

Awareness and Practices Towards Nutraceuticals Among Medical Practitioners

By

Varun Chhabra

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2016-2018



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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Varun Chhabra, student of MBA Pharmaceutical Management from The IIHMR University, Jaipur has undergone dissertation training at Onerous Pharma from 5th February 2018 to 9th May, 2018.

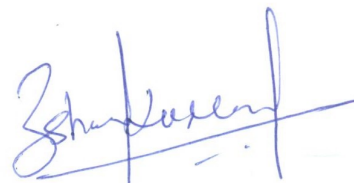
The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



(Dr. Ashok Kaushik)
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To Whom It May Concern

This is to certify that Mr. Varun Chhabra, Student of The IIHMR University has successfully completed his Dissertation on the project 'Awareness & Practices of Nutraceuticals among Medical Practitioners' (from 5th February 2018 to 9th May 2018) at this organization.

He comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning.

We wish him all the best for future endeavours.

For ONEROUS PHARMA

Authorised Signatory

THE IIMMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Awareness and Practices Towards Nutraceuticals Among Medical Practitioners** and submitted by **Varun Chhabra** Enrollment No. **IIMMR-U/02/2016-18/0085** under the supervision of **Dr. Ashok Kumar Peepliwal** for award of **MBA in Pharmaceutical Management** of the University carried out during the period from **5th Feb 2018 to 9th May 2018** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


Signature

CONTENTS

2	ACKNOWLEDGEMENT	4
3	About Organization.....	5
3.1	VISION:.....	5
3.2	MISSION:	5
3.3	ABSTRACT.....	6
4	Introduction.....	7
5	Review Of Literature	15
6	Rationale	16
7	Research Objectives.....	17
8	Research Methodology	18
9	Findings And Interpretations	19
10	Recommendations.....	24
11	Conclusion	25
12	References:.....	26
13	Annexure.....	27

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Without a proper combination of inspection and perspiration, it's not easy to achieve anything. There is always a sense of gratitude, which we express to others for the help and the needy services they rendered during the different phases of our lives. I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them.

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Varun Chhabra

ABOUT ORGANIZATION

Onerous Pharma was started with a mission to fill the gaps in quality and innovation. Over the years with the efforts it has been trying sincerely to fill the gap with innovative & quality products. It started the journey in 2012 with 5 products and today it has become a company with 60 products diversified in various therapeutic segments.

Onerous “aspires to be the great Pharmaceuticals Company of the Nation, with an unparalleled reputation on the benchmarks of quality, consistency & novelty. It strives for customer satisfaction, quality products & best management practices. Onerous brings difference in Pharma industry by adding values innovatively.

It is innovative in its packaging & designing. Onerous makes sure that each product go through stringent quality control procedures matching with complete guidelines, to minimise batch to batch variation and ensure the best quality.

VISION:

To achieve the reputation of best pharmaceutical company in India.”

MISSION:

To discover, develop and successfully market pharmaceutical preparations to prevent, diagnose, alleviate and cure diseases.

To provide total customer satisfaction and achieve leadership in chosen markets, products and services across the globe, through excellence in technology, based on world-class research and development.

ABSTRACT

Nutraceuticals are medicinal foods that enhance health, modulate immunity and thereby prevent and cure specific diseases. They may range from natural diets, herbal products to genetically engineered foods and processed products such as cereals, soups and beverages. Biofortified crops have been considered as a complementary strategy for delivering nutrition to malnourished populations. Dairy products that contain probiotic organisms such as *Lactobacillus* and *Bifidobacterium* species represent a new research area which improves gut health by modulating gut microbial composition. The ability of nutraceuticals to influence chronic diseases like diabetes, different types of cancers, etc. should be recognized as an enormous opportunity in their treatment. They played important role in future therapeutic developments. In this review, an attempt has been made to discuss, classification, commercial products and regulations of nutraceuticals and creation of awareness of nutraceutical products among doctors and consumers.

KEYWORDS: Nutraceuticals, Phytochemicals, Probiotic microorganisms, Fortified, Recombinant.”

