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RESEARCH ARTICLE

Perception and knowledge of dietary supplements use among University Students from Lahore Pakistan

Muhammad Waseem Riaz[1], Muhammad Saad Azam[2], Shiza Ashraf[3], Nauman Ismat Butt[4*], Barak Waris[5], Muhammad Sohail Ajmal Ghoauri[6]

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Abstract

Background & Objective: Dietary supplementation has gained popularity, particularly among the young population, but their knowledge and attitudes toward these supplements remain underexplored. Understanding their level of knowledge and perceptions is essential for promoting informed and responsible use of dietary supplements. The present study aimed to assess the knowledge and practices toward dietary supplementation among university students, focusing on their awareness, reasons for use or non-use. **Methods:** This descriptive cross-sectional study was conducted at Superior University Lahore Pakistan. Eighty university students of both genders were enrolled in the study after taking informed consent using non-probability consecutive sampling technique. Students with a present or past diagnosis of nutritional deficiencies were excluded. Demographic information was noted. A structured questionnaire comprising of 2 domains was filled by the participants: first domain was regarding knowledge of dietary supplementation; and second domain was about practices. All the data was entered into SPSS version 26 for analysis. **Results:** Majority of the participants (45, 56.2%) were aged ≤25 years and 51 (63.7%) were females. Seventeen (21.2%) were postgraduate while 63 (78.8%) were graduate level students. Most of the participants (42, 52.5%) belonged to middle socioeconomic status. In the present study 39 (48.8%) had heard of dietary supplementation and 33 (41.3%) reported using dietary supplementation themselves. The most common reasons for using dietary supplementation were for cosmetic reasons (16, 20.0%) and for weight loss (09, 11.2%). The most common reasons for not using dietary supplementation were expensiveness (19, 23.7%) and fear of adverse effects (13, 16.3%). **Conclusion:** While nearly half of the participants had heard of dietary supplementation, a smaller percentage were actually using supplements, with cosmetic reasons and weight loss being the most common motivations. These findings highlight the need for further education on the benefits, risks, and affordability of dietary supplements, especially among younger populations.

Keywords: Dietary supplementation, University students, Awareness, Practice, Knowledge.

[1, 2, 3] MBBS, House Physician
Department of Medicine & Allied, Chaudhary Muhammad Akram Teaching and Research Hospital, Azra Naheed Medial College, Superior University Lahore Pakistan

[4] MBBS, CHPE, CHR, FCPS Medicine, FCPS Rheumatology
Assistant Professor, Department of Medicine & Allied, Chaudhary Muhammad Akram Teaching and Research Hospital, Azra Naheed Medial College, Superior University Lahore Pakistan

[5] MBBS, House Physician
Department of Medicine, Chaudhary Muhammad Akram Teaching and Research Hospital, Azra Naheed Medial College, Superior University Lahore Pakistan

[5] MBBS, House Physician
Department of Medicine, Chaudhary Muhammad Akram Teaching and Research Hospital, Azra Naheed Medial College, Superior University Lahore Pakistan

*) *corresponding author*

Nauman Ismat Butt
MBBS, CHPE, CHR, FCPS Medicine, FCPS Rheumatology
Superior University Lahore Pakistan
Email: nauman_ib@yahoo.com

INTRODUCTION

The World Health Organization (WHO) reports that over 2 billion people worldwide suffer from vitamin and mineral deficiencies (Blumberg et al., 2018). The United Nations agencies report that 821 million people are malnourished, increasing the risk of micronutrient deficiencies (D'Alessandro et al., 2022). A balanced diet is essential for good health and preventing chronic diseases, as well as supporting proper development, including dento-facial growth. Malnutrition, often due to micronutrient deficiencies, is a significant health issue in developing countries. Dietary supplements play a vital role in addressing these deficiencies and can help improve

performance, boost immunity, reduce stress, and aid in weight loss (D'Alessandro et al., 2022; Žeželj et al., 2018). For example, creatine enhances performance by increasing ATP availability during exercise, while Vitamin C and Zinc support immune function. Ashwagandha helps reduce stress by regulating cortisol levels and green tea extract promotes weight loss by increasing metabolism through its catechins, especially EGCG.

