



Prevalence of Nutraceutical Use in Younger Population of North India and the Association Between Gender and Community in Its Usage – Cross-Sectional Study

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Abstract

Background/Aim: Nutraceuticals or dietary supplements have been recognised as a fundamental part of the holistic approach to achieve complete wellness and health. Their usage is continuously increasing due to lifestyle and sport-style requirements. The present study was designed to estimate the use of nutraceuticals in the younger population and find the association between gender and community in their usage.

Methods: An observational cross-sectional study was carried out on the younger population (between 15 and 30 years of age) of North India over a period of two weeks in October 2022. The data regarding the demographic profile and nutraceutical use among participants was collected per predesigned and pre-validated questionnaire. The collected data were analysed to determine the outcomes.

Results: The study included 575 participants, with 272 males and 303 females. Out of them, 321 were from the urban background. It was found in the study that a total of 275 (47.82 %) study subjects were using nutraceuticals, with 163 (59.27 %) and 112 (40.73 %) from the urban and rural dwellings, respectively. Among the users, 122 (44.36 %) were men and 153 (55.64 %) were women. Thus, overall, 153 (50.49 %) of females and 122 (44.85 %) of males in survey were consuming dietary supplements. The study further added that 189 (68.72 %) users believed that nutraceuticals improved their health, two-thirds of participants were using nutraceuticals for lifestyle reasons and 239 (86.90 %) of consumers were using single nutraceuticals. There was no association between gender and community in nutraceuticals usage (Chi-square test, $p > 0.05$).

Conclusion: Almost half of the younger population was using nutraceuticals and there was no association between gender and community while using them.

Key words: Nutraceuticals; Dietary food; Dietary supplements; Survey; Urban/rural area; Younger population.

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Introduction

Certain foods and herbal extracts have been recognised as a fundamental part of the holistic approach to achieve complete wellness and health since ancient times, especially in the Ayurvedic system in India.¹ This recognition of the correla-

tion between health and what we eat paved the way for the evolution of “nutraceuticals”.² The term “nutraceutical” was coined by Dr Stephen D Felice in 1989. It is derived from the combination of the words “nutrition” and “pharmaceutical,”

which mean “a nourishing food” and “a medical drug,” respectively.³

However, they are different from pharmaceutical drugs. Pharmaceutical drugs are natural or laboratory-developed or modified substances that are primarily used to prevent or treat a disease, with their manufacturing and marketing regulated by legal authorities under relevant rules and regulations.⁴ The use of pharmaceuticals is for a specific purpose and hence requires stringent clinical trials before publicising their availability.⁵ Moreover, they have a potentially higher risk of side effects than nutraceuticals. On the other hand, nutraceuticals are natural substances that may be considered foods or parts of foods, usually used in addition to a traditional daily diet and suggestively provide medical and health benefits in the prevention and treatment of myriad diseases like hypertension, diabetes mellitus, osteoporosis, memory enhancers etc, with comparatively lesser regulations and adverse effects.⁶ Other purposes for using nutraceuticals are to delay the aging process, increase life expectancy, or support the structure or function of the body to preserve health and general well-being.⁷

Nutraceuticals include vitamins, minerals, amino acids and proteins, herbal products, fibre, lignin, prebiotics, probiotics, antioxidants, nutritional lipids and oils, phytochemicals, metabolites, enzymes, etc.⁸ Nutraceuticals available in the market can be classified into functional foods, functional beverages and dietary supplements based on product category.⁹ In this manuscript the term “dietary supplement” is used interchangeably with “nutraceuticals.”

In India, nutraceuticals are freely available over the counter and in grocery shops and their use is continuously increasing at a rate of 25 %.¹⁰ The Food Safety and Standards Authority of India (FSSAI) is concerned with the regulations of licensing and registration of food businesses, manufacturing, packing and labelling, food product standards and the approval of nutraceuticals in the Indian market.¹⁰

Worldwide data also shows that the global nutraceuticals market, which was 498.86 billion \$ in 2021, is expected to reach 1025 billion \$ by 2030, with an estimated compound annual growth rate of 8.33 %.¹¹

Though numerous studies evaluating the use of nutrition supplements in the geriatric population and children are available, very few studies have been done to study their use in adolescents and younger populations despite the fact nutraceuticals are increasingly becoming a part of their diet due to lifestyle or sport style requirements. As a result, a cross-sectional study was conducted to estimate the use of nutraceuticals among the younger population of North India, as well as to determine whether there was any relationship between gender and community in their usage.

