

Measuring prescription pattern of nutraceuticals with special focus on Protein Supplements in Tier-1 Indian City.

ABSTRACT

Nutraceuticals are playing vital role in today's time given the recent changes in lifestyle, dietary patterns, and increased stress due to work related pressure. They can be organized in several ways depending upon its ease of understanding and application, i.e. for academic instruction, clinical trial design, functional food development or dietary recommendations. A study was carried out for a period of two months to assess the awareness and prescription pattern of nutraceuticals with reference to protein supplements and to evaluate factors that will drive the future demand. Responses were obtained from Doctors and chemists from a single metro city in India. The analysis was performed using descriptive statistics and frequency distribution valid percentage was calculated. Chi-Square test was performed to measure the association between the demographic factors to preferences for protein supplements. p- Value was calculated and α - value of 0.05 or less was considered significant. The results show that the maximum protein supplement was prescribed in the age group of 20-40 years. Doctors usually prescribe protein (44%) for convalescent followed by pre and post-operative cases (40%). Haematinics are the drugs, which are co-prescribed 30% of the times with protein. Responses from Chemists showed that self-prescription was prevalent amongst their buyer and many factors were identified which leads to self-prescription, amongst which buyer's own previous experience was found to be significant (p-value-0.03). The study has helped to reveal the prescription pattern and practise of the doctors and of the factors leading to self-prescription.

Keywords: Nutraceuticals, Protein, Prescription, Pattern, Self-Prescription

INTRODUCTION

Nutraceuticals are playing vital role in today's time given the recent changes in lifestyle, dietary patterns, and increased stress due to work related pressure. Nutraceutical term was

coined by DeFelice in 1994 portraying “Nutraceuticals as any substance that is a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease”. It is a wide umbrella term that is used to describe any item obtained from food sources with additional medical value notwithstanding the fundamental dietary benefit found in nourishment. Nutraceuticals are classified as Functional Foods such as “Cereal, Bakery and Confectionery, Dairy, Snacks”; Functional Beverages including “Energy Drinks, Sports Drinks, Fortified Juice, Dairy and Dairy Alternative Beverages”; Dietary Supplements such as “Vitamins, Minerals, Botanicals, Enzymes, Fatty Acids, Proteins” and the like

The expression “Nutraceutical” consolidates two words- “Supplement” (a feeding food part) and “Pharmaceutical” (a clinical medication). Their job in human sustenance is one of the most significant regions of examination, with wide-seething ramifications for purchasers, medicinal services suppliers, controllers, food makers and wholesalers. (1)

These items have advanced from the acknowledgment of the connection between food and wellbeing. (2) They are regarded as the bioactive substance and the constituents that are of known therapeutic value or are chemically defined substance accepted to contribute substantially to the therapeutic activity of the medicines. (3)

The chief purposes behind the development of the nutraceuticals display the current populace and the wellbeing patterns as discussed initially. The food items utilized as nutraceuticals vary from dietary fibre, prebiotics, probiotics, polyunsaturated unsaturated fats, cancer prevention agents and other various sorts of home grown/ normal nourishments. These help in aiding and maintaining a healthy life and prevention from multitude of diseases like joint inflammation, diabetes, cholesterol and so forth. In general, ‘nutraceutical’ has prompted the new period of medication and wellbeing, where the food business has become a favoured option, which is fast picking up. (4)

They can be organized in several ways depending upon its ease of understanding and application, i.e. for academic instruction, clinical trial design, functional food development or dietary recommendations. Some of the most common ways of classifying nutraceuticals is based on food sources, mechanism of action, chemical nature etc.

The food sources used as nutraceuticals are all-natural and can be categorized as-

- Dietary fibre is a non- digestible carbohydrates and lignins that are intrinsic and intact in plants.
- Functional fibre consists of isolated non- digestible carbohydrates that have beneficial physiological effects in human.
- Total fibre is the sum of dietary and functional fibre. (5,6)

The rapidly changing consumer lifestyle and increasing health consciousness amongst consumers, especially in urban regions, have led to a swift growth of nutraceuticals market in the country. While the Indian market witnessed high growth rates in nutraceuticals, it is still a relatively small market as compare to the global nutraceuticals industry. Indian nutraceuticals market constitutes nearly 2% of the global nutraceuticals market. It is expected to grow rapidly and account for 3% of global share by 2022. Developed countries, including the US, Europe and Japan account for more than 90% of the global nutraceuticals market. (7)

Comment [A1]: The sentence is incomplete, please reframe it with proper examples like the following citations:
<https://doi.org/10.2174/1568026621666210524095925>

Comment [A2]: reference style is not proper

Comment [A3]: not discussed just definition mentioned so reframe the sentence

Comment [A4]: Use the following reference
<https://doi.org/10.3390/biom11081176>

Growing consumer interest in a healthy diet has led to a thriving food and beverage market in the recent past and the trend is expected to continue over the forecast period. Demand for functional foods is on the rise, as they are believed to impact exceptional health benefits owing to their nutrient content. This is further expected to boost the growth of the market for nutraceuticals.⁽⁸⁾

Amongst the various type of nutraceuticals, protein as a Dietary supplement is gaining momentum owing to the increasing health consciousness and a rising number of fitness centres around the globe. In the year 2020, the protein supplement market was about USD 18.91 billion and is expected to grow at rate of 8.4% CAGR during 2021 - 2028.

