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Research Article

PRESCRIBING PATTERN OF NUTRACEUTICALS IN ONCOLOGY: AN OBSERVATIONAL STUDY

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ABSTRACT

Objective: Nutraceuticals are products found in foods and fruits that are also used as medicines other than being used for nutrition. They provide physiological benefits and protection against chronic diseases. They include minerals, vitamins, amino acids, essential fatty acids, and medicinal herbs or other dietary substances used as supplements, for example, polyphenols, quercetin, co-enzyme Q, and genistein are in use due to their chemopreventive potential.

Aim of Study: The aim of this study was to examine the prescribing pattern of nutraceuticals in cancer patients.

Methods: The present cross-sectional and observational study was conducted in the outpatient department (OPD) of Oncology of GMC Jammu after getting approval from the Institutional Ethics Committee. Patients of either gender and diagnosed with carcinoma attending oncology OPD were included in the study. Fifty prescription slips were evaluated for the prescribing pattern of nutraceuticals. The data were analyzed in percentages.

Results: Most of the patients were prescribed more than one nutraceutical. Most commonly prescribed nutraceuticals were vitamins (44%) which included vitamin A, B complex, C, and D followed by minerals (36%), essential amino acids (12%), beta-carotene (8%), coenzyme Q (6%), lycopene (6%), curcumin (4%), and wheatgrass (2%).

Conclusion: Nutraceuticals are being increasingly prescribed to cancer patients. In our study, vitamins were the most commonly prescribed nutraceuticals. Most of them have antioxidant potential. Nutraceutical use may increase in the future due to their safety and therapeutic effects.

Keywords: Nutraceuticals, Lycopene, Curcumin, Wheatgrass.

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INTRODUCTION

The term "Nutraceutical" was put forward by Dr. Stephen L DeFelica in 1989 (nutraceutic derived from "nutrition" and "pharmaceutics") [1].

Nutraceuticals include products isolated from herbal products and dietary supplements and are used as medicine besides their utility as nutrition. They have physiological benefits and protect against chronic diseases.

Nutraceuticals include minerals, vitamins, amino acids, essential fatty acids, medicinal herbs, or other dietary substances used as supplements, for example, polyphenols, quercetin, coenzyme Q, and genistein.

The wide use of nutraceuticals is based on their multiple therapeutic applications and safety profile besides nutritional properties. Their global market size in 2021 was USD 396.29 billion and projected value in 2030 is USD 636.6 billion [2].

Most nutraceuticals possess antioxidant properties and are used in multiple disorders for their disease-modifying actions in diabetes, chronic conditions, infection, Alzheimer's, and cardiovascular disorders.

Nutraceuticals are potential chemopreventive agents [3,4]. Fruit and vegetable consumption can reduce cancer incidence. Phytochemical flavonoid (quercetin) is shown to be effective in leukemia [5]. Flavonoids have anticancer effects as they modulate reactive oxygen species scavenging enzymes, apoptosis, autography, and suppress proliferation and invasiveness of carcinoma cells [6].

Cancer is a significant health problem and the leading cause of mortality worldwide accounting for 10 million deaths in year 2020 or nearly one in six deaths [7] and more so in developing countries. India is no exception, there were 26.7 million cancer patients in 2021 and are expected to rise to 29.8 million in 2025 [8].

It is now well-established that a healthy lifestyle and diet can help in prevention of cancer, and in this regard, the use of nutraceuticals assumes importance. Therefore, the present study aimed to examine prescribing pattern of nutraceuticals in cancer patients.

METHODS

The present cross-sectional and observational study was conducted in the outpatient department (OPD) of Oncology Department of GMC Jammu. The study was approved by the Institutional Ethics Committee. Patients diagnosed with cancer attending the OPD, of either gender, who were prescribed nutraceuticals, were included in the study. Prescriptions of those patients were assessed. OPD slips of patients were evaluated for the type of cancer, demographic characteristics, and prescribing pattern of nutraceuticals. The percentage and prescribing pattern of nutraceuticals prescribed were recorded.

Statistics

The collected data were analyzed and presented in percentages in tabulated form.

OBSERVATIONS

One hundred and fifty-two prescriptions of cancer patients attending the oncology OPD were studied, out of which 50 prescriptions had nutraceuticals (32.89%). The majority of patients were from rural backgrounds. Lung carcinoma (22.7%) was the most common type of

cancer, followed by breast and gallbladder (13.6% each), cervix (9%), thyroid (9%), leukemia (4.5%), and other carcinomas.

Most of the patients were prescribed more than one nutraceutical. Most commonly prescribed nutraceuticals were vitamins (44%) which included vitamin A, B complex, C, and D, followed by minerals (36%), essential amino acids (12%), beta-carotene (8%), coenzyme Q (6%), lycopene (6%), curcumin (4%), and wheatgrass (2%).