Methods

This was an observational cross-sectional study conducted on a younger population of North India between 15 and 30 years of age over two weeks in October 2022. After obtaining clearance from the Ethics Committee (No IT/03/2022, dated 20 October 2012), an online survey was conducted using the Google Forms.

A self-developed questionnaire consisting of two sections: Section A concerned with the demographic details and Section B concerned with the details of the nutraceuticals usage and participants' perception of their benefits was used in the survey. The questionnaire was distributed through social media (email and WhatsApp). The study subjects were mainly contacts of friends, relatives, neighbours and colleagues of around fifty persons working as staff within the Rajasthan College Of Medical Sciences (RUHS) Hospital and the rural community within the purview of the Hospital. Only those who were between 15 and 30 years of age, literate and willing to participate were included in the study. The questionnaire was available in Hindi and English and was pre-validated by five community workers and five faculty members. As the study was confined to northern India, where the dietary habits are almost identical, cultural adaptation was not required.

A total of 575 subjects participated in the study. The data was gathered pertaining to the socio-demographic variables of participants and the usage of nutraceuticals by them. The collected data was analysed statistically and the Chi-square test was used to find the association between gender and community in using nutraceuticals.

Also, the Goodness-of-fit test was applied to test the adequacy of the model and ordinal logistic regression was performed for the categorical variable ‘Do you think taking nutritional supplements is helpful for your health’. Values of 0, 1 and 2, were assigned for the responses “cannot say”, “no” and “yes”, respectively. Parallel regression lines were assumed and a single slope was calculated for each covariate.

Results

Overall, 575 subjects participated in the study, with the male-to-female ratio being 1:1.11 (272:303) and the urban community being 1.26 times larger than the rural population (321:254). A total of 275 (47.82 %) study subjects were using nutraceuticals, with 59.27 % and 40.73 % from urban and rural dwellings, respectively. Among the users, 44.36 % were men and 55.64 % were women. Demographic details of participants as well as statistical analysis are given in Tables 1 and 2.

Table 1: Characteristics of nutraceuticals users and non-users

Parameter	Nutraceutical users		Nutraceutical non-users		p-value
	N	%	N	%	
Gender					
Male	122	44.36	150	50.00	
Female	153	55.64	150	50.00	
Settlement type					
Urban	163	59.27	158	52.67	0.156
Rural	112	40.73	142	47.33	
Education level					
Elementary school or less	75	27.27	121	40.33	0.132
High school	110	40.00	79	26.33	
University degree	90	32.73	100	33.33	

Chi-square test;

Table 2: Logistic regression model with adjusted odds ratios (OR) and 95 % confidence interval (CI) for socio-demographic variables of nutraceuticals users

Variables	OR	95 % CI	p-value
Gender			
Male	10.83	(0.59 - 1.17)	0.286
Community settlement			
Urban	1.20	(0.85 - 1.68)	0.297
Education level			
Elementary school	0.53	(0.34 - 0.87)	0.234
High school	1.32	(0.74 - 1.34)	
University degree	1.22	(0.82 - 1.42)	

The goodness-of-fit tests, done to find the adequacy of the model, revealed the p-value to be < 0.001, thereby, indicating that the model was

adequate and the relationship between the response variable and the predictors was statistically significant.

In the next step, ordinal logistic regression was performed to analyse the responses to the categorical variable “Do you think taking nutritional supplements is helpful for your health?” (Table 3).

Table 3: Logistic regression for the variable ‘perception of participants of benefit of nutrition supplements’ in health

Predictor	Coef	SE Coef	Z	p-value	OR	95 % CI
Const (1)	-0.71	0.12	-5.97	< 0.001		
Const (2)	0.02	0.11	0.22	0.828		
Taking nutrition						
Yes	-1.51	0.19	-7.86	< 0.001	0.22	0.15 - 0.32
Yes	-21.27	12465.90	0	0.999	0	0

Coef: coefficient; SE: standard error; OR: odds ratio; CI: confidence interval; The negative coefficient and an odds ratio found to be < 1 indicates that taking more nutrients tends to be associated with better health.