Comment [A5]: when ever using any values give proper reference

As consumers are getting more aware about the benefits of protein supplements on their wellness, a study was carried out to assess the awareness and prescription pattern of nutraceuticals with reference to protein supplements and to evaluate factors that will drive the future demand.

RESEARCH METHODOLOGY

A cross-sectional exploratory study was carried out in an Indian metro city for a period of two months. It uses primary data through the interviewer-administered questionnaire targeted to capture information related to nutraceuticals from two groups of respondents- General Physicians (who usually prescribe protein intake) and Chemists (Involved in selling related products & Supplement).

The questionnaire developed for the two groups consisted of qualitative as well as quantitative questions focused on collecting information related to prescription practices from doctors and observations made by chemists on aspects like demographics, drugs co-prescribed and factors leading to self-prescription.

The content validity and reliability of the questionnaire was assessed by sharing the study instrument with three independent assessors with a minimum 10 years of experience of pharmaceutical and healthcare industry. There were no major changes suggested and thus, the same study instrument was used for the final study.

The doctors and chemists were chosen from a single city based on the availability and accessibility, since most of the cities were under lockdown with restricted movement.

Comment [A6]: why the city is not mentioned

Initial contact was made and participants agreeing to be part of the study were finalised.

Responses were obtained from 70 doctors and 20 chemists. In total data for about 180 patients was obtained from doctors and 60 patients from chemists. The data collected was associated to people 18 years and above and the data was collected physically by visiting the clinic and chemists.

Data analysis was conducted using SPSS version 23. Descriptive statistics was used and frequency distribution and valid percentage was calculated. Chi-Square test was performed to measure the association between the demographic factors to preferences for protein supplements. p- value was calculated and α - value of 0.05 or less was considered significant.

Comment [A7]: use a schematic representation of the methodology to present it in a more scientific way

RESULTS:

In order to understand the prescription pattern, the doctors were asked about the no. of patients being treated by them per day. It was identified that, on an average between 50-70 patients were being given consultation and further treatment advice. Out of these, patients given protein prescriptions were segregated. From the 70 general practitioners, prescription data for 185 patients who were prescribed protein was obtained, the details are shown in table no. 1.

Table no.1: Demographic Characteristics of Patients who are prescribed with Protein:

Demographic Details		Number (n) (%)
Gender	Male	74%
	Female	26%
Type of Residence	Urban	77.8%
	Rural	22.2%
Age Group	Below 20 years	26%
	20-40 years	46%
	41-60 years	12.3%
	Above 60 years	15.7%

The demographic details revealed male are prescribed more protein as compared to females; and more for urban population. Mostly the patients in age range of 20-40years are the ones consuming more protein supplements than the other age groups. Moreover, 16 % of doctors preferred powder form of protein whereas 84 % backed protein to be consumed by food supplements. The current international Recommended Dietary Allowance (RDA) for protein is 0.8 g per kg of body weight (bw), regardless of age⁽⁹⁾

Considering that physical activity decreases with age, this is an important factor when protein needs are evaluated. Furthermore, the body of an ageing adult undergoes multiple physiological changes that alter protein utilisation, and thus requirements, i.e., anabolic resistance, insulin resistance, impaired digestion, inflammation, and decreased IGF-1 levels:⁽¹⁰⁾

Protein requirements vary on an individual basis, depend on various factors, such as age, health status and therefore, question on in what condition usually the protein powder or supplement is prescribed was asked and the responses are exhibited in Figure no.1