A dietary supplement is defined as a product in the form of a pill, capsule, tablet, or liquid containing dietary ingredients like vitamins, minerals, herbs, amino acids, or botanicals, and is intended to be taken orally as a nutritional supplement. These products are meant to complement the diet but are not designed to treat diseases or health conditions. The use of dietary supplements, including multivitamins, has surged in recent decades, with billions worldwide taking multivitamin-multimineral (MVMM) supplements to improve health, prevent diseases, or address deficiencies in vitamins and minerals (D'Alessandro et al., 2022; Žeželj et al., 2018). In developed countries, approximately 20-30% of the population uses such supplements. Commonly used supplements include multivitamins (for general health and nutrition), omega-3 fatty acids (for heart health) and protein supplements (for muscle building and recovery). Additionally, probiotics are often used for gut health, while vitamin D is widely used to support bone health, especially in regions with limited sunlight exposure. While dietary supplements can be beneficial, overuse or excessive intake may lead to adverse effects such as gastrointestinal issues especially with iron supplements, interactions with other medications (such as aspirin), and ineffectiveness (Ronis et al., 2018; Wang et al., 2022). A recent study in Pakistan found that while 85% of participants used supplements, over 50% were unaware of their potential harmful effects, and the majority lacked knowledge about the proper indications for use (Qidwai et al., 2012).

University students represent a unique demographic due to their transitional life stage, exposure to health trends, and increasing autonomy over dietary and lifestyle choices. However, their health-related decisions are often influenced by peer pressure, perceived body image ideals, and misinformation. This highlights the importance of investigating supplement use behaviors in this group, especially in regions like Pakistan where data is limited. Despite global research on dietary supplement use, there remains a gap in local, context-specific studies focused on university students in developing countries, including Pakistan. In developing countries, youth often use dietary supplements like multivitamins, protein powders and weight loss supplements due to trends for improved health, muscle gain, or weight loss. These trends highlight the need for education on the responsible use of supplements, as many rely on them without proper understanding or professional guidance. Motivations among youth for using supplements are often rooted in a combination of health aspirations, aesthetic goals, academic or athletic performance, and emotional wellbeing. This reflects broader youth health dynamics, where health behavior is influenced by both rational knowledge and social/psychological factors.

To interpret these behaviors, health behavior theories such as the Health Belief Model (HBM) and Theory of Planned Behavior (TPB) can be applied. According to the HBM, perceived susceptibility to nutrient deficiencies, perceived benefits of supplements, and cues to action (e.g., peers or media) shape behavior. TPB highlights how attitudes, subjective norms, and perceived control influence supplement intake decisions. These models help explain why students may rely on supplements even in the absence of professional recommendations. Given the global trend in dietary supplement use, particularly among the young populations who often use these products as trends rather than based on professional recommendations, the present study aims to evaluate their knowledge, attitudes, and practices regarding dietary supplements. Understanding their level of knowledge and perceptions is essential for promoting informed and responsible use of dietary supplements. Sociocultural factors also play a critical role. Youth in Pakistan are increasingly exposed to globalized beauty standards, fitness culture, and diet trends that influence supplement consumption. Moreover, social media platforms like Instagram, TikTok, and YouTube are powerful channels for disseminating both information and misinformation, often promoting supplement use through influencers and non-expert endorsements. The primary objective of this study was to assess the level of knowledge and the practices related to dietary supplementation among university students in Lahore, Pakistan. Specifically, the study aimed to determine the proportion of students who were aware of dietary supplements, assess their personal use of dietary supplements and the frequency of use, identify the main reasons for using or avoiding dietary supplements, and explore the common sources of information regarding dietary supplements. These objectives were set to understand the awareness, attitudes, and behaviors surrounding dietary supplementation among university students in Pakistan, with a focus on promoting informed and responsible usage. By understanding the knowledge, motivations, and sociocultural influences that shape students' supplement use, this study aims to contribute to the evidence base necessary for promoting informed, safe, and health-oriented behaviors among young adults in Pakistan.

METHODS

Study Design, Setting and Duration:

This was a descriptive cross-sectional study conducted at Superior University Lahore Pakistan over a period of three months from March to May 2024 to assess the knowledge, attitudes and practices related to dietary supplement use among university students.

Population and Sample:

The target population included university students aged 18 to 30 years who were enrolled in undergraduate and postgraduate programs across various academic faculties, including health sciences, business, social sciences and engineering. A total of 80 students, both male and female, were recruited using a non-probability consecutive sampling technique. Inclusion criteria consisted of students who were currently enrolled at Superior University and who voluntarily agreed to participate after being informed about the nature of the study. Students with a current or past diagnosis of nutritional deficiencies, such as iron deficiency anemia, vitamin B12 deficiency, or vitamin D deficiency, were excluded from participation to avoid potential bias resulting from medically indicated supplement use. The sample size of 80 was selected based on logistical feasibility and precedent in similar exploratory studies. A

formal sample size calculation was not conducted due to the preliminary nature of the research.

