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OF SCIENCES AND LITERATURE

**NUTRITIONAL SUPPLEMENTS
AS A BASIC PART OF DRUG TREATMENT**

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Abstract

Most chronic diseases of concern today are multifactorial in origin, and this is becoming more widely accepted. A treatment strategy that includes both medication and nutrition may be the most effective in combating these diseases and other health issues. An ever-increasing number of nutritional supplements with their own health claims are being sold alongside (disease-related) dietetic programs. At the so-called 'Pharma-Nutrition Interface,' these goods are positioned between traditional foods and medicines. Nutritional supplements can be used as monotherapy or in combination with prescription medications to lower health risk factors or illness risk. However, it is important to keep in mind the possible drawbacks of these products. In addition to the increased risk of food-drug interactions due to the higher levels of certain functional ingredients in the diet, these caveats also include the encouragement of self-medication, which may result in less adherence to drug therapy. Drugs and nutritional supplements should be compared using health technology assessments in order to measure the usefulness of dietary supplements in combination with drug treatment.

Keywords: Nutritional supplements – Drugs – Foods and medicines – Chronic diseases – Self-medication

Chapter I: Introduction

1.1. Research Background

Products that complement a person's diet with additional health-enhancing elements are known as dietary supplements. Nutritional supplements are products that are designed to be used as an addition to the diet and contain nutrients such as vitamins, minerals, amino acids, and botanicals. They can be taken orally and are labelled "dietary supplement" under the Dietary Supplement Health and Education Act (DSHEA) (Ronis et al. 2018). Dietary supplements are a common part of many people's lives. In general, they are used to improve and preserve health. A supplement's primary purpose is to keep women's bones strong and avoid osteoporosis. Multivitamins, mineral supplements, calcium supplements, and omega-3 fatty acids or fish oil are the most often utilized supplements (Bailey et al. 2013).

The abundance of dietary supplements at pharmacies, chain stores, supermarkets, and health food stores attests to the fact that they have become a key component of health culture. Vitamin, mineral, and herbal supplement consumption has surged since the 1960s (Kessler et al., 2001). In 2002, nutritional supplements generated \$18.7 billion in sales, making them a large market today (Nutrition Business Journal, 2003). More than 380 percent of the population used herbal products between 1990 and 1997 (Eisenberg et al., 1998), and recent survey statistics show that 14 percent of Americans have taken an herbal product or supplement within a week and that 18.9 percent had taken one in a year (Barnes et al., 2004). Consumers, researchers, and practitioners face distinct regulatory, safety, and efficacy issues when it comes to the use of dietary supplements.

In the past, medications have been used to treat or mitigate the symptoms of illness. As an alternative, the primary goal of nutrition is to keep people healthy by giving them the right combination of macro- and micronutrients. Medicines are increasingly being utilized to reduce risk factors and thereby prevent chronic diseases as a result of the growing understanding of disease. Cardiovascular disease can be prevented by using medications that control blood pressure and cholesterol. With the advent of nutritional supplements, the line between pharmaceuticals and nutrition has become even more blurred (Figure 1).

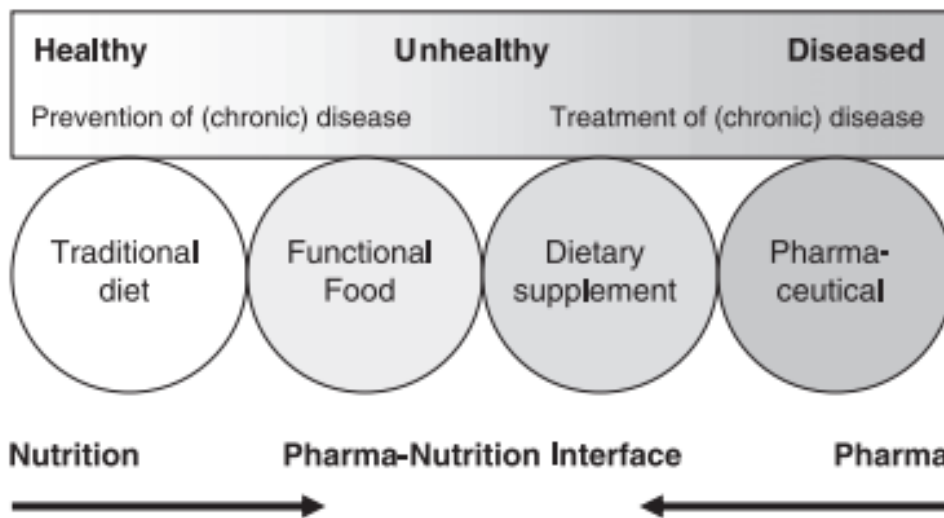


Figure 1: the line between pharmaceuticals and nutrition

Dietary supplements are sold in the form of capsules, pills, powders, or gels and are not intended to be consumed in the same way as regular foods. The purpose of dietary supplements is to supplement the diet with one or more dietary elements (e.g. vitamins, minerals, amino acids, herbs or other botanicals) (U.S. Food and Drug Administration, 1994; van Kreijl et al., 2006). Large (sub) populations are frequently targeted by dietary supplement manufacturers today. Prebiotics and probiotics products are marketed to healthy populations, while phytosterol-enriched functional foods are directed at adults with (moderately) high cholesterol levels.