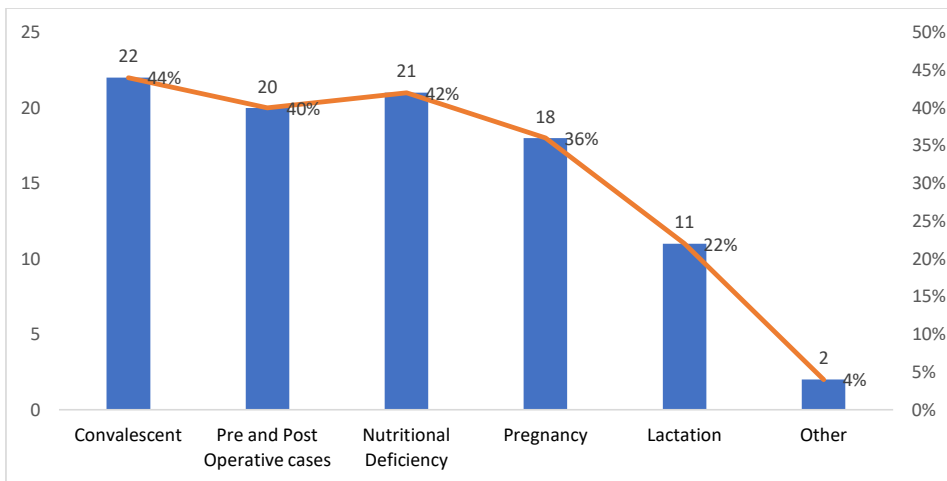


Figure no.1 Factors considered for prescription of Protein

The factors in terms of physical conditions do the practitioners consider while they prescribe protein mainly include- convalescent (44%), Pre and Post-Operative cases (40%), followed by 42 % in cases of nutritional deficiency ,and for pregnant ladies and lactating mothers it is 36 % and 22 % respectively.

While prescribing these products, safety of the product is considered as an important factor by 48 % of respondents followed by availability 31% and the price of the product 21 %.

Along with the general physicians, responses from Chemists were also included in the study.

According to them, general practitioner's prescription of protein is higher as compared with other specialists, which include orthopaedicians, diabetologists and gynaecologists and others.

They also stated that along with proteins certain categories of drugs are usually prescribed and are depicted in Table no.2:

Table No.2 Types of drugs co-prescribed with protein

Types of Drugs Co-Prescribed	Percentage
Anti-Diabetic	12.5 %
Anti-Oxidants	28%
Antibiotics	18%
Haematinics	30%
Other	11.5%

From the interaction with Chemist, practice of self-prescribed protein was also calculated. Table no.3 gives the overview regarding the same:

Table no.3 Practise of Self-Prescription:

Item		Male (%)	Female (%)	Total (%)	p-Value

Self-Prescription of protein related Products	Yes	45.2	42.8	88	0.44
	No	7.2	4.80	12	

p-value was determined using Chi-square Test. $p < 0.05$ was considered significant when compared between male and female groups.

It is clear that majority of the buyers practise self-prescription. There was no significant difference between male and female practise of self-prescription as evident from *p*-value of 0.44 ($p > 0.05$).

The purpose or reasons were further investigated to identify the factors that lead to self-prescription in most of the instances. Table no.4 reflects the data of preferences.

Table no.4 Factors for Self-Prescription

Factors	Male (%)	Female (%)	Total (%)	X ² Value	p-Value
Gym/ workout instructors	24.40	20.80	45.20	1.70	0.47
Opinion of family/ friends	10.80	4.40	15.20	1.62	0.44
Previous doctor's prescription	23.20	29.60	52.80	1.14	0.56
Influence by Social Media	4.80	1.20	6.00	1.63	0.44
Own past experience	30.00	20.80	50.80	9.08	0.03*

p-value was determined using Chi-square Test. * $p < 0.05$ was considered significant when compared between male and female groups.

Out of the many reasons reported for self-consumption of protein, related supplements 52.80 % said it is because of their previous doctor's prescription. It was noted that 50.80 % consumed based on their experience and based on the gym instructors 45.20 % took protein. Opinion of family & friends and influence from various social media platforms accounted for 15.20 % and 6 % respectively. The *p*-value for past experience amongst male and female was found to be significant at 0.03($p > 0.05$).

DISCUSSION:

The rising popularity of health-conscious living combined with increased disposable income is creating a wave of new customers looking for health supplements and nutraceuticals to complement their nutritional needs. With benefits ranging from enhanced physical performance and mental alertness to disease prevention, these products are fast becoming an everyday lifestyle necessity. The global nutraceuticals market is expected to witness consistent growth following the outbreak of COVID-19, as these include the food ingredients that provide medical or health benefits to prevent diseases as well as boosts the overall immune system. The flexibility in storage options, the demand for combined formulations with multiple benefits, increased consumer education levels, informed

consumers, and the rise in health concerns among connected consumers are expected to fuel the demand for the market during the forecast period.

Most of the studies done on nutraceuticals focus on entire array which includes- vitamins, antioxidants, minerals, herbals/ botanicals, protein, fibres etc. The present study has highlighted the specific pattern and factors that lead to prescription of protein powder/ supplements.

It is commonly believed that people in the younger age groups are healthy and do not need additional multi vitamin or other supplement to maintain their energy levels and good health. As opposed to this fact, the study revealed majority of doctors favour protein supplements prescription and prescribe it mostly for the age groups between 20-40 years of age group and below 20 years. This can be attributed to the fact that these can be majorly due to medical requirement of an individual and that BMR decreases with growing age.