INTRODUCTION

NUTRACEUTICALS:

Nutraceuticals is a term got from "sustenance" and "pharmaceutics." The term is connected to items that are disengaged from home grown items, dietary (supplements), particular weight control plans, and prepared nourishments, for example, grains, soups, and refreshments that other than sustenance are likewise utilized as solution. {1}

In the US, the expression "nutraceutical" items are directed as medications, sustenance fixings and dietary supplements. The term isn't characterized the same in various nations yet is normally characterized as an item confined from substances that is by and large sold in therapeutic structures not generally connected with nourishment. A nutraceutical item might be characterized as a substance, which has physiological advantage or gives assurance against endless illnesses. Nutraceuticals might be utilized to enhance wellbeing, defer the maturing procedure, forestall incessant illnesses, increment future, or bolster the structure or capacity of the body. {1}

A dietary supplement is considered as an item that bears or contains at least one of the accompanying dietary fixings: A mineral, a vitamin, an amino corrosive, a therapeutic herb or other natural, a dietary substance for use by man to supplement the eating regimen by expanding the aggregate day by day allow, or a think, metabolite, constituent, concentrate, or blends of these fixings. Nutraceuticals are of these wholesome supplements which are utilized for wellbeing purposes other than sustenance. {2}

Some well-known nutraceuticals incorporate ginseng, Echinacea, green tea, glucosamine, omega-3, lutein, folic corrosive, and cod liver oil. Larger part of the nutraceuticals have various helpful properties.

These days, nutraceuticals have gotten significant enthusiasm because of potential nutritious, security and restorative impacts. A statistical surveying as of late suggested that the overall nutraceuticals advertise is growing and would contact US \$250 billion by 2018. {3}

Late investigations have demonstrated promising outcomes for these mixes in different obsessive inconveniences, for example, diabetes {4}{5}, atherosclerosis{6}, cardiovascular maladies

(CVDs), disease, and neurological disorders{7}. These conditions include numerous progressions, including changes redox state. A large portion of nutraceuticals have cancer prevention agent movement with the capacity to neutralize this circumstance. Subsequently, they are considered as solid wellsprings of wellbeing advancement, particularly for anticipation of hazardous maladies, for example, diabetes, contamination, renal, and gastro-intestinal clutters.

In the present survey much exertion has been given to display new ideas about nutraceuticals in view of their maladies changing signs. Accentuation has been made to introduce natural nutraceuticals compelling on hard healing issue identified with oxidative pressure, including hypersensitivity, Alzheimer's, cardiovascular, malignancy, diabetes, eye, insusceptible, incendiary and Parkinson's ailments, and additionally corpulence.

Nutraceuticals contrast from Pharmaceuticals by not having patent security. The greater part of the nutraceutical items promoted are potential nutraceuticals and have not experienced any clinical trials. The vast majority of the engineered drugs have properties relating to toxicities. Nutraceutical mixes, natural nutraceuticals have been researched for their potential in battling the lethal impacts of poisons and different prescriptions.

The greater part of the plants have cancer prevention agent action and other than different particular approaches to battle poisons and engineered drugs, they by and large may decrease their danger by diminishment of oxidative pressure. These days, nutraceuticals are getting high enthusiasm because of their potential nourishing and wellbeing profile, other than restorative ability.

CLASSIFICATION BASED ON CHEMICAL GROUPS

Inorganic mineral supplements	Minerals
Probiotics	Helpful Bacteria
Prebiotics	Digestive Enzymes
Dietary Fibres	Fibres
Antioxidants	Natural Antioxidants
Phytochemicals	
Fatty acids	Omega 3 fatty acids
Phenolics	Tea polyphenols
Isoprenoids	Carotenoids
Lipids	Sphingolipids
Proteins	Soya proteins

PROBIOTICS

Live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host

Species of Lactobacillus.

Bifidobacterium.

Yeast *Saccharomyces cerevisiae*.

E. coli and *Bacillus* species are also used as probiotics.”{8}

PREBIOTICS

Non-digestible substances that provide a beneficial physiological effect for the host by selectively stimulating the favorable growth of a limited number of indigenous bacteria.

Commonly known prebiotics are: Oligofructose ,Inulin , Galacto-oligosaccharides , Lactulose. {8}

DIETARY FIBRES

“Dietary filaments are of two kinds:

- Water insoluble filaments
- Water solvent filaments

Day by day prescribed admission is 30-40 gms.

SOURCES: Entire grain oats, wheat items, Oats, dried beans, vegetables.

ANTIOXIDANTS

Antioxidants are of 3 categories:

True antioxidants

Reducing agents

Antioxidant synergists

Deficiency causes diseases like cancers, Rheumatoid Arthritis, Alzheimer’s disease, Cardiovascular Diseases.”

CLASSIFICATION- “Nutraceuticals are categorized on the basis of foods available in the market.”