'Personalized medicine' and 'Personalized nutrition' have been developed as a result of recent breakthroughs in pharmaco- and nutrigenomics (Abrahams, E. and Silver, M., 2009; Kaput, 2008; Kussmann and Fay, 2008).

People's genetic risk profiles are taken into account in these new fields. Many pharmaceuticals, as well as a number of dietary components (Afman and Müller, 2006), have been shown to influence gene expression and thus metabolic pathways and homeostasis, as well as health and disease (Afman and Müller, 2006; Pravenec and Kurtz, 2007). In addition, genes play a significant role in determining how a person responds to a particular food or drug, as well as how often an individual experiences bad drug reactions (Friso and Choi, 2002; Lee et al., 2010).

1.2. Research problem

Many people believe that today's diet is more nutritious than it was in the past. People's lack of understanding of the fundamentals of nutrition has led a substantial portion of the population to eat a diet that is heavy in calories and fat but low in protein, vitamins, and minerals (Kourkouta et al. 2016). Various degenerative diseases have emerged as a result of this long-term scenario. With this in mind, nutritional supplements were offered as a possible alternative (Oikonomou, 2009). In the event that an individual's daily diet is not balanced or if nutrients are deficient, dietary supplements are products that include one or more concentrated nutrients in order to complement the individual's daily diet. Consuming dietary supplements is not the same as eating a balanced diet or taking medication, and they are not targeted for a particular group of people.

Supplements fill in the gaps in the body's nutritional needs so that it can stay in peak physical and mental health. As a result, the human body is not overworked, and injuries and weariness are also avoided (Kourkouta et al., 2016). In the recent decade, the manufacture and consumption of

dietary supplements have expanded significantly. Tablets and powders make up the bulk of these supplements. Although the increased intake is expected to provide health benefits, overconsumption of vitamins and minerals may result in greater levels of these nutrients that the body cannot handle. Consumption of dietary supplements can represent a health hazard to consumers. By using these supplements without prescription or medical supervision, the problem grows more serious (Beitz et al. 2004).

Health-care providers recommend around a quarter of all supplements. As a result, the majority of supplement use decisions are made by customers. Dietary supplements, despite their widespread appeal, have a doubtful effect on health. Scurvy, beriberi, pellagra, and rickets are all deficiency disorders caused by a lack of vitamins in the diet. However, a typical, well-balanced diet contains enough vitamins to prevent many illnesses. The outcomes of studies looking into the effects of supplements are frequently inconclusive. A contemporary scientific consensus does not appear to exist about the benefits or drawbacks of vitamin and food supplementation for health in well-nourished people (Moyer 2014).

A significant difficulty in clinical practice is the interaction between natural products and drugs. The same pharmacokinetic and pharmacodynamics principles govern interactions between pharmaceuticals and natural products. Several fruits and berries include compounds that interfere with enzymes that break down drugs (Molden, E. and Spigset, O., 2007). In addition to grapefruit, citrus fruits like seville orange, pomelo, and star fruit include compounds that inhibit CYP3A4 (the most significant enzyme in drug metabolism), which are found in these fruits (Kirby, B.J. and Unadkat, J.D., 2007).

Pharmacokinetic and pharmacodynamics studies are expected to increase the safety of drugs, and personalized drug therapy will be possible as a result of this research. Only when given in the

correct dosage, with the correct mix of pharmaceuticals and foods, and at the correct time, can a drug be shown to be effective. The information on drug-drug interactions is readily available, but the information on food-drug interactions isn't always available. Drug interactions with food and nutrition are a challenging and complex topic to solve.

1.3. Research questions

The research aims to ask the main question which is stated as follows:

“How are the nutritional supplements used as a basic part of drug treatment for diseases and other health conditions?”

The secondary questions are:

- What are the associations between supplement ingredients and health outcomes in chronic degenerative diseases?
- Is the treatment more successful and with less negative effects when using medicine with nutritional supplements?
- Is the treatment more successful to treat many cases when using medicine with nutritional supplements?
- What are the adverse effects of the misusing of nutritional supplements?
- What are the issues of personal choice and values, sometimes involving the efficacy of supplements as complementary and alternative therapies?

