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Prevalence and Pattern of Dietary Supplements Use among Female Medical Students: A Bangladesh Study

Fatema Johora[1]* Jannatul Ferdoush[2] Asma Akter Abbasy[3] Mst. Arifa Shirin[4]
Nazla Shamsuddhoha[5] Tarafder Shahniam Ahmed[6]

ABSTRACT

Background: Over the years, Bangladesh has been experiencing substantial transformation in demographic, health and nutritional status of the population. Although malnutrition rates among children and women have reduced, micronutrient deficiencies are still present. Research evidence suggests a higher proportion of supplement consumption among females, younger age group. As there is extensive feminization of medical education in Bangladesh is going on, it was interesting to explore the prevalence and associated factors of Dietary Supplements (DS) use among them. To analyze the prevalence and pattern of DS use among the female medical students of Bangladesh.

Materials and methods: This descriptive cross-sectional study was conducted in the Department of Pharmacology & Therapeutics of 18 Medical Colleges of Bangladesh including both government and non-government institutions from May 2024 to October 2024. A structurred questionnaire survey was conducted among the 3rd year and 4th year MBBS students of studied medical colleges who agreed to participate the study, and a total of 1688 medical students participated in this study.

Results: The overall prevalence of DS use was 41.00% and 48.27% respondents use at least 1 type of supplement. The most consumed DS were multivitamins-minerals combination (25.15%) followed by vitamin C (24.87%) iron (22.26%) vitamin D (19.37%) and calcium (18.21%) respectively. The most common reason for taking DS was for improvement of overall health (38.58%). DS was taken asself-medication among 46.24% of respondents. Supplement intake was significantly associated with types of medical colleges (p =0.00008) and marital status (p value = 0.007*).

Conclusion: The proportion and pattern of supplement consumption among study population were comparable to previous studies. It would be commendable to review the undergraduate curriculum in regards of DS for encouraging rational prescribing of supplements in upcoming days.

KEY WORDS

Dietary supplements; Female medical students; Minerals; Self-medication; Vitamins.

1. Associate Professor of Pharmacology & Therapeutics
Army Medical College, Bogura.
2. Professor of Pharmacology
Bangladesh Medical University, Dhaka.
3. Professor of Pharmacology & Therapeutics
Brahmanbaria Medical College, Brahmanbaria.
4. Associate Professor of Pharmacology & Therapeutics
Shaheed Ziaur Rahman Medical College, Bogura.
5. Assistant Professor of Pharmacology & Therapeutics
Medical College for Women and Hospital, Dhaka.
6. Professor of Pharmacology & Therapeutics
Army Medical College, Bogura.
*Correspondence : Dr. Fatema Johora
Email: fatemajohora.0801@gmail.com
Cell : +88 01613 00 03 27, 01719 57 96 14

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INTRODUCTION

The use of DS intended to improve the diet with vitamins, minerals, herbs and amino acid, has extensively increased, mainly in developed countries but also in developing countries.[1] Worldwide prevalence of DS usage ranges from 22% to 53%.[2] Vitamin and mineral supplements are the most commonly used dietary supplements by populations worldwide. While supplements can be consumed to address micronutrient deficiency or maintain an adequate intake, over-the-counter supplements are most often taken by people with no clinical signs or symptoms of insufficiency. The beneficial effect of DS in case of reduction of non-communicable diseases in "Apparently healthy" populations is debatable. And evidence from several randomized trials does not support the use of DS to reduce the risk of non-communicable diseases. Whether use of DS considerably reduces the prevalence of inadequate intake for most nutrients but alsoincreases the frequency of excessconsumption of some micronutrients.[3]

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The global dietary supplements market size was estimated at USD 192.65 billion in 2024 and is projected to reach USD 414.52 billion by 2033, growing at a Compound Annual Growth Rate (CAGR) of 8.9% from 2025 to 2033. The market is driven by heightened health consciousness, evolving consumer lifestyles and increased focus on preventive healthcare.[4] Over the last 20 years, the use of supplements has continued to grow in many countries. Due to the public health catastrophe fetched by the COVID-19 pandemic and amidst uncertainties regarding COVID-19 vaccines and their low supply in many regions of the world, there has been a striking interest in the use of DS as another means of protecting against and treating this emerging disease, as well as enhancing the immune system and lessening the threat of inflammation and infection.[5] The vitamins and minerals market in Bangladesh has been undergoing steady progression in recent years. Bangladesh vitamins and minerals segment amounts to US$0.53bn in 2023 and is expected to grow annually by 8.19%.[6]