As shown in Table 3, the values labelled Const (1) and Const (2) were the estimated intercepts for the logits of the cumulative probabilities of the variable helpful for health. Since the p-value was < 0.001, it indicated that for most a-levels, there was sufficient evidence to conclude that “taking nutrients” was subjectively beneficial for health. Also, the negative coefficient and an odds ratio found to be < 1 indicated that taking more nutrients tends to be associated with better health.

It was also reported in the study that two-thirds of the study subjects were using nutraceuticals for lifestyle reasons and only one-third were requiring them due to their excessive physical activity. 68.72 % of supplement users believed that nutraceuticals improved their health. 86.90 % of them were using only one food supplement and multivitamins were the most frequently used nutraceutical (62.3 %), followed by miscellaneous (16.2 %) and protein powders (11.6 %).

The Chi-square test of independence found that both the variables ie, gender and area were independent of each other and showed no association in deciding nutraceutical usage (p > 0.05).

Discussion

According to the Dietary Supplement Health and Education Act (DSHEA) of 1994, dietary supplements, or nutraceuticals are products intended to supplement the diet.¹² In recent years, diet and

lifestyle-related illnesses have become important healthcare concerns. In a similar vein, all age groups, including youngsters, have shown an increase in interest and awareness in health care that uses nutritional supplements as a non-specific biological therapy for the treatment and prevention of various diseases.³

The present study, which included 575 individuals between the ages of 15 and 30 years in northern India, discovered that 47.82 % of them were consuming dietary supplements. According to comparable research conducted in other regions of Asia, 32.7 % and 33.8 % of the subjects used dietary supplements.^{13, 14} One similar research found that up to 80 % of people use nutritional supplements or herbal medicines.¹¹ Americans are most likely to consume dietary supplements, followed by Europeans who live in Germany, Italy and Russia.^{9, 15}

Presented study showed that overall, a greater number of females in northern India consume nutraceuticals than males. Similarly, Shade et al¹⁶ mentioned a significant association between gender and multivitamin use in favour of females. However, Piórecka et al¹⁷ found that dietary supplement consumption was significantly higher among boys compared to girls (37.3 % vs 27.8 %) and among children who lived in rural areas as opposed to metropolitan areas (39.3 % vs 26.5 %). A study by Svendsen K et al¹⁸ revealed that females are more likely to assert their knowledge of all dietary recommendations. In contrast, a study on athletes by Aguilar-Navarro et al found that male athletes consumed significantly more supplements than female athletes.¹⁹

Rural living differs from urban living in many ways that could affect dietary supplement consumption and related consequences, besides other demographic factors.²⁰ Several epidemiological studies also opine that demographic factors may influence supplement consumption.^{19, 20} Old age, female gender, degree of education, affordability and employment status are a few prominent demographic characteristics linked to increasing dietary supplement usage.²¹

The current study reported that overall, 59.27 % of nutraceutical users belonged to urban dwellings. However, the findings of various research studies on nutraceutical intake in urban and rural settings vary greatly across populations.^{16, 17, 22} Studies suggest that, though there is a higher calorie intake in urban areas, they are deficient

in micronutrients despite the wider availability of fresh fruits and vegetables in larger cities. It could be the reason why more adolescents are using supplements in urban areas. In contrast, Shade et al¹⁷ discovered that older people in rural areas use more oral dietary supplements. It should be noted, however, that rural areas have fewer medical facilities and a slightly higher percentage of elderly people.²³

In presented research, the majority of consumers (68.72 %) believed that taking nutraceuticals improved their overall health. Similarly, a study mentioned that 61.6 % of patients reported feeling satisfied after using nutraceuticals, while 12.4 % of patients reported feeling unsatisfied. 25.8 % of patients had no idea that nutraceuticals existed.⁹ Nevertheless, a survey found that 78 % of respondents were undecided regarding the effectiveness and safety of nutraceuticals, particularly for children and the elderly.²⁴

The present study also evaluated the association between gender and community in using nutraceuticals, as in countries like India, males are usually given priority over females when it comes to nutrition and education, especially in rural settings. However, in terms of the use of nutrition supplements, the study found no significant association between gender parity and dwellings. Researchers did not find any similar studies evaluating the association between gender and community in dietary supplement usage.

Strengths and limitations of the study

The present study recruited the participants online thereby covering a larger area of northern India and the limitation was that only a small techno-savvy population could be included from the eligible group.

Conclusion

Almost half of the younger population was using nutraceuticals, with somewhat more consumption in urban areas. Also, there was no association between gender and the living dwelling while using it.

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Conflict of interest

None.

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