1.4. Aim and objectives

The research aims mainly to determine the usage of nutritional supplements as a basic part of drug treatment for diseases and other health conditions.

The secondary objectives:

- Determine the associations between supplement ingredients and health outcomes in chronic degenerative diseases

- Investigate the adverse effects of the misusing of nutritional supplements
- Investigate the issues of personal choice and values, sometimes involving the efficacy of supplements as complementary and alternative therapies

1.5. Research significance

Dietary supplements can be beneficial to human health in certain circumstances, but they should not be used as a substitute for a well-balanced regular diet of food substances. Supplements consumed by customers to improve their health or well-being are a huge market. These items, however, may not be suitable for everyone. Pregnant women who take supplements containing active substances that can affect the body's physiology or pharmacology may experience side effects. To avoid major medical complications, more attention must be paid to probable side effects and interactions. Before initiating or recommending a regimen incorporating these substances, both users and physicians should examine the most recent scientific research. Dietary supplements are taken by a big percentage of the population, and doctors should be aware of this. To ensure that they are providing the best possible care, doctors should ask patients about their supplement use. Pregnant women, elderly people, and those with disabilities should be informed and counselled by their doctors or pharmacists about nutritional supplementation. Self-prescription of dietary supplements should be avoided.

1.6. Thesis structure

The thesis is divided into five main chapters:

- **Chapter I: Introduction**

It provides background to the topic; brief review of current knowledge on the nutritional supplements; indicates gap in knowledge, states aim of the research and how it fits into the gap; and an outline of the following chapters.

- **Chapter II: Literature Review**

It is an evaluation of previous research on the topic, the gap in the knowledge that the research will attempt to fill is stated here. It provides more information and examples on the history of nutritional supplements, their classification, forms and usage.

- **Chapter III: Methodology**

It outlines the chosen method and its justification; what, when, where, how and why the results will be obtained.

- **Chapter IV: Results and Discussion**

It outlines what is found out in relation to the research questions/hypotheses, presented in figures and in written text. Results contain the facts of research. a brief comment on the significance of key results will be stated, with the expectation that more generalized comments about results will be made in the Discussion section.

The Discussion section comments on the results; explains what the results mean; interprets the results in a wider context; indicates which results were expected or unexpected; provides explanations for unexpected results. The Discussion also relate specific results to previous research or theory.

- **Chapter V: Conclusions and Recommendations**

In this chapter, it is emphasized that the research aims/objectives have been achieved. Moreover, it also emphasizes the most significant results, note the limitations and make suggestions for further research.

Chapter II: Literature Review

There has been a dramatic growth in use of all forms of complementary and alternative medicine, including herbal medicines and dietary supplements, since 1990 (Eisenberg, D.M., et al., 1998). Those experiencing anxiety and despair tend to use the medication twice as frequently as those claiming back and neck discomfort. Investigators have found a correlation between panic disorder and the usage of complementary and alternative medicine in two large-scale community surveys (Kessler, R.C., et al., 2001; Unützer, J., et al., 2000).

Prescription and nonprescription drug use patterns in the United States' ambulatory adult population were studied by Kaufman et al. (2002). Vitamin and mineral supplements are habitually taken by 40 percent of the population; 14 percent of the population took herbal and supplement products in the previous week; 16 percent of prescription drug users also took herbal and supplement products.

2.1. Historical Overview of Nutritional Supplements

Early human civilizations relied heavily on plant and fish meals that could be cheaply obtained. Big-game meat was later provided by hunter-gatherers. Before 10,000 BC, the emergence of agriculture and animal husbandry supplied more meat and cereals for the whole family, making this the typical diet of most humans. Vitamins and minerals, as well as protein, carbohydrate, and fat were unknown at the time. People in many parts of the world have devised healthful diets based primarily on local ingredients that helped them maintain their health. They experimented with a variety of foods and cooking ways until they found what worked best for them in terms of health, fertility, and strength.

Foods and herbs with extra health benefits for youngsters, pregnant women, and the elderly were well-known in indigenous civilizations. Native societies have supplemented their diets since the dawn of time. The Native Americans, for example, were aware that drinking tea prepared from pine bark and needles, which contains a high concentration of ascorbic acid, might treat scurvy. Vitamin C insufficiency was eventually discovered to be the cause of this illness. Citrus fruits with a high vitamin C concentration were discovered by Dr. James Lind in 1749 to prevent scurvy (Shils et al., 2006; Fraga 2009).

In comprehending the relationship between nutrition, health, and illness, the discovery of vitamins was an important scientific breakthrough. Vitamin research made great progress in the 1920s and 1930s, and mainstream marketing of synthesised vitamin C began in 1935 under the name Redoxon. In the approximately 75 years after the first vitamin C pill was marketed, there have been significant advancements in vitamin and other dietary supplement products (Kourkouta et al. 2016).