Supplement use is generally more prevalent in the United States (US)and Canada in comparison with other countries. National survey data for supplement use in the general population remain scarce for low and middle income countries.[7,8] People using supplements tend to be older, female and have higher education, income and healthier lifestyles than people who do not use them.[3] Intake of certain dietary supplements like vitamin A, vitamin D and iron in the developing countries has increased to combat micronutrients deficiency in children, pregnant women and older age group.[9,10]

Trend of DS consumption among students of health science including medical, pharmacy and nursing is not conclusive.[11,12,13] There are evidence that relatively increased consumption of DS among students of health science background but skeptic attitude also prevailed among them.[3,11,12] Use supplements among physicians and medical students is of thought provoking as their behavior might shape their prescribing in future. Consumption of DS among female medical students would be interesting as feminization of medical education is an ongoing process all over the world including Bangladesh for last few decades.[14,15] In Bangladesh, micronutrient deficiencies are substantial in women of the reproductive age group. Iron, folic acid, zinc, vitamin D and vitamin B_{12} deficiencies are highly prevalent among women and status of deficiency did not significantly improve over the past decade.[16] Hence, the current study was conducted to analyze the prevalence and pattern of DS use among the female medical students of Bangladesh.

MATERIAL AND METHODS

This was a descriptive cross-sectional study conducted in the Department of Pharmacology & Therapeutics of 18 Medical Colleges of Bangladesh including both government (Dhaka Medical College, Armed Forces Medical College, Manikganj Medical College, Cumilla Medical College, Dinajpur Medical College, Shaheed Zaiur Rahman Medical College, Bogura and Habiganj Medical College) and non-government (Army Medical College Bogura, Army Medical College Chattogram, Army Medical College Cumilla, Army Medical College Jashore, Brahmanbaria Medical College, BGC Trust Medical College, Chattogram International Medical College, Khawja Yunus Ali Medical College, Medical College for Women and Hospital, United Medical College and Z.H. Sikder Women's Medical College) medical colleges from May 2024 to October 2024. The study was conducted among the female medical students (3rd year and 4th year) of the studied medical colleges, and a total of 1688 students participated in this study.

A structured questionnaire was used for data collection and questionnairewas validated before survey. The questionnaire was adopted from an earlier study conducted in Bangladesh.[17] Piloting of the questionnaire was done before commencing the survey. AsEnglish is the medium for medical education in Bangladesh, the administered questionnaire was in English.

Ethical approval was taken from the Institutional Ethical Review Board (IERB) of Army Medical College Bogura. Permission was taken from college authorities and informed consent was taken from the participants of the Structured Questionnaire Survey.The respective medical colleges were clearly informed about the study and its objectives. The survey was conducted among the 3rd year and 4th year MBBS students of studied medical colleges who agreed to participate in the study. Researchers explained the nature and purpose of the survey to the students during a lecture class. This self-administered questionnaire was circulated among students through both online and offline based. In case of online data collection, questionnaire waslinked in a Google formand was distributed among study population through official WhatsApp group. To ensure the quality, students filled and submitted the questionnaire quickly during end of class. Later, this web-based questionnaire was sent to students who were absent in the class through email.A reminder mail or message wasgiven on 7th day and 15th day of the primary one.The response generated by the students was received through Google Drive and it did not accept more than one response from same

Journal of Brahmanbaria Medical College
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participant. To maintain confidentiality, responses were anonymous. In case of offline data collection, questionnaire was handed to the students by the researchers. To ensure the quality, students filled and returned the questionnaire quickly at end of the lecture class. Participants who did not return questionnaire in time were approached again. In case of losing the questionnaire, a new questionnaire was provided to them. Students who did not return their questionnaire after three approaches were considered as non-respondents.

