Original Research Article

Understanding Future Healthcare Providers' Knowledge, Attitudes, and Practices on Supplement Use at a Private Medical College in Lahore

Abstract

Background: The use of dietary supplements without healthcare provider recommendations is common, though many supplements should ideally be used under professional guidance.

Objective: This study aimed to evaluate the knowledge, attitude, and perception of future healthcare providers regarding the use of supplements.

Methods: A validated questionnaire was administered to future healthcare providers from various faculties, including medical, dentistry, and pharmacy. The questionnaire was divided into segments: demographics, attitude, knowledge, and perception regarding the use of supplements.

Results: The study found that females exhibited a more positive attitude towards the use of supplements, with a mean score of 44.43 out of 50 (SD = 2.11), compared to males who scored 39.32 (SD = 4.65). Final-year students had a better attitude compared to first-year students ($P = 0.001$, $\eta^2 = 0.213$). In terms of knowledge, females scored higher, with an average of 8.9 out of 10. Pharmacy students demonstrated better knowledge compared to students from other faculties ($P = 0.35$, $\eta^2 = 0.14$). Perception results showed that females had a more positive perception than males, and non-hostellers had a better perception compared to hostellers ($P = 0.008$, $\eta^2 = 0.18$). Overall, females, pharmacy students, and final-year students showed better knowledge, attitude, and practice regarding supplement use.

Conclusion: The study highlights the importance of targeted educational interventions to improve the knowledge, attitude, and perception of future healthcare providers regarding the appropriate use of supplements, with particular attention to gender and faculty differences.

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1. Introduction

Nutrition is a fundamental requirement for a healthy body (1). Malnutrition and poor diet are primary risk factors for diseases and disabilities (2). A healthy diet provides essential nutrients for the proper functioning, growth, and development of living cells (3). Calcium and vitamin D are crucial for bone development (4). Additionally, vitamin D plays a vital role in the prevention and management of atherosclerosis, diabetes mellitus, metabolic syndrome, cardiac remodelling, and cardiovascular diseases (5). People often use supplements to meet the major nutritional requirements for maintaining a healthy body (6). In broiler chickens, Spirulina platensis is used as a nutritional supplement to improve the quality of meat, serving as a valuable source of human protein (7).

Supplements are essential for boosting immunity, including vitamins (fat-soluble vitamins A and D, and water-soluble vitamins B12, B6, and folates) and minerals such as zinc, selenium, iron, and copper (1). The usage rate of dietary supplements among gym members is 43.8% (2). During the COVID-19 pandemic, the prevalence of vitamin C use in Saudi Arabia was 68.4% (3). In Dubai, 87.9% of the general population used vitamins (4). Among university students in Kazakhstan, supplement use is highest among swimmers, with a rate of 55.0% (5). The use of dietary supplements among pharmacy students in Saudi Arabia is 46.8% (6). In Japan, approximately 63.9% of the population uses nutritional supplements (7).

Dietary supplements are essential for individuals of all ages, tailored to the body's requirements for homeostasis and proper functioning, particularly in children and adolescents (1). Dietary fibers contribute significantly to the maintenance of pregnancy by ensuring optimal levels of iron, calcium, folate, and zinc in plasma (2). For pregnant women who avoid meat and dairy products, dietary supplements are particularly beneficial (3). The demand for nutrients like

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choline increases during pregnancy, as it is crucial for fetal development and helps prevent premature birth (4). To mitigate oxidative stress during pregnancy, antioxidants such as vitamins A, C, and E, along with selenium and zinc, play a vital role (5).

Vitamin D is a vital supplement, with cholecalciferol being the most effective form, while calcidiol and calcitriol are less suitable for use (1). In the management of osteoarthritis, hyaluronic acid (HA), chondroitin sulfate (CS), and glucosamine serve as chondroprotective dietary supplements (2). For patients with rheumatoid arthritis, dietary fibers and supplements such as probiotics, vitamin D, and the Mediterranean diet are beneficial, whereas red meat and salts have adverse effects (3). In menopausal women, decreased estrogen levels lead to reduced bone density; vitamin D is used to prevent bone fractures (4). People with cardiovascular problems benefit from supplements as well; coenzyme Q10 and vitamin D help reduce myocardial dysfunction, statin myopathy, and the risk of coronary artery disease (5).