Numerous research studies (epidemiologic, clinical, in vivo, and in vitro) were launched in the 1980s to investigate the possible health advantages of dietary supplements. A number of studies have shown that antioxidant nutrients, such as vitamins C, A, E and -carotene, have a role in protecting cells from oxidative free radical damage, which stimulated this interest. A diet high in fruits and vegetables, as well as antioxidants and nutrients, has been linked to a lower risk of coronary heart disease and certain malignancies, according to epidemiological research (Fortmann et al. 2013; Leenders et al. 2014).

2.2. Classification of Nutritional Supplements

Labeling for these substances must carry the following information, as required by law (Claessens, M., et al., 2013):

- A statement stating the product is a dietary supplement after the product name
- The daily dosage of the product. Statement that supplements are not a substitute for a well-balanced diet".
- Warning regarding keeping the product out of the reach of children.

In terms of their intended application, dietary supplements are classified into two groups by the National Agency of Medicines (NAM) (Montagnese, C., et al., 2015):

- 1- In the food industry, nutritional supplements are considered food products. They are an addition to a regular diet.
- 2- Specially formulated beverages, such as those for infants and children between the ages of two and five, people with certain types of metabolic disorders, or people in a specific physiological condition, that are meant to meet the dietary needs of a specific population group.

In addition, supplements can be classified as either natural or synthetic based on their source. According to their texture or form, they are categorized as follows (Coppens, P., et al., 2006):

- Supplements that contain both vitamins and minerals, whether in the form of multivitamins or multi-minerals.
- In the form of liquid or tablet supplementation with carbs, fats, vitamins, and minerals in combination or not, protein supplements are available.

- A wide variety of amino acids in various structures and compositions.
- Weight-gain supplements
- Powders, wafers, or biscuits that serve as a meal replacement.
- Electrolytes and vitamins can be included in carbohydrate supplements or left out.
- All-natural anabolic supplements that do not fall within the category of "restricted compounds."
- Growth hormone and other hormone "activator" supplements.
- Basic fatty acid supplements.
- Yeast, garlic, kelp, and royal jelly are all examples of foodstuff ingredients.
- Herbs.

Over a million different supplements can be found in stores today. Many of them are excellent, while others fall somewhere in between. Their manufacturing process and the source of their basic components are the primary causes of their low efficiency (Rovira, M.A., et al., 2013).

Table 1: classification of nutritional supplements

Class	Example	Contents
Activator	Amino acids	Contains growth hormone and other hormones
Carbohydrate	Dextrose	May contain vitamins and electrolytes
Food and Food stuff	Fish oils, mineral and vitamins	Contain garlic, kelp, royal jelly, yeast
Herbs	Ginseng, Fiber	Contains amino acids, other plant source
Minerals	Selenium, multimineral tablets	Contains only minerals
Multivitamins and multiminerals	Vitamin D, calcium supplement	Contains both mineral and vitamins
Oil supplements	Cod liver oil, primrose oil	Contains oil base, with vitamins, minerals
Vitamins	Vitamin C, vitamin B	Contains only vitamins

2.3. Forms of Nutritional Supplements

Packages, sizes, and types of food supplements vary depending on how they are used. In addition to syrup, there are effervescent pills and powders, as well as a variety of other forms of tablets and capsules. The following are methods for ingesting dietary supplements (Ciulla, M., et al., 2019):

- Pills, powders, and liquids that can be swallowed for rapid absorption.
- Oral disintegrating tablets or sublingual drops to enhance their absorption and minimize the harmful effects of their active ingredient.
- Nose spray or drops to increase the rate at which they are absorbed.
- intramuscular injections for rapid absorption and activation of injectable
- For sustained action and gradual absorption, the drug is fixed in bone.