They are classified as:

1. Traditional nutraceuticals
2. Non-traditional nutraceuticals

Traditional nutraceuticals are just normal without any progressions to the nourishment. Sustenance contains a few common segments that convey benefits past fundamental nourishment, for example, lycopene in tomatoes, omega-3 unsaturated fats in salmon or saponins in soy.”

They are gathered based on

I. Substance Constituents

A) Nutrients b) Herbals c) Phytochemicals”

A) Nutrients "

Substances, for example, vitamins, minerals, amino acids and unsaturated fats with built up nourishing capacities. Most vegetables, wholegrain grains, dairy items, foods grown from the ground items, for example, meat, poultry, contain vitamins and are useful in curing heart ailments, stroke, waterfalls, osteoporosis, diabetes and disease. Minerals found in plant, creature and dairy items are helpful in osteoporosis, weakness and manufacture solid bones, teeth, muscles, enhance nerve driving forces and heart mood.

Flax seed and salmon contain unsaturated fats omega-3 PUFAs, and are powerful controllers of the incendiary procedures, support of mind work and lessen cholesterol affidavit.

B) Herbals-

Nutraceuticals holds an extraordinary guarantee to enhance wellbeing and counteract interminable sicknesses with the assistance of herbals. A few cases are willow bark (*Salix nigra*), having dynamic segment as salicin, which is mitigating, pain relieving, antipyretic, astringent and antiarthritic. Parsley (*Petroselinum crispum*) contains flavnoids (apiol, psoralen) and is diuretic, carminative and antipyretic.

Peppermint (*Mentha piperita*) contains menthol as a dynamic part and cures cool and influenza. Lavender (*Lavandula angustifolia*) contains tannin which is useful in curing discouragement, hypertension, stretch, cold,cough and asthma. Cranberries (*Vaccinium erythrocarpum*) contain proanthocyanadin and are observed to be helpful in growth, ulcers and urinary tract diseases. {9}

C) Phytochemicals-

They are characterized based on substance name offered by their phytochemical properties. For instance, Carotenoids (Isoprenoids) found in different organic products, vegetables and egg yolk, are anticarcinogenic, support regular executioner safe cells and ensure cornea against UV light. Vegetables (chickpeas and soybeans), grains, palm oil contain non-carotenoids, which expel cholesterol and are against cancer-causing. Flavonoid polyphenolics are found in berries, organic products, vegetables, and vegetables, which are strong cell reinforcements, phytoestrogens, forestall bosom disease, prostate tumor and control diabetes.

Non-flavonoid polyphenolics are available in dull grapes, raisins, berries, peanuts, turmeric roots are solid calming, hostile to oxidants, and successful against thickening operators and lessen cholesterol. Phenolic acids, found in blueberries, tomatoes and ringer peppers having cancer prevention agent movement, decrease mutagenicity of polycyclic fragrant hydrocarbons. Seeds of Barbarea verna, broccoli contain isothiocyanates (glucosinolates) and have hostile to tumorigenesis action.

II. Probiotic Microorganisms

Probiotics signify 'forever' and are characterized as live microorganisms, which when devoured in sufficient sums, give a wellbeing impact on the host. {10} microscopic organisms that advance sound assimilation and ingestion of a few supplements. They act to swarm out pathogens, for example, yeasts, other microscopic organisms and infections that may some way or another reason illness and build up a commonly beneficial advantageous interaction with the human gastrointestinal tract. {15}.

They have an antimicrobial impact through altering the microflora, avoiding bond of pathogens to the intestinal epithelium, seeking supplements essential for pathogen survival, creating an antibody impact and turning around a portion of the results of disease on the intestinal epithelium, for example, secretory changes and neutrophil movement. Probiotics can cure lactose bigotry by

the creation of the particular chemical (β -galactosidase) that can hydrolyze the culpable lactose into its segment sugars.

III. Nutraceutical Compounds

Compounds are a fundamental piece of life, without which our bodies would stop to work. "Those individuals who are experiencing restorative conditions, for example, hypoglycemia, glucose issue, stomach related issues and heftiness, dispense with the manifestations by compound supplements to their eating regimen. These compounds are gotten from microbial, plant and creature sources.