In post-discharge colorectal cancer patients, oral nutritional supplements enhance the effectiveness of chemotherapy and reduce the risk of sarcopenia and muscle loss (1). Nutritional supplements also benefit brain health by improving memory, cognitive performance, and overall brain function (2). Creatine, a neuroprotective supplement, is effective in cases of traumatic brain injury and helps improve focus and sleep during phases of insomnia (3). Among various therapies, dietary supplements are considered one of the safest treatments for obesity and have become particularly appealing to people in the post-COVID era (4).

The objective of the current study is to evaluate the knowledge, attitude, and practice regarding supplements among future healthcare providers. Understanding supplements is crucial for guiding the general population about the basic requirements of nutrition. Nutritional deficiencies can lead to serious health issues, while an overdose of nutrients can also adversely affect health. Healthcare providers play a key role in advising on the maintenance of proper nutrition for a healthy body.

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2. Methodology

This research study employed a cross-sectional design to evaluate the knowledge, attitudes, and practices regarding supplement use among students at a private medical college in Lahore. The

study focused on final-year and pre-final-year students from the faculties of pharmacy, medicine, and dentistry. The participants were diverse in terms of age, gender, race, and living status. Conducted from August 15, 2022, to December 10, 2022, the study utilized a pre-validated questionnaire. The survey aimed to include a minimum of 60 students from each faculty, with a total of 286 students participating.

Inclusion Criteria

The study included all pre-final and final-year medical, dental, and pharmacy students who were willing to participate and complete the distributed form.

Exclusion Criteria

1. The exclusion criteria include first-year, second-year, and third-year students of medicine, dental, and pharmacy at the private medical college.
2. Students of physiotherapy, biotechnology, and nutrition sciences at the private medical college are also excluded from the study.

Data Collection Method

The questionnaire was designed to evaluate the knowledge, attitudes, and practices regarding supplement use among students at a private medical college in Lahore. Experts in clinical pharmacy and pharmacy practice verified it. After validation and necessary revisions, the final survey questionnaire comprised 30 questions categorized into knowledge, attitude, and practice sections.

Section A (Attitude-based questions): Utilized a Likert scale (strongly disagree, disagree, neutral, agree, strongly agree).

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Section B (Knowledge-based questions): Required selecting the correct answers.

Section C (Practice-based questions): Involved yes or no answers.

The first part of the questionnaire included an informed consent form and demographic details such as gender, age, faculty, year of study, and place of living. The second part contained 10 attitude-based, 10 knowledge-based, and 10 practice-based questions.

Likert scale questions (attitude-based): Scored from 1 to 5, with strongly disagree scoring 1, disagree scoring 2, neutral scoring 3, agree scoring 4, and strongly agree scoring 5.

Knowledge and perception-based questions: Correct answers scored 1 and incorrect answers scored 0.

Practice-based questions: Consisted of yes or no options, with only one correct answer to choose from.

Ethical Approval and Confidentiality

The Lahore Medical and Dental College Human Ethics Committee approved the study protocol, including demographic authorization, on July 15, 2022. The Faculty Research Committee also reviewed and granted ethical clearance for the study. All respondents provided informed consent, and their information was kept confidential for research purposes.

Statistical Analysis

The collected data were entered into SPSS version 21 for analysis. Descriptive statistics were conducted to determine the percentage, frequency, mean, and standard deviation for the quantitative data. The normality of the data was assessed using the Kolmogorov-Smirnov test

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and by checking the skewness and kurtosis values. Upon confirming the normality of the data, parametric tests, such as the one-way ANOVA, were performed. A p-value of less than 0.05 was considered statistically significant.

3. Results:

The study comprised 286 participants who completed the questionnaire. The majority of respondents were female (59%), with the remaining 41% being male. Among the participants, 119 were from the Faculty of Medicine, 120 from the Faculty of Pharmacy, and 47 from the Faculty of Dentistry. A total of 208 students were in their pre-final year, while 78 students were in their final year. The largest proportion of participants (78%) were in the age group of 21–25 years. Additionally, 76% of the 286 students were non-hostel residents.