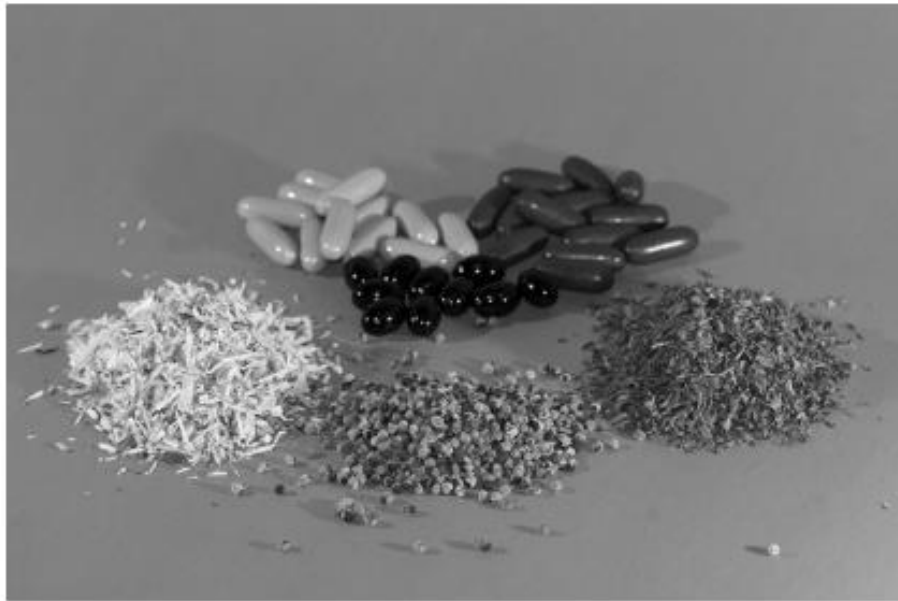


Figure 2: Vitamin supplements in natural and gel capsule

A number of dietary supplements are poorly absorbed, while others are eliminated almost entirely in the stomach, and yet others irritate the mucosa of the stomach and intestine. For those who find it difficult to swallow pills or capsules, powders and liquid formulations can be helpful. Athletes who have a psychological problem can be helped by taking pills and drinking water in a specific method. Supplements in the form of sprays might induce severe local irritation or even lung aspiration, depending on the dosage.

It is always best to seek the advice of a medical professional before injecting supplements. In order to avoid local inflammations and problems with bone anchored supplements, monitoring and laboratory control are required due to surgical approach (Teixeira, V.H., 2013). An overdose or inadequate absorption of supplements can lead to an extreme change in the color of urine, which indicates that an excessive amount of the supplement is expelled from the body. This necessitates a review of its efficacy (Mulholland, C.A. and Benford, D.J., 2007).

2.4. Usage of Nutritional Supplements as Drug Treatment

High nutrient content in tiny quantities; unique nutrient compositions; the absence of fats, cholesterol, and purines as well as complete covering of specialized sporting needs are only some of the advantages that nutritional supplements have to offer. Currently, the most popular dietary supplements are multivitamins, multi-minerals, vitamins, and mineral supplements (Bailey et al. 2013).

However, these formulations should not be considered a replacement for a balanced diet but rather an addition to it. The amount or frequency of dietary supplements is frequently increased by those who use them. Thus, dosages become increasingly ineffective. As a result, the human body is compelled to work harder to remove the additional amounts of supplements it consumes. The risk of toxicity grows with increasing doses of these micronutrients, even though they are necessary for good health to be maintained (Mulholland and Benford 2007). Micronutrient insufficiency is so uncommon in affluent countries that most people who take supplements are really getting too much of these essential nutrients.

In spite of the prevalent notion that vitamin and mineral supplementation is advantageous to health, recent evaluations have determined that there is no convincing evidence of favorable health effects from vitamin and mineral supplement trials in community-dwelling persons without dietary deficits. As a result, these include the prevention or secondary prevention of chronic diseases such as cardiovascular disease (CVD), cancer, and cognitive decline (Guallar et al. 2013; Fortmann et al. 2013). Of course specific vitamins and minerals can cause harm if consumed in excess.

There are a number of factors that can lead to side effects from toxicity in dietary supplements, including (a) dosage, because exceeding recommended dosage can cause side effects; (b) the duration of intake, which is related to the fact that the human organism is overloaded, owing to the specific substances that the supplement contains, until the substance is eliminated; (c) the special chemical properties of some substances and their integration into the human body; (d) The person's weight who takes those supplements; (e) Age, because lots of supplements are not recommended for underage persons or the elderly; and (f) The individual capacity, because each person reacts differently in the face of various substances (Oikonomou, 2009).

People with chronic low back pain (CLBP) are increasingly turning to complementary and alternative medicine (CAM). Herbal treatment, megavitamin therapy and homoeopathy were all utilized by a small percentage of the general adult population in the United States in the past year according to a 1991 poll. (Eisenberg, D.M., et al., 1998)

In contrast, just ten percent of individuals who reported using herbal medicine had sought the advice of a health care expert; the same percentages were 12 percent and 32 percent for megavitamin therapy and homoeopathy, respectively. During the 1997 survey, 12 percent of respondents reported using herbal medicine in the previous 12 months, compared to 6 percent who reported using megavitamins, and 3 percent who reported using homoeopathy. Relaxation was the most prevalent complementary and alternative medicine (CAM) therapy, followed by herbal medicine (16 percent). 15% of herbal medicine users, 24% of megavitamin treatment users, and 17% of homoeopathy users saw a professional practitioner (Eisenberg, D.M., et al., 1998).

