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KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO DIETARY SUPPLEMENTS IN UNDERGRADUATE STUDENTS

Original Article

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ABSTRACT

Background: The global rise in dietary supplement use is particularly notable among health-oriented populations, including university students in medical and allied health fields. These individuals, as future healthcare providers, play a crucial role in shaping community health behaviors. However, inconsistent knowledge, attitudes, and practices (KAP) related to supplement use—especially in developing countries like Pakistan—raise concerns about safety, efficacy, and public health outcomes.

Objective: To assess the knowledge, attitudes, and practices regarding dietary supplements among undergraduate female students enrolled in health sciences programs at Peoples University of Medical and Health Sciences for Women (PUMHSW), Nawabshah.

Methods: A descriptive cross-sectional study was carried out among 400 undergraduate students from BSPH, DPT, Pharm-D, and BSN departments using a non-probability quota sampling approach. Data were collected via a structured, pre-validated, self-administered questionnaire developed in English, covering socio-demographic details, knowledge, attitudes, and practices. Ethical approval was obtained, and informed verbal consent was secured. Data were analyzed using SPSS version 25, and results were reported using descriptive statistics including frequencies, percentages, means, and standard deviations.

Results: Out of 400 participants, 100% were female with a mean age of 20.85 ± 1.66 years. Supplement use was reported by 71.3%, with 60.5% using multivitamins and minerals. Preventive benefits were acknowledged by 82%, but 62.5% incorrectly believed supplements could treat diseases. Only 46% were aware of potential side effects. Simultaneous use of more than one supplement was reported by 26%, and 24.5% experienced adverse effects. Positive attitudes were common, with 67% believing supplements are necessary for everyone and 73% perceiving them as low-risk.

Conclusion: While attitudes toward dietary supplements were generally positive, substantial knowledge deficits and risky usage behaviors were evident. Targeted educational strategies are urgently needed to promote safe, evidence-based supplement use among future healthcare professionals.

Keywords: Attitude, Dietary Supplements, Female, Health Behavior, Knowledge, Multivitamins, Students.

INTRODUCTION

Dietary supplements have emerged as a prominent element of contemporary health behavior, increasingly adopted across diverse populations to support overall well-being and bridge nutritional gaps. Defined by the U.S. Food and Drug Administration (FDA) as orally consumed products containing dietary ingredients such as vitamins, minerals, herbs, amino acids, or other bioactive substances, these supplements are widely available in various forms including tablets, capsules, powders, and liquids (1). While not intended to diagnose, treat, or cure diseases, they are widely promoted for enhancing immunity, supporting metabolic health, preventing chronic illnesses, and compensating for dietary deficiencies (2). Over the past few decades, global use of dietary supplements has risen significantly, driven by greater public awareness of preventive healthcare, increased health consciousness, lifestyle modifications, and persuasive marketing strategies (3). The global dietary supplements market, valued at over USD 140 billion in 2020, is projected to grow to USD 278 billion by 2024 (2). This surge in demand is evident in both developed and developing nations, where supplements are used for a range of purposes such as managing body weight, promoting skin health, alleviating stress, and reducing the risk of chronic conditions including cardiovascular disease, osteoporosis, and certain cancers (4). In this context, university students, especially those pursuing health-related disciplines—constitute a key demographic due to their academic pressures, erratic eating patterns, and often sedentary lifestyles, which collectively contribute to increased supplement use as a perceived compensatory strategy (5). These students' behaviors and perceptions surrounding supplement intake are not only reflective of their personal health management but also hold future implications, as they transition into roles that will shape public health behaviors and clinical guidance (6).