List of nutraceuticals enzymes from Microbes, plants and animals

Microbial Enzymes/source	Plant Enzymes/source	Animal Enzymes/source
Hemicellulase (microorganisms and mushrooms)	Hemicellulase (plant walls)	OxBile (ox)
Catalase	Pectinase (cell wall)	Pancreolipase (pancreatic juice)
Amyloglucosidase (ascomycetes)	α - Galactosidase (beans, cabbage, Brussels sprouts, broccoli, asparagus, other vegetables, and whole grains)	Trypsin (pancreatic juice)
Glucoamylase (A. niger, Saccharomycopsis fibuligera)	β -Amylase (higher plants)	Chymotrypsin (all classes of vertebrates)
Cellulase (all living cells)	Bromelain (pineapple)	Pepsin (animals tracheal secretions)
Lactase – β -Galactosidase (bacteria)	Glucoamylase (callus and suspension cultures of sugar beets (Beta vulgaris L.) as well as in mature roots)	α –Amylase (saliva)
Invertase – Sucrase (yeast)	Biodiastase (soybean)	Lysozyme (saliva, tears, egg white, and many animal fluids)

Non-traditional nutraceuticals are artificial foods prepared with the help of biotechnology. Food samples contain bioactive components which are engineered to produce products for human-wellness. They are arranged into

a) Fortified Nutraceuticals -It constitutes invigorated nourishment from farming reproducing or included supplements or potentially fixings. e.g. squeezed orange strengthened with calcium, oats with included vitamins or minerals and flour with included folic corrosive. A few cases are drain invigorated with cholecalciferol utilized as a part of vitamin D lack {10}. Prebiotic and probiotic sustained drain with Bifidobacterium lactis utilized as a part of looseness of the bowels, respiratory contaminations and serious ailments, in kids. {10}

b) Recombinant nutraceuticals- “Energy-providing foods, such as bread, alcohol, fermented starch, yogurt, cheese, vinegar, and others are produced with the help of biotechnology.

c) COMMERCIAL NUTRACEUTICALS New molecule is difficult to discover and more expensive and risky than ever before. Many pharmaceutical companies are now trying to manufacture nutraceutical because there is undoubtedly a very huge and growing market. Nutraceuticals cover most of the therapeutic areas, such as anti-arthritis, cold and cough, sleeping disorders, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol control, pain killers, depression and diabetes.

Recognition of health benefits from consumption of omega-3 rich seafoods is one of the most promising developments in human nutrition and disease prevention research in the past three decades. {11}

REVIEW OF LITERATURE

Nutraceuticals, in contrast to pharmaceuticals, are substances, which usually have not patent protection. Both pharmaceutical and nutraceutical compounds might be used to cure or prevent diseases, but only pharmaceutical compounds have governmental sanction.

A dietary supplement is considered as a product that bears or contains one or more of the following dietary ingredients: A mineral, a vitamin, an amino acid, a medical herb or other botanical, a dietary substance for use by man to supplement the diet by increasing the total daily intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients. Nutraceuticals are of these nutritional supplements which are used for health purposes other than nutrition.

Some popular nutraceuticals include ginseng, *Echinacea*, green tea, glucosamine, omega-3, lutein, folic acid, and cod liver oil. Majority of the nutraceuticals possess multiple therapeutic properties.

Nowadays, nutraceuticals have received considerable interest due to potential nutritional, safety and therapeutic effects. A market research recently proposed that the worldwide nutraceuticals market is expanding and would reach US \$250 billion by 2018.

Recent studies have shown promising results for these compounds in various pathological complications such as diabetes, atherosclerosis, cardiovascular diseases (CVDs), cancer, and neurological disorders. These conditions involve many changes, including alterations redox state. Most of nutraceuticals have antioxidant activity with the ability to counteract this situation. Hence, they are considered as healthy sources of health promotion, especially for prevention of life threatening diseases such as diabetes, infection, renal, and gastro-intestinal disorders.

In the present review much effort has been devoted to present new concepts about nutraceuticals based on their diseases modifying indications. Emphasis has been made to present herbal nutraceuticals effective on hard curative disorders related to oxidative stress, including allergy, Alzheimer's, cardiovascular, cancer, diabetes, eye, immune, inflammatory and Parkinson's diseases, as well as obesity.

RATIONALE

Nutraceuticals are increasingly becoming a part of diet in a health-conscious society. People have changed their outlook towards nutraceuticals because of varying lifestyle diseases and they see the need to improve their physical and mental health. A Nutraceutical is a product isolated from food stuff and can be sold in the form of powders; pills and other forms not generally associated with food and demonstrating numerous physiological utilities and offer protection against chronic diseases. Any type of food or a part of food carrying any health benefits can be called as Nutraceuticals The present study was designed to assess the awareness and perception of doctors and consumers to get insight of Indian Nutraceutical market and to study the factors driving the growth of Nutraceutical market.