In 1997, there were 10 million, 22 million, and 2 million visits to practitioners for these procedures, respectively. Allergies, sleeplessness, and high blood pressure were among the

medical problems for which herbal medication usage was highest; megavitamin use was highest. A German research of 1342 patients with low back pain (LBP) found that 3% got homoeopathy, less than 2% saw a naturopathic healer, and less than 1% used herbal medication in the subsequent one year follow-up period. (Chenot, J.F., et al., 2007)

Females were shown to be more likely to utilize homoeopathy than males, with an odds ratio of 2.08 (95 percent confidence interval, 1.3 to 6.1). Seventy-one per cent of Canadians have used an NHP in the previous year, according to the 2005 Baseline Natural Health Products Survey (Charrois, T.L., et al., 2007)

Indications for CAM use include low back pain (LBP). According to a Canadian survey, 37% of people with LBP sought treatment from a CAM practitioner, compared to 17% of people in the general community. (Millar, W.J., 2001)

Each five years, the Cochrane Collaboration Complementary Medicine field has more than 6,500 studies connected to randomized controlled trials (RCTs) (Vickers, A., 2000). In addition, some undergraduate medical school programs also contain CAM ideas. (Mills, E.J., et al., 20020)

CLBP patients with no neurologic involvement and symptoms lasting more than three months were included in an RCT by Keitel et al. (2001). Those who received daily capsaicin plaster or placebo for three weeks were randomized. Pain scores for both groups were lower than at the beginning of the treatment period (Arhus low back rating scale). The group using capsaicin saw a significant decrease in pain compared to the group taking a placebo. There were no significant differences in disability (Arhus low back assessment scale) across groups.

CLBP patients with no neurologic involvement and symptoms lasting more than three months were included in an RCT by Frerick et al. (2003). Those who received daily capsaicin plaster or

placebo for three weeks were randomised. While in the capsaicin group, the mean composite pain score (Arhus low back rating scale) dropped significantly over the course of therapy compared to baseline, no such improvement was seen in the placebo group. Capsaicin's pain-relieving effects were more pronounced than those of the placebo group. Both groups saw a decrease in disability (Arhus low back rating scale) (P values not reported). The capsaicin group showed a greater improvement in disability than the placebo group.

61 people with subacute or chronic LBP participated in a single RCT that was published in 2012 (Yip, Y.B. and Tse, S.H.M., 2004). There were eight sessions in the active group over the course of three weeks in which acupoint stimulation was followed by lavender oil acupressure. After one week of treatment, the active group saw a 39% decrease in pain (VAS) compared to those in the control group (P =.001), as well as an increase in lateral spine flexibility and improved walking time. There is insufficient evidence to support the use of lavender oil in the treatment of chronic lower back pain (CLBP).

IM vitamin B12 injections (IM B12; Tricortin 1000 mg) were examined in 60 participants with CLBP or sciatic neuritis of mechanical origin that did not require surgery and did not show indicators of B12 deficiency, according to a clinical trial (Mauro, G.L., et al., 2000).

There were daily injections of placebo or B12 for two weeks. With the active therapy group experiencing a higher drop in pain, both groups had a decrease in pain. The VAS score decreased from 75.5 to 9.5 in the active treatment group and from 70.6 to 36.8 in the placebo group (P .0001). With the active treatment group, the disability index fell significantly (P .0001) compared to the control group. In the active therapy group, paracetamol rescue medication use was also considerably reduced (P .0001). For Chronic Low Back Pain (CLBP), there is moderate evidence that intravenous B12 is more helpful than placebo.

It's impossible for any supplement to be completely harmless. Hypervitaminosis, for example, can result from an overdose of fat-soluble vitamins. The liver and kidneys can be damaged by a protein overload. A lot of powdered carbohydrate intake can lead to an increase in body fat. The body's inability to synthesize some muscle proteins may be caused by an excessive intake of fatty acids. Performance-enhancing medications may also cause problems with the endocrine system (Troesch et al., 2012).

Water-soluble vitamin toxicity is extremely rare. In elderly people taking multivitamin supplements, pyridoxine-associated chronic sensory polyneuropathy has been described (Ziegler and Filer, 1996) at doses of more than 500 mg/day of pyridoxine (vitamin B₆) (De Kruijk and Notermans, 2005).

Overconsumption of supplementary antioxidant fat-soluble vitamins has resulted in more reports of toxicity. Tocopherols and tocotrienols, the eight members of the vitamin E family, include - tocopherol, the type most commonly found in supplements. More than 1200 mg/day can lead to diarrhoea, impaired vision, and gonadal dysfunction, as well as bleeding related with antiplatelet activity (Ziegler and Filer, 1996).