Despite their widespread use and perceived safety due to their "natural" origin, dietary supplements can pose significant health risks when consumed inappropriately. Adverse effects ranging from gastrointestinal issues and allergic reactions to hepatotoxicity and interactions with pharmaceutical drugs have been documented in literature (7). In countries with underdeveloped regulatory frameworks, such as Pakistan, the proliferation of unregulated herbal and nutritional supplements exacerbates the potential for misuse and related complications (8). Public perception of supplement safety is frequently influenced by unverified online information, peer recommendations, and misleading commercial advertisements, further undermining informed decision-making (9). A critical issue is the inadequate formal education on dietary supplements among both healthcare professionals and students. Studies from Malaysia, Jordan, Saudi Arabia, and Bangladesh have highlighted that while university students often display a positive attitude toward supplements, their actual knowledge regarding appropriate usage, safety, dosage, and potential interactions remains moderate to low (10). Many students rely on non-professional sources such as friends, family, or social media for information, rather than evidence-based guidance (11). In Pakistan, complementary and alternative medicine (CAM) practices, including the use of herbal and nutritional supplements, are deeply rooted in cultural norms. However, systematic investigations into the knowledge, attitudes, and practices (KAP) of young adults regarding supplements remain sparse (12). A study conducted in Punjab reported that although a majority of students viewed supplements positively, a substantial portion lacked awareness about associated risks and drug interactions (13).

Media exposure through television, the internet, fitness influences, and health-related blogs further shapes students' perceptions, often promoting supplement use without fostering critical appraisal skills or evidence-based understanding (14). Consequently, while many students use supplements with the intent of improving health, they may do so without adequate knowledge or risk assessment (15). Factors such as gender, parental education, and socioeconomic status have also been shown to influence supplement consumption patterns, with female students and those from higher-income families more likely to engage in supplement use, often motivated by health preservation and aesthetic considerations (16). Given these dynamics, understanding the KAP of dietary supplement use among undergraduate students is essential not only from a clinical safety standpoint but also for informing educational and public health interventions. As these students evolve into future healthcare providers, their current behaviors and beliefs are likely to influence clinical practice, community health education, and national health policy. This study, therefore, aims to assess the knowledge, attitudes, and practices related to dietary supplement use among undergraduate students at a leading health sciences university in Pakistan, with the objective of identifying gaps in awareness and providing evidence to support curriculum development and regulatory oversight.

METHODS

This descriptive cross-sectional study was conducted at the Peoples University of Medical and Health Sciences for Women (PUMHSW), Nawabshah, with the aim of evaluating the knowledge, attitudes, and practices related to dietary supplement use among undergraduate students enrolled in Allied Health Sciences programs. The target population included students from four academic disciplines: Bachelor of Science in Public Health (BSPH), Doctor of Physical Therapy (DPT), Doctor of Pharmacy (Pharm-D), and Bachelor of Science in

Nursing (BSN). To ensure balanced representation from each department, non-probability quota sampling was employed. The required sample size was calculated using an anticipated prevalence rate of 47.3% for dietary supplement use, based on previous literature, with a 95% confidence interval and a 5% margin of error. This yielded an estimated sample of 382 participants, which was increased to 400 to accommodate potential data losses or non-responses. Only undergraduate students enrolled in the aforementioned Allied Health programs were eligible to participate. Students enrolled in MBBS or postgraduate studies, as well as those who declined to participate, were excluded to maintain focus on the undergraduate demographic and ensure homogeneity in educational exposure.

Data collection was conducted using a structured, self-administered questionnaire prepared in English, which included three main sections: (1) socio-demographic characteristics, (2) knowledge and attitudes toward dietary supplements, and (3) self-reported practices related to their use. The questionnaire was reviewed for content validity by subject experts prior to administration. While internal consistency testing (e.g., Cronbach's alpha) was not explicitly mentioned, such reliability assessment is typically recommended for KAP studies to ensure measurement precision. The questionnaires were distributed directly by the research team after obtaining verbal informed consent from each participant. Although written consent is generally preferred in biomedical research for documentation and ethical accountability, verbal consent was accepted in this context, which may reflect cultural or institutional norms. Ethical approval for the study was obtained from the Department of Community Medicine at PUMHSW. Participants were assured of anonymity and confidentiality throughout the process, and no personally identifiable information was collected. Data were entered and analyzed using SPSS version 25. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to provide a summary of the participants' knowledge, attitudes, and practices regarding dietary supplements.