Table 1 indicates that faculty, age, and place of residence do not significantly influence students' attitudes toward supplement use ($p > 0.05$), however females are having more positive attitude as compared with males. Table 2 summarizes students' practices regarding supplement use, revealing a significant difference among faculties with a p-value of 0.035 with effect size 0.014. According to Cohen's classification, the η^2 value of 0.014 indicates a weak positive association. In contrast, year of study, age, and place of residence showed no significant differences. Table 3 demonstrates a statistically significant difference in knowledge about supplements among two genders ($p = 0.008$, $\eta^2 = 0.0024$), year of education($p = 0.008$) with an η^2 value of 0.047, suggesting a small positive association. For the remaining variables, the p-values are considerably higher than 0.05, indicating no statistically significant differences in knowledge about supplements with respect to gender, faculty, year of study, and place of residence.

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Table 1: Attitude of students on supplement use(Total Maximum score was 50 and minimum was 10 for 10 questions).

Outcome Variable	Mean (SD)	95% Confidence Interval (C.I)		*t- statistic (df)*	*p- value*	*Effect size (η^2)*
		Lower bounds	Upper bounds			
Gender						
Male	39.82±4.85	38.36	40.73	7.362	*0.003*	*0.024*
Female	44.43±2.11	42.67	45.86	*(1, 283)*		
Faculty						
Medicine	41.39±3.67	39.78	41.98	18.67	*0.261*	-
Pharmacy	45.54±5.79	41.34	43.82	*(1, 283)*		
Dentistry	41.61±2.87	39.76	41.32			
Age						
18-20	40.61±4.61	38.86	41.78	32.48	*0.357*	-
21-25	41.69±4.51	40.97	42.16	*(1, 283)*		
>25	43.38±3.96	39.76	46.18			
Year of study						
Pre-final Year	40.82±4.96	40.54	41.90	8.679	*<0.001*	*0.213*
Final Year	44.92±3.34	41.68	45.57	(*1, 283)*		
Place of living						
Hostellar	42.31±4.61	41.56	42.41	7.561	*0.431*	-
Non-hostellar	42.41±5.52	41.54	42.32	*(1, 283)*		

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Female	8.98±1.91	6.89	9.06	*(1,283)*		
Faculty						
Medicine	6.36±2.61	4.41	7.04	*6.723*	*0.035*	*0.014*
Pharmacy	8.36±1.94	5.98	9.04	*(2,283)*		
Dentistry	4.61±3.75	4.82	5.92			
Age						
18-20	5.92±1.73	5.74	6.09	*5.382*	*0.506*	-
21-25	5.56±1.88	5.15	5.98	*(2,283)*		
>25	6.68±2.88	6.11	7.32			
Year of study						
Pre-final Year	5.98±2.61	4.89	5.89	*0.567*	*0.009*	-
Final Year	8.13±1.91	7.36	9.13	*(1,283)*		
Place of living						
Hostellar	5.52±2.82	4.98	6.01	*7.495*	*0.189*	-
Non-hostellar	5.95±2.90	5.05	6.22	*(1,283)*		

Table 2 Practice of Students on supplement use(Total Maximum score was 10 and minimum was 0 for 10 questions).

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Outcome Variable	Mean (SD)	95% Confidence Interval (C.I)		*t- statistic (df)*	*p- value*	*Effect size (η^2)*
		Lower bounds	Upper bounds			
Gender						
Male	17.23±2.54	16.45	17.76	*0.431*	*0.008*	*0.124*
Female	19.12±2.67	18.79	19.84	*(1,283)*		
Faculty						
Medicine	18.45±2.47	17.97	18.92	*13.556*	*0.653*	-
Pharmacy	19.09±2.18	18.32	19.11	*(2,283)*		
Dentistry	17.29±3.62	17.85	19.93			
Age						
18-20	17.41±3.89	17.04	18.08	*43.831*	*0.231*	-
21-25	19.20±2.13	18.41	19.48	*(2,283)*		
>25	18.00±1.87	17.65	18.02			
Year of study						
Pre-final Year	16.28±2.97	15.70	16.76	*6.782*	*0.003*	*0.161*
Final Year	19.65±1.56	18.26	19.85	*(1,283)*		
Place of living						

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Hostellar	15.69±2.74	14.69	15.98	*8.397* *(1,283)*	*0.008*	*0.198*
Non-hostellar	18.51±2.82	18.17	19.83			

Table 3: Knowledge of students on supplement use(Total Maximum score was 20 and minimum was 0 for 20 questions).

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4. Discussion:

The present study represents a novel evaluation of the use of supplements among medical students at a university in Pakistan. Previous research in Pakistan has not assessed medical students' knowledge, attitudes, and practices regarding the self-use of supplementary medicines, despite their future roles as healthcare providers. To evaluate the attitudes of these medical students, a total of 10 questions were administered using a five-point Likert scale.