In addition, a randomized trial of head and neck cancer patients found that supplementing with vitamin E after radiation therapy was linked to an increased risk of cancer recurrence in the first 3.5 years of follow-up (Bairati et al., 2005), and a meta-analysis found that supplementing with high doses of vitamin E was associated with an increased risk of death from any cause (Miller et al., 2005).

Supplemental vitamin A and the provitamin carotenoid precursors have also been linked to toxicity. Low bone mineral density and an increased risk of fracture have been linked to

excessive vitamin A supplementation, according to research (Melhus et al., 1998). In addition, studies show that pregnant women who consume high doses of vitamin A supplements have a higher risk of giving birth to children with birth defects (Rothman et al., 1995).

A patient with persistent hypervitaminosis A experienced intrahepatic cholestasis after 12 years of supplement use, which resolved after the supplements were stopped (Ramanathan et al., 2010). Excess intake of minerals and vitamins can lead to toxicity. Excess intake of iron or multimineral supplements is connected with an increased risk of hyperchromatosis, an iron storage disorder that can cause liver damage (Barton et al., 2006).

Omega-3 fatty acids are essential fatty acids that cannot be synthesized *de novo* in humans and therefore must be provided through the diet (Spector and Kim, 2015). A well reported study from 1971 involving Eskimos (Greenlanders) from Greenland's west coast revealed a relationship between fish oil and ischemic heart disease (Bang et al., 1971).

Eating a diet rich in polyunsaturated omega-3 fatty acids, Greenlanders living in Denmark and Danes living in Greenland had considerably lower levels of total cholesterol, plasma cholesterol, plasma triglycerides, and pre -lipoprotein (equivalent to very low density lipoprotein). As a result of their research, the scientists concluded that the low incidence of ischemic heart disease and type 2 diabetes in Greenlanders could be linked to this diet. When it comes to omega-3 fatty acids in the form of fish oils or krill oil or DHA/EPA purified from fish oils, they have become a common supplement in the diet of many people. Fatty acids with anti-inflammatory and electrically stabilizing effects on ion channels in cardiac myocytes can be found in these fatty acids (Sierra et al., 2004; Leaf et al., 2008). For its anti-cancer and cardio-protective properties, they have been connected (Gogos et al., 2000; Harris and Isley, 2001).

As a result, the therapeutic advantages on cardiovascular disease are still under question due to inconsistent results from clinical trials (Glück and Alter, 2016). At 1000–2000 mg/day, fish oil and omega-3 fatty acids tend to be well tolerated, with minimal evidence of harm. Vitamin A is found in fish liver oils, which may lead to hypervitaminosis A if taken with multivitamin supplements. Fish oils and omega-3 fatty acid supplements may also worsen anticoagulation and increase bleeding in patients using anticoagulant drugs like warfarin (Gross et al., 2017).

SPI (soy protein isolate) is one of the most commonly used supplements among athletes and bodybuilders because of its high concentration of vegetable-based protein. Infant formulae are also based on these proteins. Dairy proteins appear to be safe, except for those who are allergic to cow's milk protein. However, excessive ingestion of dairy proteins can lead to ketosis, which is a dangerous condition. On the other hand, the safety of SPI remains the subject of continuous dispute. The isoflavones: genistein and daidzein, which are among the 100 phytochemicals that stay attached to the protein isolate, are at the heart of this controversy (Fang et al., 2004).

In newborns fed soy formula and in children, men, and postmenopausal women who use soy protein supplements, these chemicals can rise to potentially estrogenic levels. Potential reproductive damage, infertility, demasculinization, and enhanced promotion of estrogen-responsive malignancies such as breast and endometrial cancer have all been linked to early exposure to oestrogen (Messina, 2016).

However, the results of animal research on SPI and soy formula toxicity are inconclusive. Prenatal exposure to soy-based diets resulted in reduced steroidogenesis, decreased testosterone production, and increased Leydig cell proliferation in rats, according to Akingbemi et al. (2007). Serum testosterone levels in marmoset monkeys fed soy newborn formula were also reduced (Tan et al., 2006).

During adulthood, these monkeys also had larger testicles and more Leydig cells per testis, which is consistent with compensating for Leydig cell loss. SPI boosted the proliferation of human breast cancer cell xenografts in adult female ovariectomized mice, consistent with an estrogenic action (Allred et al., 2001). Soy protein isolate (SPI) has been shown to have no influence on sex organ weights, serum sex steroid concentrations, or fertility in rats fed a soy-based diet for the entirety of their lives (Badger et al., 2009).