RESULTS

A total of 400 female undergraduate students from Allied Health Sciences disciplines participated in the study, with an overall mean age of 20.85 ± 1.66 years. All participants were female, as the university caters exclusively to women. Each department—Public Health, Physical Therapy, Pharmacy, and Nursing—was represented equally with 100 participants, ensuring proportionality and departmental comparability. The residential background of participants revealed that 52.2% resided in urban areas, 41.3% were from rural settings, and 6.5% lived in semi-urban locations. Regarding socioeconomic classification, 44.0% belonged to middle-income households (PKR 40,000–100,000/month), 34.2% were from low-income families (below PKR 40,000), and 21.8% belonged to high-income groups (above PKR 100,000). Knowledge assessment showed that 72.5% believed dietary supplements were safe because they are food-based, while 72.0% stated they are composed of natural ingredients or herbs. A majority (82.0%) agreed that supplements can prevent disease; however, 62.5% also believed supplements can treat disease. Notably, 77.0% considered it safe to use dietary supplements alongside medications, a belief that may present safety concerns. Furthermore, 85.5% trusted recommendations from health professionals regarding supplement use. While 62.2% of students felt they had sufficient information about the effectiveness of supplements, only 46.0% were aware of potential side effects.

In terms of attitudes, 61.0% agreed and 10.4% strongly agreed that supplements can prevent chronic illnesses with regular use. Meanwhile, 78.7% agreed or strongly agreed that supplements are not necessary if one follows healthy dietary habits. Despite this, 67.0% felt that supplements are necessary for everyone regardless of age, indicating a generalized belief in universal supplementation. Approximately half of the students (50.6%) considered supplements to be generally harmless, and 73.0% believed they pose minimal risk of adverse effects. Practices related to supplement use demonstrated high prevalence, with 71.3% of students currently using dietary supplements and 62.7% having consumed them in the past six months. The most commonly consumed products were multivitamins and minerals (60.5%). Usage frequency varied: 29.7% used supplements daily, 25.5% weekly, and 26.0% occasionally, while 18.8% reported no current usage. Importantly, 26.0% of respondents reported consuming more than one supplement simultaneously. Adverse effects were experienced by 24.5% of users, which included symptoms such as gastrointestinal discomfort, nausea, dizziness, and abdominal pain. Regarding motivations for use, 45.2% of participants reported using supplements to maintain good health, 22.8% for overcoming nutritional deficiencies, 6.0% for weight loss, and 4.5% for enhancing physical appearance. A total of 21.5% indicated "not applicable," reflecting either irregular or non-specific use.

Table 1: Socio-Demographic Statistics

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE (%)
Age (Mean ± SD)	–	–	20.85 ± 1.66
Gender	Female	400	100.0
Department	BSPH	100	25.0
	DPT	100	25.0
	Pharm-D	100	25.0
	BSN	100	25.0
Area of Residence	Urban	209	52.2
	Semi-urban	26	6.5
	Rural	165	41.3
Socioeconomic Status	Low (< 40,000 PKR)	137	34.2
	Middle (40,000–100,000 PKR)	176	44.0
	High (> 100,000 PKR)	87	21.8

Table 2: Knowledge Regarding Dietary Supplements

KNOWLEDGE STATEMENT	YES (%)	NO (%)	DON'T KNOW (%)
Supplements are safe because they are food items	72.5	21.5	6.0
Made from natural ingredients/herbs	72.0	17.8	10.2
Can prevent disease	82.0	18.0	–
Can treat disease	62.5	37.5	–
Can be used simultaneously with medicines	77.0	23.0	–
Recommended by health professionals are effective	85.5	14.5	–
Have sufficient information about supplement effectiveness	62.2	37.8	–
Have sufficient information about supplement side effects	46.0	54.0	–

Table 3: Attitude Towards Dietary Supplements

ATTITUDE STATEMENT	STRONGLY AGREE (%)	AGREE (%)	DISAGREE (%)	STRONGLY DISAGREE (%)
Supplements prevent chronic illness if used regularly	10.4	61.0	25.8	2.8
Not necessary if having healthy eating habits	25.2	53.5	20.3	1.0
Necessary for everyone regardless of age	15.5	51.5	30.0	3.0
Supplements are generally harmless	9.8	40.8	45.3	4.1
Safe with minimum risk of adverse effects	10.3	62.7	23.5	3.5