RESEARCH OBJECTIVES

To assess the attitude by knowing the awareness and practices of Medical Practitioners towards Nutraceuticals.

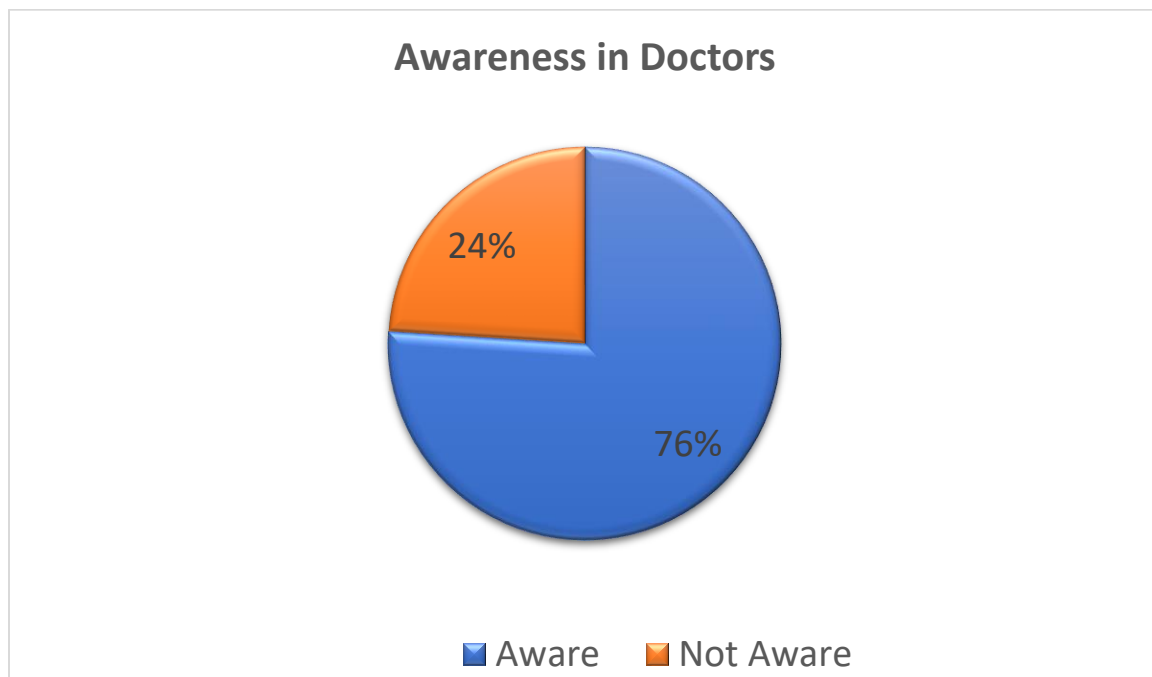
To study the factors driving the growth of Nutraceutical market.

RESEARCH METHODOLOGY

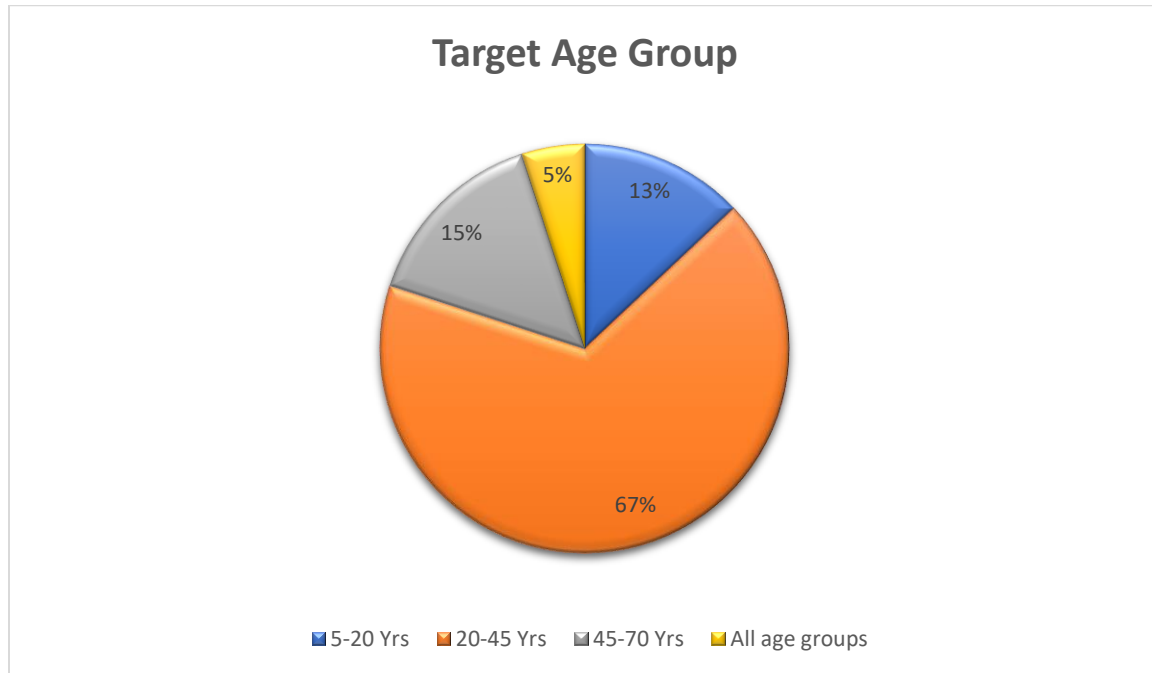
Study design:	Cross-Sectional study focusing on understanding Awareness and Practices towards Nutraceuticals among registered medical practitioners
Location covered	The study was be conducted in Ludhiana.
Sample Size	100 respondents (General Physician/Gastro-enterologists)
Duration of the study	February 2017 to May 2017 (three months)
Sampling technique	Purposive Convenience Sampling
Tool for Data collection	Primary Data – The primary data for this project was gathered through survey using a structured questionnaire
Data Analysis	The data was entered in MS-Excel sheet and analysis was made in terms of proportion of patients