Research Instruments:

Data were collected through a structured, self-administered questionnaire designed to evaluate students' knowledge and practices regarding dietary supplements. The questionnaire was developed after a review of relevant literature and consultation with experts in public health and nutrition. It consisted of two major sections. The first section gathered demographic data including age, gender, level of education, academic discipline and socioeconomic background. The second section comprised two domains: first domain dealt knowledge of dietary supplements, assessed through five Yes/No questions focusing on basic understanding, risks, and benefits; and second domain dealt practices related to supplement use, evaluated through four multiple-choice questions covering frequency of use, types of supplements taken, reasons for consumption or avoidance, and sources of information. Although the questionnaire was based on existing instruments and refined with expert input, it was not formally validated or pilot-tested prior to use, which is acknowledged as a limitation of the study.

Data Collection Procedure:

Participants were approached in classrooms and university common areas. After being briefed about the purpose, process and voluntary nature of the study, those who agreed to participate provided written informed consent. The questionnaire was then distributed in paper form and completed on-site in the presence of a member of the research team, who was available to provide clarification if needed. The average time taken to complete the questionnaire was approximately 10 to 15 minutes. Completed surveys were collected immediately and stored securely for subsequent analysis.

Data Analysis:

All responses were entered into IBM SPSS Statistics version 23 for analysis. Descriptive statistics, including frequencies and percentages, were used to summarize demographic characteristics, levels of knowledge and reported practices related to dietary supplement use. Given the exploratory nature of the study, no inferential statistical analysis was performed.

Ethical Considerations:

This study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki (1964), as revised in 2000. All participants were provided with detailed information about the study's aims, procedures and potential benefits, and were assured that participation was entirely voluntary. Written informed consent was obtained from each participant prior to data collection. Confidentiality and anonymity were strictly maintained throughout the study. No identifying information was collected on the questionnaires. All physical data were securely stored and accessible only to the principal investigators. Data were used solely for research purposes and were not shared with any third parties.

RESULTS OF STUDY

Out of the 80 students enrolled, 51 (63.7%) were females. Majority of the participants (45, 56.2%) were aged ≤25 years as shown in Table 1. Seventeen (21.2%) were enrolled in postgraduate programs while 63 (78.8%) were undergraduate level students. Most of the participants (42, 52.5%) belonged to middle socioeconomic status. These demographics suggest that the findings are particularly reflective of younger, middle-class female students pursuing early-stage higher education. As depicted in Table 2, in the present study 39 (48.8%) had heard of dietary supplementation and 33 (41.3%) reported using dietary supplementation themselves. This reveals a moderate level of awareness but a more limited translation into personal health behavior. Importantly, those with awareness were more likely to perceive supplements as beneficial and safe, pointing to a positive association between knowledge and usage behavior. Interestingly, a majority of students (60.0%) believed that dietary supplements could replace diet and exercise, which reveals a knowledge gap and possible misconception about the role of supplements in overall health.

Table 1. Demographic Variables of the participants

Demographic Variables		Frequency (%)
Age	≤25 years	45 (56.2%)
	≥26 years	35 (43.8%)
Gender	Female	51 (63.7%)
	Male	29 (36.3%)
Education Class	Graduate	63(78.8%)
	Postgraduate	17 (21.2%)
Socio-economic Background	Low	12 (15.0%)
	Middle	42 (52.5%)
	High	26 (32.5%)

Table 2. Responses to questions about dietary supplementation knowledge

Questions	Response	Frequency (%)
Have you heard of dietary supplementation?	Yes	39 (48.8%)
	No	41 (51.2%)
Do you think dietary supplementation improves health?	Yes	48 (60.0%)
	No	32 (40.0%)
Have you previously taken a dietary supplement?	Yes	33 (41.3%)
	No	47 (58.7%)
Do you think dietary supplementation is safe?	Yes	48 (60.0%)
	No	32 (40.0%)
Can dietary supplementation replace healthy diet & exercise?	Yes	48 (60.0%)
	No	32 (40.0%)

This misconception may be influenced by the sources of information: more than half of the students (41, 51.2%) had no reliable source of supplement-related knowledge and only a minority cited medical professionals (06, 7.5%) as their primary source. Instead, family and friends (18, 22.5%) and social media (15, 18.8%) were common influencers, which may contribute to misinformation and trend-driven consumption as depicted in Table 3. The most common reasons for using dietary supplementation were for cosmetic reasons (16, 20.0%) and for weight loss (09, 11.2%) as shown in Table 3. This underscores a non-clinical, appearance-oriented motivation among students, especially prevalent among female participants. In contrast, usage for bodybuilding (05, 6.3%) was less

common, likely reflecting the smaller male proportion in the sample. The most common reasons for not using dietary supplementation were expensiveness (19, 23.7%) and fear of adverse effects (13, 16.3%), highlighting financial and safety concerns as deterrents as depicted in Table 3. Meanwhile, lack of knowledge (06, 7.5%) and interest (09, 11.2%) were less commonly reported, indicating that while general awareness may exist, economic and safety perceptions more strongly shape avoidance behavior.