Table 4: Practices Related to Dietary Supplements

PRACTICE VARIABLE	RESPONSE CATEGORY	FREQUENCY	PERCENTAGE (%)
Currently using dietary supplements	Yes	285	71.3
	No	115	28.7
Used dietary supplements in the last 6 months	Yes	251	62.7
	No	149	37.3
Most commonly used supplement	Multivitamins & minerals	242	60.5
Frequency of usage	Daily	119	29.7
	Weekly	102	25.5
	Occasionally	104	26.0
	No use	75	18.8

PRACTICE VARIABLE	RESPONSE CATEGORY	FREQUENCY	PERCENTAGE (%)
Experienced any side effects	Yes	98	24.5
	No	302	75.5
Consuming more than one supplement simultaneously	Yes	104	26.0
	No	296	74.0
Reason for supplement use	Maintain good health	181	45.2
	Overcome nutritional deficiencies	91	22.8
	Weight loss	24	6.0
	Enhance physical appearance	18	4.5
	Not applicable	86	21.5

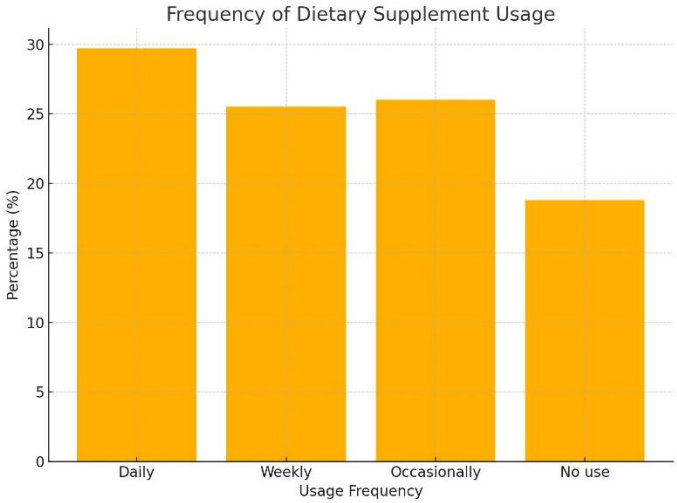

Figure 1 Frequency of Dietary Supplement Usage

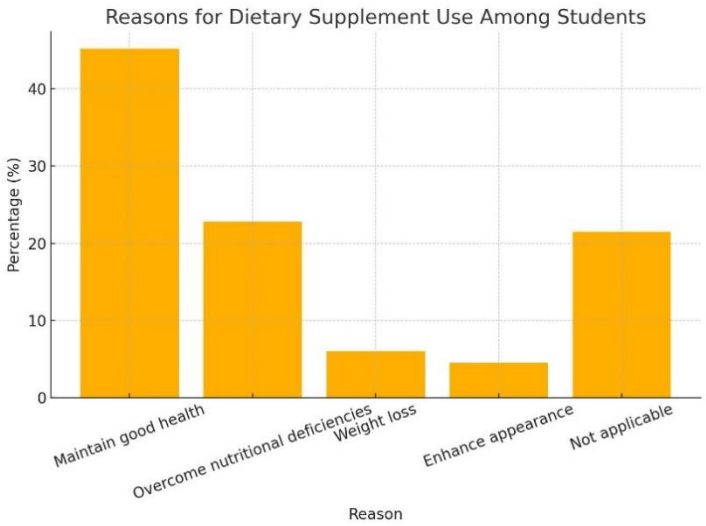

Figure 2 Reason for Dietary Supplement Use Among Students

DISCUSSION

The present study evaluated the knowledge, attitudes, and practices related to dietary supplement use among female undergraduate students from health sciences disciplines at a public university in Pakistan. The findings revealed a notably high prevalence of supplement use (71.3%), surpassing previously reported figures from similar cohorts in Karachi and other international contexts such as Jordan and Bangladesh (14). This elevated usage rate may reflect growing health awareness among young adults, increased accessibility of supplements, and heightened influence of digital media, particularly among populations pursuing health-related education. Despite a generally favorable attitude towards dietary supplements, considerable misconceptions were observed in the participants' understanding of their role and safety. While the preventive potential of supplements was correctly recognized by most participants (82.0%), a significant proportion (62.5%) misperceived them as curative agents. This conflation of preventive and therapeutic purposes appears consistent with findings from other regions and underscores the widespread impact of unregulated health marketing and insufficient curricular emphasis on pharmacological distinctions (15). Furthermore, although most students trusted the advice of healthcare professionals (85.5%), only 46.0% demonstrated awareness of potential side effects—an area of concern also documented in regional studies conducted in similar educational settings (16). The gap between perceived effectiveness and risk awareness suggests an imbalance in the information available to students, especially in environments where dietary supplements are marketed without stringent oversight.