Data were compiled, presented andresults were expressed asfrequency and percentage. Chi-square test was performed to determine factors associated with supplement use. $p < 0.05$ was considered statistically significant.

RESULTS

Table I showed that more than half of the study population were 4th year medical students (54.08%) studying in government institution (55.27%) and unmarried (94.19%).

Table I Distribution of demographic variables of respondents (n=1688)

Variables	Frequency	Percentage (%)
Academic year		
3rd year	775	45.91
4th year	913	54.09
Type of institution		
Government	933	55.27
Non-government	755	44.73
Marital status		
Married	98	5.81
Unmarried	1590	94.19

Overall prevalence of DS consumption among the respondents was 41.00% (Figure 1).

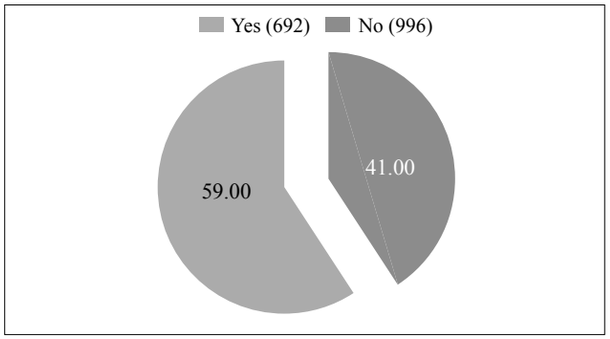

Figure 1 Overall prevalence of dietary supplement use among respondents (n=1688)

Figure 2 showed that 334 (48.27%) respondents use at least 1 type of supplement.

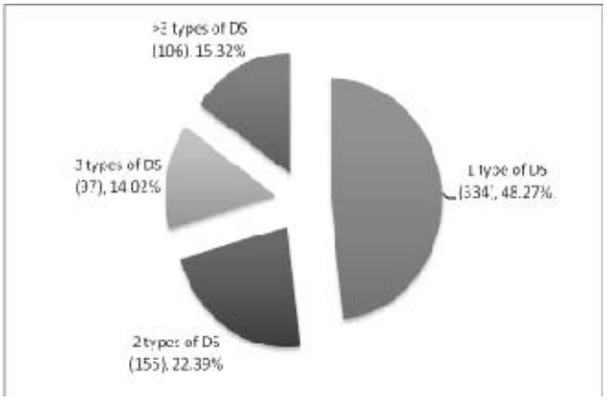

Figure 2 Number of DS use among respondents (n=692)

Figure 3 showed that multivitamins-minerals combination (25.15%) was the highest consumed DS followed by vitamin C (24.87%) iron (22.26%) vitamin D (19.37%) and calcium (18.21%) respectively.

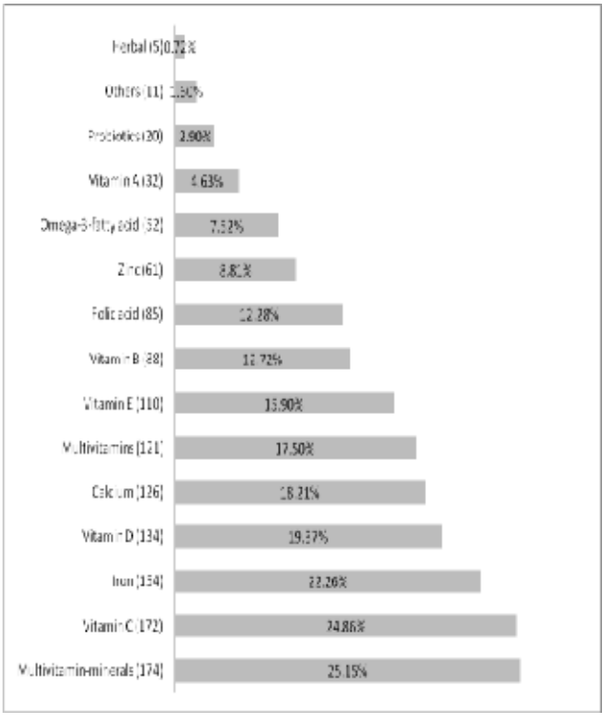

Figure 3 Distribution of types of DS taken by respondents (n= 692)

Improvement of overall health (38.58%) was the highest cited reason for DS intake followed by prevention of health problems (26.45%) maintenance of health (23.84%) and skin health (16.85%) respectively (Figure 4).