As a protein supplements doctors prefer food supplements to the pharmaceutical products is seen through the results of the survey. In doctors survey it clearly indicates that doctors prescribe different brands of protein supplements/ food supplements to the coming patients for various reasons like nutritional deficiency, pregnancy, lactation and in pre- and post-operative care. These specific health condition demands high protein intake to fulfil the caloric intake, muscle repair and building, protein synthesis etc. The doctors opined that they did not come across any side effects of Nutraceutical products and going forward the demand for nutraceutical products will increase every day.

The responses from chemists suggests that they sale high amount of nutraceutical products under doctor's prescription when there are other drugs co-prescribed with proteins. They every day receives more than 10-15 prescriptions. General practitioners, gynaecologists, physicians, orthopaedic surgeons, diabetologists all category of doctors gives preference to food supplements.

As is common in India, people resort to self-prescription majority of the time for common ailments like – headache, upset stomach, common cold, pain, vomiting to name a few. Similarly, the study identified the factors responsible that lead to self-consumption of protein powder / supplements. It is majorly due to the thought process that protein is not like a medicine that needs a visit to a doctor or an analysis of requirement by a nutritionist. These people are rarely aware about the daily requirement and of the fact what over consumption can lead.

CONCLUSION

The study has proven helpful in identifying the prescription pattern from doctor's point of view as well as the factors responsible for self-prescription.

The response of nutraceuticals can vary from person to person; nutraceuticals have proven health benefits to many in different ways. Nutraceuticals industry in India is one of the rapid growing market. Higher and upper middle-class consumers perceive nutraceuticals as alternative to prescribed drugs and exclusively for their beneficial properties with no side effects is working to its advantage. Boosting energy and improving overall health are the prime reasons for the rapid growth of this sector. The wide acceptance in younger age- group, safety and good quality are some of the key identifiers for protein related supplements to do well in urban market setting. With more people, becoming health conscious and taking up various physical activities along with the presence of such products on multiple online platforms will lead to increase in its consumption enormously.

The study has shown the most common situations were medical practitioners prescribe these supplements, its prevalence in the age group and the settings.

Comment [A9]: Major Revisions required before acceptance

UNDER PEER REVIEW

Reference:

1. Dr. Tomislav Meštrović P. What are Nutraceuticals? [Internet]. News-Medical.net. 2021 [cited 6 May 2021]. Available from: <https://www.news-medical.net/health/What-are-Nutraceuticals.aspx>.
2. Dr. Tomislav Meštrović P. What are Nutraceuticals? [Internet]. News-Medical.net. 2021 [cited 6 May 2021]. Available from: <https://www.news-medical.net/health/What-are-Nutraceuticals.aspx>.
3. Curtis L. Handbook of Non-Prescription Drugs: An Interactive Approach to Self-Care, 15th ed. 2007. Rosemary F. Beraidi and others. Handbook of Non-Prescription Drugs: An Interactive Approach to Self-Care, 15th ed. Washington, DC: American Pharmaceutical Association 2006. Xxiv+1235 pp. £90; \$149, ISBN: 1 58212 074 9 Distributed in the UK by McGraw-Hill. Reference Reviews. 2007; 21(1):37-38.
4. Das L, Bhaumik E, Raychaudhuri U, Chakraborty R. Role of nutraceuticals in human health. Journal of Food Science and Technology. 2011; 49(2):173-183..
5. Kaundal S, Kumar R. Comparative Proximate Nutraceutical Study of Poor Man's Pulse, Horsegram [Macrotyloma uniflorum] with the Other Common Legume Crops: A Review. European Journal of Nutrition & Food Safety. 2020;18-31.
6. Singh V, Mahaur S, Kushwaha S. Nutraceuticals: A New Golden Era in Health and Disease. Asian Journal of Research in Chemistry. 2018; 11(3):652..
7. [Internet]. Www2.deloitte.com. 2021 [cited 15 September 2021]. Available from: <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/consumer-business/immersion/Nutraceuticals%20market%20in%20India.pdf>.
8. Nutraceuticals Market Size, Share & Trends Analysis Report By Product (Dietary Supplements, Functional Food, Functional Beverages), By Region, and Segment Forecasts, 2020-2028 [Internet]. Research and Markets; 2021. Available from: <https://www.researchandmarkets.com/reports/4452005/nutraceuticals-market-size-share-and-trends>
9. Trumbo P, Schlicker S, Yates A, Poos M. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. 2021.)
10. Bauer J, Biolo G, Cederholm T, Cesari M, Cruz-Jentoft A, Morley J et al. Evidence-Based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group. Journal of the American Medical Directors Association. 2013;14(8):542-559.