The attitudinal data further supported the presence of overconfidence in supplement safety, with 73.0% of respondents regarding them as low-risk. The belief held by 67.0% of students is that supplements are universally necessary regardless of age points to a generalized

and potentially misguided perception of supplementation as essential for all. While such perspectives may be shaped by promotional messaging and peer discourse, they deviate from evidence-based guidelines that emphasize individualized assessment and clinical justification (17,18). These beliefs may drive unnecessary or inappropriate usage, potentially normalizing supplement reliance in the absence of dietary insufficiencies. In practical terms, multivitamins and mineral supplements were the most commonly consumed products (60.5%), mirroring consumption patterns noted in studies from Saudi Arabia and Serbia (19). However, the practice of using multiple supplements simultaneously (26.0%) and the reporting of side effects by nearly a quarter of users (24.5%) highlight issues of safety and misuse. Commonly reported adverse effects such as gastrointestinal disturbances and dizziness raise concerns about unsupervised intake, dosage errors, or interactions—especially given that many students lacked awareness of contraindications (20). These findings emphasize the need for tailored interventions to promote informed usage among future healthcare professionals, particularly in countries like Pakistan where regulatory controls remain underdeveloped (21).

Motivations for supplement use largely centered on general health maintenance (45.2%) and correction of nutritional deficiencies (22.8%), but aesthetic concerns such as weight loss and appearance enhancement were also evident. Such motivations, while not uncommon among female students globally, reflect the broader societal pressures and health anxieties that can influence health-related behavior (22). Importantly, the study highlights how perceptions and practices, though shaped within an academic health sciences context, do not always align with best practices in clinical nutrition or pharmacovigilance. This study offers important insights into the dietary supplement behaviors of health sciences students—a population poised to influence future public health and clinical counseling. A key strength lies in its diverse sample, balanced across departments and socioeconomic backgrounds, enhancing the representativeness within the institutional context. However, the use of non-probability quota sampling limits the generalizability of findings to the broader student population. Moreover, the reliance on self-reported data introduces the possibility of recall and social desirability bias, and the absence of inferential statistical analyses limits the ability to identify associations between knowledge levels and demographic variables. Future studies should aim to incorporate stratified analyses, longitudinal designs, and mixed methods to better understand the evolving dynamics of supplement use and the influence of educational interventions. Integrating a robust nutrition module on dietary supplements into the undergraduate health sciences curriculum could address observed misconceptions, improve critical appraisal skills, and foster safe practices. Additionally, regulatory and institutional policies should prioritize accurate labeling, controlled marketing, and awareness campaigns to curb misuse and encourage evidence-based health behavior. In conclusion, the findings underscore a compelling need for comprehensive educational and regulatory strategies to address the knowledge-practice gaps observed among health sciences students. Equipping future healthcare professionals with accurate, balanced, and clinically relevant information on dietary supplements is essential to promote public safety and informed healthcare delivery.

CONCLUSION

This study concluded that dietary supplement use is prevalent among undergraduate health sciences students, with a strong preference for multivitamins and generally positive attitudes toward their benefits. However, notable gaps in knowledge—particularly regarding potential risks and adverse effects—underscore the need for targeted educational efforts. As these students are future healthcare providers, equipping them with accurate, evidence-based understanding of supplement use is essential not only for their own health decisions but also for their future role in guiding patient care and promoting safe public health practices.

AUTHOR CONTRIBUTION

Author	Contribution
Aqsa Kalhoro	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Sana Hanif	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Tahira Khuwaja	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Mehnaz Zardari	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

Azhar Ali Zardari	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Mehrun Nisa Soomro	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Abdul Razzaque Nohri*	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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