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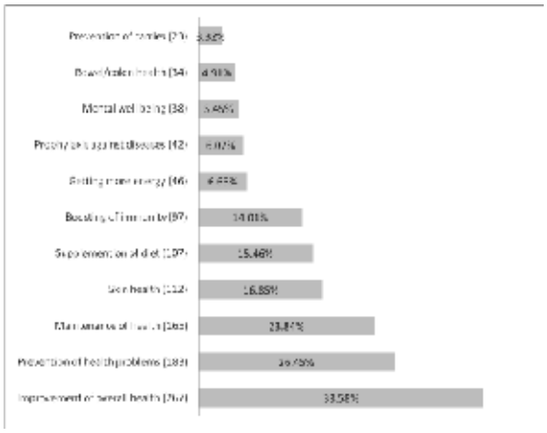

Figure 4 Distribution of reasons for taking DS (n=692)

And 46.24% respondents took DS as self-medication (Figure 5).

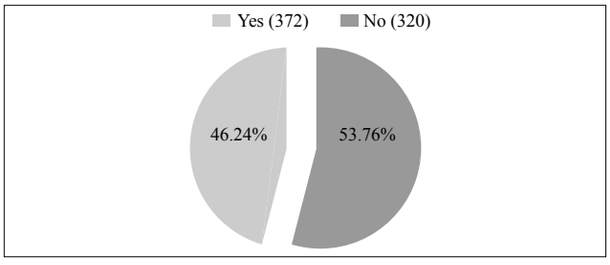

Figure 5 Percentage of DS consumption as self-medication among respondents (n=692)

Table II showed that among supplements user, 332 (47.98%)and 360 (52.02%)were 3rd year and 4th year medical students respectively. Among the supplements user, 61.13% and 38.87% were students of government and non-government institutions respectively. Among 98 married students, 53 students took DS, while among 1590 unmarried participants, 639 took DS. The use of supplements correlated significantly with the type of institution (p value = 0.00008*) and the marital status (p value = 0.007*) of respondents.

Table II Distribution of DS use among demographic characteristics of respondents and Association of demographic variables with DS use (n=1688)

Variables	DS users n (%) 692 (41.00)	DS non-users n (%) 996 (59.00)	χ^2 value	p value
Academic year				
3rd year	332 (47.98)	443 (44.48)	2.01	0.16
4th year	360 (52.02)	553 (55.52)		
Type of institution				
Government	423 (61.13)	510 (54.66)	16.26	0.00008*
Non-government	269 (38.87)	486 (64.37)		
Marital status				
Married	53 (7.66)	45 (4.52)	7.37	0.007*
Unmarried	639 (92.34)	951 (95.48)		

Chi square test was done, p<0.05- Significant.

DISCUSSION

Over the years, Bangladesh has been experiencing substantial transformation in demographic, health and nutritional status of the population. Although malnutrition rates among children and women have reduced, micronutrient deficiencies are still present. Research evidence suggests a higher proportion of supplement consumption among females, younger age group. In Bangladesh, there is a development in medical sector perceiving with more female admitted into medical colleges, it was interesting to explore the prevalence and associated factors of DS use among them.The current study found higher prevalence of DS use among married and students of government medical colleges.