Table 3. Responses to questions about dietary supplementation practices

Questions	Response	Frequency (%)
Source of dietary supplementation Awareness	Family or friends	18 (22.5%)
	Medical Consult	06 (7.5%)
	Social media	15 (18.8%)
	Not Aware	41 (51.2%)
Frequency of dietary supplementation use	Daily	10 (12.5%)
	Weekly	15 (18.8%)
	Monthly	08 (10.0%)
	Never	47 (58.7%)
Reason for using dietary supplementation	For nutrition	03 (3.8%)
	For bodybuilding	05 (6.3%)
	For weight loss	09 (11.2%)
	For cosmetic reasons	16 (20.0%)
	Never used	47 (58.7%)
Reason for not using dietary supplementation	Lack of knowledge	06 (7.5%)
	Lack of interest	09 (11.2%)
	Fear of adverse effects	13 (16.3%)
	Expensive	19 (23.7%)
	Taking supplementation	33 (41.3%)

DISCUSSION

Given the vast number of dietary supplements available in the market, it should be prioritized those that are most commonly used by university students, such as multivitamins, protein supplements and weight-loss products, particularly those that are used without proper knowledge or medical guidance. The selection would be based on the prevalence of use, public awareness, and the potential health risks associated with these supplements. To evaluate the effectiveness of dietary supplements, the authors recommend conducting rigorous scientific studies, including randomized controlled trials (RCTs), meta-analyses and longitudinal studies, to assess their impact on health outcomes such as nutrition, body composition and wellness. Collaboration with healthcare professionals would be essential in ensuring that studies reflect real-world use. The focus should be on promoting nutrient-dense food choices and advising students to use supplements only when necessary, such as in cases of documented deficiencies. The campaign would also emphasize the importance of consulting a healthcare provider before using any supplement, as individual needs may vary based on health status and lifestyle factors.

In terms of dietary supplementation knowledge, nearly half (48.8%) of the participants had heard of dietary supplements and 60% believed they improved health and were safe in the present study. However, 58.7% had never taken a supplement themselves. A significant portion (60%) thought dietary supplements could replace a healthy diet and exercise. Wierzejska et al. (2014) reported that majority of participants knew about dietary supplements, over 55% did not consider dietary supplements as foodstuffs and more than 40% classified them as drugs. Al-Johani et al. (2018) demonstrated that 44.6% of female medical students used dietary supplements in Dammam, Saudi Arabia. In the study by Alhomoud et al. (2016) 39% University students reported consuming dietary supplements, with the primary reasons being to maintain good health and ensure adequate nutrition while 49% believed that the best way to obtain nutrients is through a combination of food and dietary supplements. This disconnect between perceived benefits and personal practice may be understood through the lens of health behavior theories, such as the Health Belief Model (HBM). According to HBM, individuals are more likely to engage in health-related behaviors if they perceive susceptibility to a condition and believe the behavior will reduce the risk. In this study, low supplement use despite high perceived benefit suggests limited perceived need or susceptibility, potentially due to a lack of nutritional self-awareness or diagnosis. Furthermore, the belief held by 60% of participants that supplements can replace diet and exercise reflects a misinterpretation of health behaviors, influenced more by social norms and perceived convenience than by informed decision-making.

As for the sources of information in the present study, most participants (51.2%) were not aware of dietary supplements, while others relied on family, friends, and social media for information. Regarding usage, 58.7% had never used dietary supplements, and the most common reasons for use included cosmetic purposes (20%) and weight loss (11.2%). Among those who did not use supplements, the primary reasons were cost (23.7%), fear of adverse effects (16.3%), and lack of knowledge (7.5%) in the present study. Sekhri and Kaur (2014) reported that 68.33% of participants used multivitamin supplements, with 69.5% using them on doctor's advice, 18.2% self-prescribing and 12.1% following advice from friends or family. However, the majority was unaware of the correct indications for multivitamin use and 76% lacked knowledge about natural sources of these vitamins (Sekhri & Kaur, 2014). In the study by Finamore et al. (2022) 46.4% of participants used dietary supplements, primarily to increase muscle mass (36.9%) and aid in muscle repair (35.1%) with gym trainers being the main source of information. Naqvi et al. (2018) demonstrated that 29.4% of college students used dietary supplements, with maintaining general health and well-being the most common reasons for use. A recent study from Karachi concluded that 48.2% university students used dietary supplements with medical opinion being the most common reason, reported in 25% (Naqvi et al., 2019).