FINDINGS AND INTERPRETATIONS

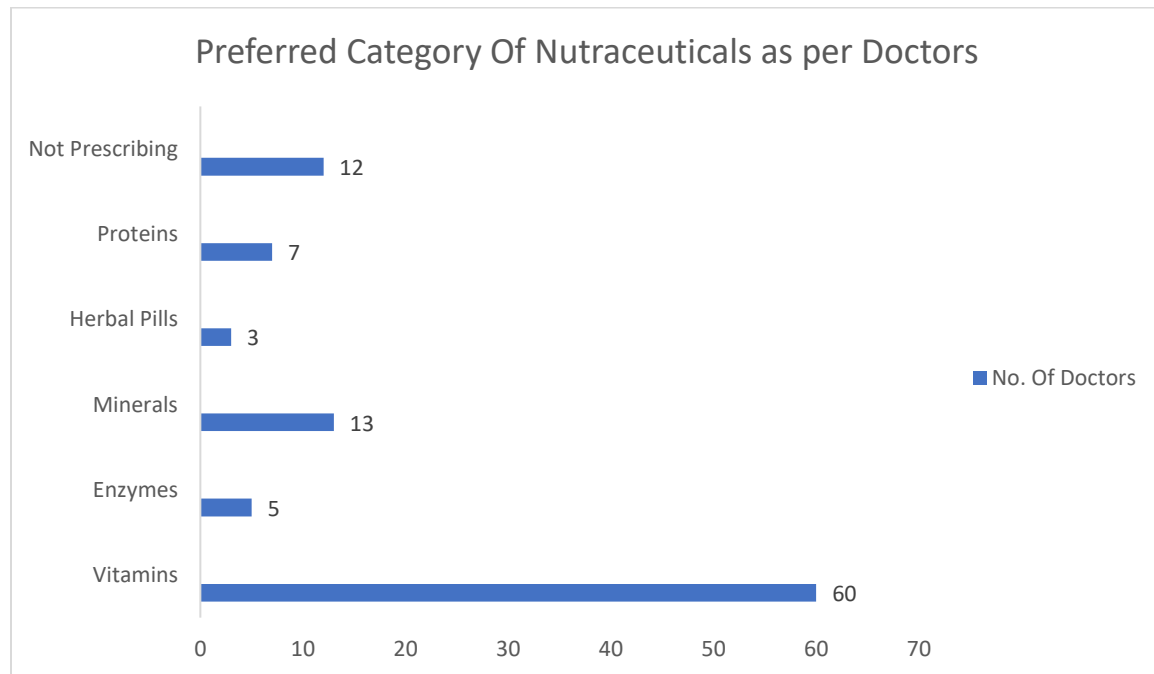
Q. Are you aware of the term Nutraceuticals?