The correlation between high educational level and DS use has been revealed in many studies. One study conducted in France found a significant association between educational level and dietary supplement use among students.[18] Another study done on female showed high consumption of vitamins and minerals among respondents with a high educational level.[19] In current study, overall prevalence of DS consumption among the respondents was 41.00% and corresponds with one study conducted among medical students.[20] A higher percentage of DS use among medical students was observed in studies conducted in Saudi Arabia, Nigeria and the US.[21,22 ,12] One recent study conducted in Middle East found that prevalence of dietary supplement use among female college students was 76.6%.[23] On the other hand, 29.77% of female students of health science background took DS.[24] More frequent use of DS has been observed among female university students of Bangladesh.[17] So it can be said that female medical students of Bangladesh have been thoughtfully consuming DS as they have adequate knowledge on adverse drug reactions as well as potential drug-drug interaction.[25] Similar pattern of considerate style of pharmacy students regarding supplements use was observed in an earlier study conducted in Pakistan.[11]

In the current study, 48.27% respondents consume at least 1 type of supplement, whether 15.32% students took more than 3 types of supplements. Multivitamins-minerals combination (25.15%) was the highest consumed DS among study population, and that corresponds with studies conducted among female population around the world.[21,23,26,27] Actually multivitamins and mineral supplements are the most commonly used supplements in the world. There are still debates whether it's really necessary for a healthy individual to take a combination or it would be better to

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consume individual nutrient for addressing deficiencies. Taking multivitamin and mineral supplements can intensify nutrient intake and assistance people attain recommended amounts of vitamins and minerals when they do not fulfill these needs from natural diets alone.

Improvement of overall health (38.58%) was the highest cited reason for DS intake followed by prevention of health problems (26.45%) maintenance of health (23.84%) and skin health (16.85%) respectively. Nutritional supplementation and health promotion were the most reported reasons for utilizing dietary supplements among medical students of Saudi Arabia and Nigeria.[21] "Maintain healthy hair" was the most frequent reason for DS intake among female college students.[23] General health and well-being were revealed as main reasons for taking DS among female university students of Bangladesh.[12] A large scale study done on female physicians of the US showed that those who were specially health conscious or at higher risk of heart disease or osteoporosis used supplements.[27]

In our study, almost half of the respondents took DS as self-medication and this finding was similar to one study conducted in Pakistan.[11] On the other hand, in a study conducted among medical students in Croatia revealed a higher percentage of self-medication when consuming a dietary supplement.[28] Practice of self-medication is quite common among the undergraduate medical students of Bangladesh.[29] Appropppriate emphasis on self-medication practice as well as covering the topic of DS in assessment through incorporation of problem-based questions might be safeguarding rational use of medicine among the future prescribers.[30,31]

Socio-demographic characteristics that influenced the consumption of dietary supplements in this study were marital status and types of institution. There was no statistically significant difference between 3rd year and 4th year medical students (p value 0.16) regarding use of DS and that was contrary to earlier studies conducted among medical students[12,20,21] as well as among female college students.[23] One study conducted among pharmacy students did not find correlation between DS among senior students.[11] The present study revealed that dietary supplement use increased significantly among married students and this was similar to one study conducted among medical students.[12] Higher percentage of DS use among married female college and university students were also reported in earlier studies.[17, 21] Higher proportion of supplement use was found among respondents studying in government institutions in comparison with those studying in non-government institutions (p value 0.00008) and this finding was contrary to earlier studies conducted in Bangladesh among the university students.[17, 26] This was probably because the study population were equipped with knowledge about nutrition and assumed that the diets served in government institutions might lack certain nutrients.[32]

The study has some strengths as it is a multi-center study and questionnaire was validated. There are several limitations too. It was a self-administered questionnaire and subjects' responses were not validated. Researchers did not conduct a Food Frequency Questionnaire on these respondents, so we could not assess whether they acquired sufficient nutrients from their food and whether taking supplements were necessary for their wellbeing. We did not show a relationship of supplement intake with their Body Mass Index (BMI) pregnancy, lactation, parity, family income, physical exercise, smoking habit and concurrent illness.

CONCLUSION

The overall consumption of DS is increasing worldwide although there are lots of speculations. Our study revealed that the proportion of supplement consumption among female medical students is comparable to values stated earlier in the works and multivitamins-minerals combination was the most commonly used supplement. In addition, married and students of government medical colleges were found to be linked with greater consumer of supplements. Asnear half of the respondents took supplements as self-medication, it would be earnestto appraise the undergraduate curriculum for encouraging rational use of supplements in their practice life.

DISCLOSURE

All the authors declared no competing interest.

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