The findings revealed that female students exhibited a more positive attitude compared to their male counterparts, with a significant P value of 0.007. However, the effect size was found to be 0.024, indicating a weak positive association between gender and student attitudes. These results align with several previous studies that have reported more positive attitudes among females than males(5). This trend may be attributed to females' greater health consciousness and concern for health-related issues, or it could be due to a generally more positive disposition among females(6).

The findings of the current study indicate that final-year students across all healthcare provider faculties have a more positive attitude towards the use of supplementary medicines compared to pre-final-year students. This is supported by a P value of 0.001 and an effect size of 0.213, suggesting a moderate positive association between the year of education and attitudes towards supplementary medicine use. A similar study conducted in Malaysia by Iqbal et al. reported that final-year students exhibited a more favorable attitude towards various health-related questions compared to pre-final-year students(7). The probable explanation for this trend could be the increased professionalism of final-year students regarding the use of supplementary medicines, as they are on the verge of graduating and becoming healthcare providers(8). This impending transition likely contributes to the more positive attitude observed among final-year students.

None of the other variables showed a significant relationship with the use of supplementary medicine. The study found no significant difference in attitudes among students from the faculties of medicine, pharmacy, and dentistry. However, pharmacy students exhibited a more positive attitude compared to students from the other two faculties. Similarly, when comparing age groups, students older than 25 years had a more positive attitude than those aged 18 to 25 years.These findings are supported by a study conducted in Malaysia, which also reported that pharmacy students had a more positive attitude compared to students from

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other faculties. A probable reason for this could be the higher number of pharmacy students involved in research activities compared to students from the other faculties(9).

Another aspect of the current study was to evaluate the practices of future healthcare providers regarding the use of supplementary medicines. The findings indicate that only gender and faculty variables have a positive relationship with the practice of using supplementary medicines, while age, year of study, and place of living do not show any direct relation.The data revealed that female students had better practice scores compared to male students. Specifically, female students scored an average of 8.98 with a standard deviation of 1.91, whereas male students scored an average of 5.87 with a standard deviation of 1.83. The P value was 0.003, and the effect size (η^2) was 0.054, indicating a weak positive association between gender and the practice of using supplementary medicines among future healthcare providers.The probable reason for this difference could be that female students tend to have better practices regarding the use of supplementary medicines compared to males(10). These findings are supported by a study conducted by Iqbal et al., which also indicated that females had better practice scores compared to males, possibly due to similar reasons(11).

On the other hand, students from the pharmacy faculty demonstrated better practices regarding the use of supplementary medicines compared to those from the medical and dentistry faculties. Additionally, dentistry students exhibited the lowest practice scores in response to questions about the use of supplementary medications. A probable reason for this could be the higher use of supplements by pharmacy students and their tendency to recommend them. In contrast, dentistry students are less likely to consume and refer supplementary medicines to their patients.A statistically significant association was observed, with a P value of 0.035 and an effect size (η^2) of 0.014, indicating a weak positive association between faculty affiliation and the practice of supplementary medicine use. These findings are supported by previous studies conducted in different countries, which also showed that pharmacy students have better practices compared to students from other faculties(8,12). The probable reason for this could be the more frequent practical training and emphasis on the use of supplements within the pharmacy curriculum(13).

In a recent study assessing the knowledge of future healthcare providers, a total of 20 questions were used for evaluation. The findings revealed that females demonstrated better knowledge than males. The mean score for females was 19.12 with a standard deviation of 2.67, whereas the mean score for males was 17.23 with a standard deviation of 2.54. A

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statistically significant association was observed between gender and knowledge, with a 95% confidence interval and an effect size of 0.124, indicating a positive weak association according to Cohen's classification of effect size(14).These results align with a study conducted in Malaysia by Iqbal et al., which also found that females had better knowledge compared to males(15). A plausible explanation for this difference is that females have a better understanding of their own health conditions compared to males. This justification has been supported and elaborated by various previous research studies(16,17).

The knowledge levels of final-year students were found to be significantly higher compared to pre-final-year students, with a p-value of 0.003 and an effect size of 0.161. This indicates that final-year students possess more extensive knowledge compared to pre-final-year students. These findings are consistent with the literature, which similarly reports that graduating students exhibit more advanced knowledge than all other students (18).

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