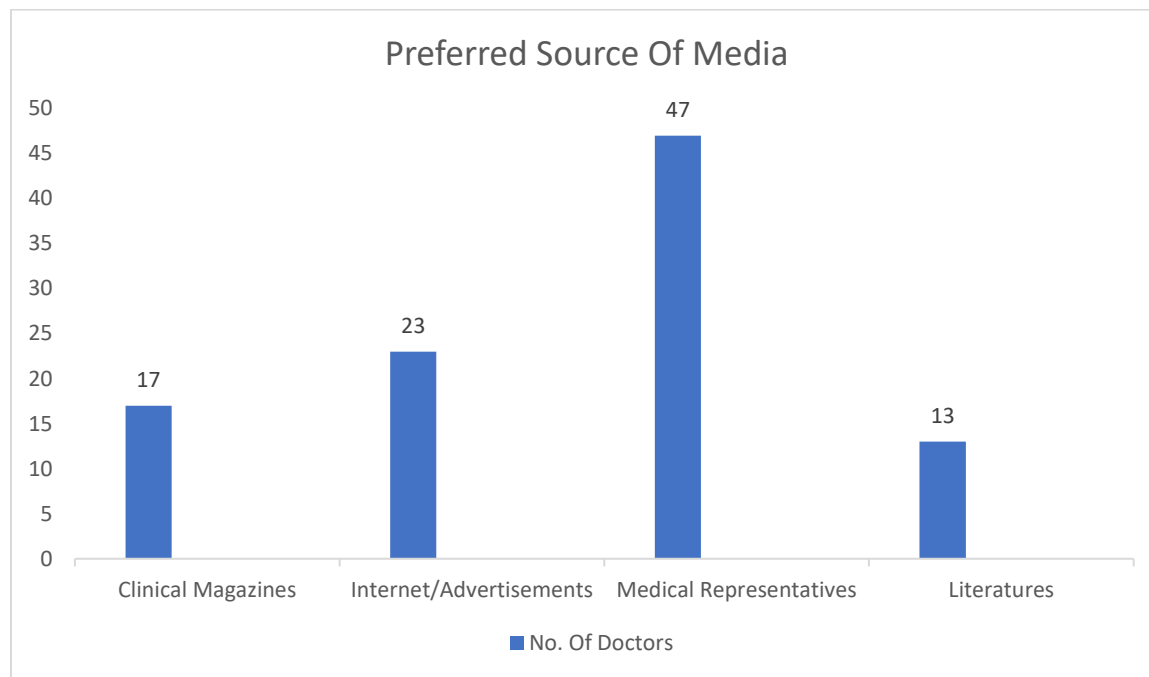
Q. Which age group do you commonly prescribe Nutraceuticals?



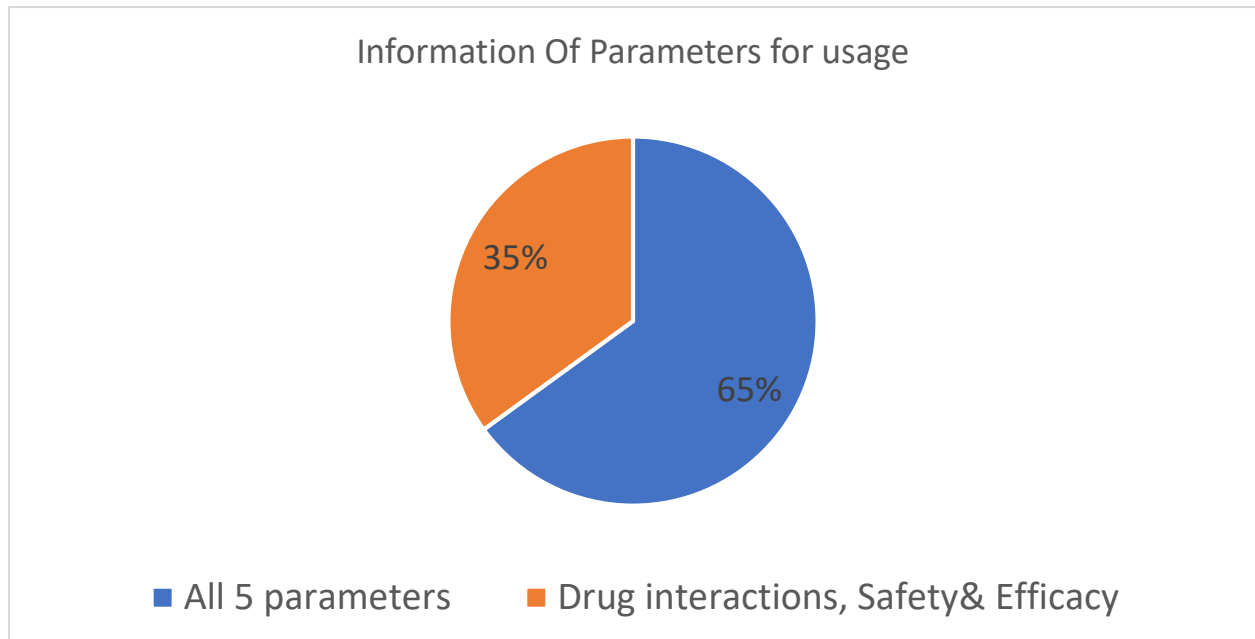
Q. During a patient approach towards nutraceuticals, which category of nutraceuticals comes on the top of your mind?