The Theory of Planned Behavior (TPB) also offers insight: students' practices may be driven more by attitudinal and normative beliefs, particularly those shaped by peers and social media, rather than objective knowledge or professional guidance. Cosmetic reasons and weight loss are the leading motivations, revealing appearance-oriented behavioral patterns typical in youth, often reinforced by cultural and media influences rather than medical advice. A critical factor shaping both knowledge and practice is the source of information. These sources likely shape not just behaviors but also misbeliefs–such as equating supplements with shortcuts to fitness or wellness. From a health policy and campus education perspective, these findings signal an urgent need for targeted interventions. University students represent a formative demographic in

shaping lifelong health behaviors. Educational institutions must develop structured health promotion programs that emphasize critical evaluation of supplement claims, debunk myths, and promote responsible usage. Collaborations between campus health services, nutrition experts, and faculty can help incorporate evidence-based nutrition education into university curricula. Given the prominent role of social media, leveraging these platforms to deliver expert-led content in accessible formats (videos, infographics) could help combat misinformation at its source.

The study has several limitations including limited sample size. It focused solely on university students, limiting the generalizability of the findings to other populations. Participants may have struggled to accurately answer questions due to a lack of understanding, which could affect the validity of the results. Furthermore, one of the key limitations of this study is that the structured questionnaire used was not formally validated. Although it was designed to cover relevant domains of knowledge and practices regarding dietary supplementation, the lack of prior validation may impact the reliability and accuracy of the responses. Participants may have interpreted questions differently, which could influence the consistency of the data collected. Additionally, the study's findings may be influenced by the unique characteristics and culture, making them less representative of other universities or educational institutions. One potential limitation of this study is the influence of socioeconomic status on dietary supplement use, as participants from low socioeconomic backgrounds may be less likely to afford or access supplements. The demographic composition particularly the high proportion of females and middle socioeconomic status could also bias the findings, as these groups may have different health priorities and access levels compared to males or lower-income students. This could result in a higher number of "no" responses, particularly regarding supplement use, and may introduce bias into the findings. Future studies should aim to include a more balanced representation of participants across different socioeconomic groups to better understand how these factors affect knowledge and practices related to dietary supplementation. However, our study emphasizes the need to improve knowledge and awareness about dietary supplements among University students specifically, and the young population on the whole, by promoting evidence-based information and responsible use.

We recommend implementing targeted educational campaigns, encouraging students to consult credible sources like healthcare professionals, and fostering collaboration between educational institutions and experts. Based on the findings of this study, we recommend launching a campaign to increase awareness and education about the responsible use of dietary supplements among university students. The campaign should focus on providing evidence-based information about the benefits, risks, and appropriate use of dietary supplements. It is crucial to encourage students to consult healthcare professionals before using supplements and to emphasize that supplements should complement, not replace, a balanced diet. Additionally, addressing concerns about the affordability and accessibility of dietary supplements will help ensure that students can make informed and responsible choices regarding their health and well-being. The findings also have broader implications for national public health strategy. As supplement use rises in low- and middle-income countries, regulatory frameworks must be strengthened to ensure safe access and marketing of these products. Policies mandating clearer labeling, public education campaigns, and subsidized access to nutritional counseling could reduce reliance on unverified sources and trend-driven use. Raising awareness of the risks and benefits, integrating supplement-related content into curricula, and conducting ongoing research and evaluation will ensure students make informed decisions. These strategies will help students adopt responsible supplement use to improve their health and well-being.

CONCLUSION

While nearly half of the participants had heard of dietary supplements, fewer actually used them, with cosmetic reasons and weight loss as the main motivations. Female students and those from middle to high socioeconomic backgrounds were more likely to use supplements, while cost, fear of side effects, and lack of knowledge deterred others, especially from lower socioeconomic groups. Many students misunderstood supplements' role, often believing they could replace a healthy diet and exercise, highlighting significant gaps in health literacy. This study provides valuable insight into the knowledge, attitudes, and behaviors of university students in Pakistan, emphasizing the need for targeted education programs to promote responsible supplement use, improve access to reliable information, and encourage consultation with healthcare professionals. Enhancing health literacy through these efforts can support safer, evidence-based decisions among young adults.

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ADDITIONAL INFORMATION

Correspondence All inquiries and requests for additional materials should be directed to the Corresponding Author.

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