DISCUSSION

Nutraceuticals are frequently used in multiple disorders, especially chronic due to their antioxidant properties. Some of the nutraceuticals such as vitamins, minerals, ginseng, glucosamine, omega-3 fatty acids, lutein, and lycopene are commonly used for multiple indications.

In the present study, commonly prescribed nutraceuticals were vitamins (44%) which included vitamin A, B complex, C, and D, followed by minerals (36%), essential amino acids (12%), beta-carotene (8%), coenzyme Q (6%), lycopene (6%), curcumin (4%), and wheatgrass (2%).

The vitamins have antioxidant actions and possess apoptotic, anti-angiogenesis, and inhibitory potential against metastasis of cancer cells. Primarily, vitamin C, vitamin D, and vitamin E are also involved in the amelioration of side effects of chemotherapy in cancer patients [9].

Lycopene was prescribed in 6% cancer patients. Carotenoids possess antioxidant properties and provide color to food. A number of studies has highlighted lycopene's role in cancer prevention. Dietary intake of products rich in lycopene is associated with decreased risk of chronic diseases such as cancer and cardiovascular diseases. On the other hand, lower lycopene levels lead to increased risk [10,11].

It reaches and accumulates in organs such as the prostate, adrenal gland, testes, and skin and has the potential to prevent cancer at these sites [12]. Carotenoids are potent quenchers of singlet molecular oxygen [13] Lycopene-rich fruits such as tomatoes, watermelon, pink grapefruit, and papaya are rich sources of antioxidants and find their utility in cancer prevention and coronary artery disease.

Beta-carotene also possesses potent antioxidant activity and scavenges free radicals and, in the present study, 8% of patients were prescribed beta carotene.

Curcumin (diferuloylmethane) is a polyphenol that comes from the plant Curcuma longa, known as turmeric and is widely used in the diet. It has been reported to possess antioxidant, anticancer, and anti-inflammatory properties. Curcumin exhibits anticancer ability by targeting different cell signaling pathways including growth factors (FGF, VEGF, TGF-β1, TF, CTGF, and EGF), cytokines (Prostaglandins, TNF, IFN, interleukins, COX-2, MCP-1, and MIP), transcription factors (*ERG-1*, ERE, STAT-1, STAT-3, STAT-4, STAT-5, Notch-1, NF-κB, PPAR-γ, WTG-1, and β-catechin), and genes modulating cellular proliferation and apoptosis [14,15]. Curcumin is an effective singlet oxygen quencher [16].

Coenzyme Q helps in the generation of energy from food as it is involved in the mitochondrial respiratory chain. Its concentration is maximum in organs with high-energy demands such as liver, kidney, heart, spleen, and pancreas. It is an important antioxidant and prevents the generation of toxic free radicals (reactive oxygen species). In the deficiency of Coenzyme Q10, there is dysfunction of mitochondrial respiratory chain leading to increased ROS. In a number of diseases, there is an increased generation of ROS, indicating more significant role of Coenzyme Q in these disorders.

Coenzyme Q10 plays a role in redox control of cell growth and signaling, membrane channel structure and fluidity, hydrogen peroxide production, apoptosis, gene expression, and formation of thiol groups [17-19].

Wheatgrass (*Tritcumaestivum* Linn) is an essential herbal medicinal plant commonly used in Ayurveda. It is very rich in chlorophyll, which is unique due to its structural similarity with human hemoglobin and is called green blood. It also contains several vitamins, minerals, amino acids, and vital enzymes.

Its role in cancer is well-documented [20]. Wheat grass juice is suggested to be an effective alternative to blood transfusion and in terminally ill cancer patients, it should be encouraged [21]. It prevents deterioration of hematological parameters (Hemoglobin and platelet count) produced by anticancer therapy and decreases the number of blood transfusions requirements in cancer patients [22].

Most nutraceuticals are antioxidants and the primary mechanism of nutraceuticals may involve the activation of signal transduction pathways, antioxidant defenses, gene expression, cell proliferation, differentiation, and preservation of mitochondrial integrity [23].

However, nutraceuticals, like other herbal products, may also suffer from some drawbacks and limitations. There may be a possibility of ineffective targeting, poor solubility, low permeability, fast metabolism, interactions, and other limitations [24].

CONCLUSION

Dietary chemopreventive agents are assuming importance in cancer patients and as such use of nutraceuticals is on the rise. In the current trial, vitamins were more commonly prescribed. Most nutraceuticals are antioxidants and scavenge free radicals. Their use may increase due to their perceived safety profile and their nutritional value.

AUTHORS' CONTRIBUTIONS

Dr. Kanika conceived the research idea of research work, conducted the study, and collected the data. Dr Seema Gupta supervised the work in analyzing, interpreting the data and writing the manuscript, Dr Rahul Sharma supervised the work at hospital site, while Dr. Vijay Khajuria reviewed and edited the manuscript.

CONFLICTS OF INTEREST

Authors declared no conflicts of interest related to study.

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