Q. For information about Nutraceuticals, Which source of media do you prefer?



Q. Out of the following mentioned in the list, information about which parameters should be known to greater extent in regard to usage of nutraceuticals?



Parameters to be known

Dosage

Formulations

Adverse effects

Drug Interactions

Safety & Efficacy.

RECOMMENDATIONS

- The present study was designed to assess the awareness and perception of doctors and consumers to get insight of Indian Nutraceutical market and to study the factors driving the growth of Nutraceutical market.

Nutraceuticals are being increasingly perceived as beneficial to health and are being continuously used in the treatment of various diseases. Therefore, it is imperative that a doctor educates the public and creates an awareness of the required number of nutraceuticals that can be safely used. The future of nutraceuticals is bright and can transform healthcare in a developing country like India which utilizes many natural compounds. More studies need to be taken up on prescription of nutraceuticals in healthcare.

The study suggested that there is no clear perception created in the physician's mind regarding usage and prescription of Nutraceutical Products. The reason for stating so is the relative number of doctors having less or no awareness in Nutraceutical Market, assuming the increase in awareness and knowledge over the use of Nutraceuticals will improve the health outcome of consumers

The factors that would improve the knowledge are conducting CME'S, free subscriptions to magazines to Doctors, keeping the physicians about the products and therapy options

CONCLUSION

Nutraceuticals are prescribed at various healthcare organizations but their proportion in the prescriptions is less convincing. There should be an immediate call for increasing the awareness about Nutraceuticals. The present challenges need a systematic approach and proper coordination from the organization's aspects to the physicians for better growth. The expenditures within the healthcare system have increased exponentially and the need for continuation and sustainability of the system has forced many patients and consumers to hunt for further cost-effective alternatives.

Nutraceuticals are increasingly being prescribed by medical practitioners but there is need for further study to analyse the attitude and practices towards them to provide ultimate benefit to mankind.

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ANNEXURE

QUESTIONNAIRE

Respondent category (Gastro-enterologists/GP/Diabetologists) _____

No. of Practicing Years _____

Speciality _____

City: _____

Q1. Are you aware of term 'Nutraceuticals'?

Yes

No

Q2. Which age group of patients do you commonly prescribe Nutraceuticals?

5-20

25-45

45-70

All above.

Q3. During a patient approach towards nutraceuticals, which category of nutraceuticals comes on the top of your mind?

Vitamins

Enzymes

Minerals

Herbal Pills

Proteins

Not Prescribing any Nutraceuticals

Q4. From Out of the following, which is the most appropriate reason for prescribing the usage of nutraceuticals, according to you?

As a treatment for any illness

To improve body function

For general well being

To reduce body weight

Because it prevents long term chronic illness

Q5. According to you, Do you think that adequate awareness and supply of nutraceuticals products as per demand is available in the region?

Agree

Do not agree

Do not know.

Q6. For information about Nutraceuticals, Which source of media do you prefer?

Clinical Magazines

Internet/Advertisements

Literatures

Representatives and distributors

Q7. Does packaging of the product provide impact on the consumers to buy the product? If Yes, which dosage form do they prefer?

1. Sachets

2.Capsule

3.Tablet

4.Syrup

Q8. Do you consider availability of the product in decision of prescribing Nutraceuticals?

Yes

No

Q9. Do you consider adding cost of nutraceutical with other drugs which have been prescribed for long term usage such as diabetes, hypertension, gastritis?

Yes

No

Q10. Out of the following mentioned in the list, information about which parameters should be known to greater extent in regard to usage of nutraceuticals?

Dosage	Yes	No
Formulation	Yes	No
Adverse Effects	Yes	No
Drug Interaction	Yes	No
Safety & Efficacy	Yes	No