Both modern medications based on plant chemicals (such as aspirin and morphine) and botanical food supplements have their roots in traditional herbal treatment. Given that these natural (i.e., derived from plant roots, leaves, or bark) ingredients were among the earliest medicines, herbal and botanical treatments have maintained their popularity. According to the CDC's National Health and Nutrition Examination Survey (NHNES) 2003–2006, 20% of individuals take a supplement containing at least one botanical element (Bailey et al., 2010).



Figure 3: Herbal supplements as dried plant materials and

Taking these medications to "enhance general health" is a popular reason for doing so. Because of this, most botanicals are regulated by the FDA as dietary supplements and not as pharmaceuticals intended for the treatment or prevention of certain ailments (FDA, 2016). Non-smoking and better self-reported health are linked to the use of botanicals (Bailey et al., 2013).



Figure 4: Herbal supplements in natural and solid plant

Because many botanical supplements may interfere with prescribed pharmaceuticals, it is alarming that patients commonly fail to inform their primary care physicians of their usage of herbal supplements (Wu et al., 2011). Hospitalization may be required if bioactive components of botanicals are taken in isolation. The most prevalent botanical and herbal supplements are discussed in terms of their acute side effects and herb-drug interactions in this overview. Botanical supplements are made up of a variety of organic substances because they are derived from plants. Toxic and/or therapeutic properties can be found in just a small percentage of these chemicals, which are physiologically inactive.

There are many factors that make it difficult to determine hazardous processes in clinical instances, including concurrent exposure to other chemicals (e.g. medicines, smoking), as well as the complexity of herbal supplements. Botanicals are typically safe, and reports of side effects are rare (Di Lorenzo et al., 2015). As a general rule, the impacts are minor (e.g., nausea, fatigue,

and headache). Drug-induced liver injury and its accompanying pathways have been implicated in more significant clinical instances, including mitochondrial dysfunction, oxidative stress, and alterations in bile acid balance.

Medication-assisted treatment can help lessen the agony of withdrawal from drugs and alcohol, but natural therapies can also be helpful. Detoxification is often the most difficult part of the rehabilitation process, and medications can make it easier to go through it. Medication-assisted treatment has numerous advantages for addicts who are trying to overcome their addictions. The FDA has approved and is monitoring the medications provided to help with detox, so they are safe and effective.

Also, because these medications are only sold in approved facilities, using medication-assisted treatment ensures that patients receive treatment in an accredited facility. Medication-assisted treatment programs automatically include counseling and vocational aid for patients, who otherwise would not have access to these services.

With medication-assisted treatment at an institution, patients are guaranteed access to ongoing services and support. Starting with medication-assisted treatment is a fantastic place to start for long-term recovery since it provides patients with long-term support. A combination of natural supplements and medication is often the most effective strategy to treat substance abuse for many people.

Table 2: Popular botanical supplements, their key active components, and their normal application are included in this list

Scientific name	Common name	Uses	Active components	References
Genus <i>Echinacea</i>	Echinacea	Imuno-stimulant	Chicoric acid, alkylamides	(Hermann and von Richter 2012)
<i>Allium sativum</i>	Garlic	Antioxidant; antihypertension	Allicin, adenosine	(Hermann and von Richter 2012)
<i>Ginkgo biloba</i>	Ginkgo biloba	Memory improvement; lowering blood pressure	Terpenoids (ginkgolides)	(Mayo Clinic 2013a)
<i>Panax ginseng</i>	Ginseng	Overall health; antistress	Ginsenosides	(Hermann and von Richter 2012)
<i>Camellia sinensis</i>	Green tea extract	Antiproliferative; antioxidant	Catechins (ECGC, ECG)	(Chen et al. 2016)
<i>Serenoa repens</i>	Saw palmetto	Treatment of benign prostatic hypertrophy	Various phytosterols	(Mayo Clinic 2013b)
<i>Hypericum perforatum</i>	St. John's wort	Antidepressant	Hyperforin, hypericin	(Mayo Clinic 2013c)
<i>Silybum marianum</i>	Milk thistle	DILI; high cholesterol	Silymarin	(Mayo Clinic 2013d)
<i>Piper methysticum</i>	Kava kava	Reducing anxiety	Kavalactones	(Teschke 2010)
<i>Cimicifuga racemosa, Actaea racemose</i>	Black cohosh	Alleviating postmenopausal symptoms	Triterpene glycosides	(Mayo Clinic 2013e)
<i>Valeriana officinalis</i>	Valerian	Reducing anxiety	Valepotriates (terpene alcohols)	(Gharib et al. 2015)
<i>Pausinystalia yohimbe</i>	Yohimbe	Stimulant; erectile dysfunction treatment	Yohimbine	(Hermann and von Richter 2012)
<i>Hydrastis canadensis</i>	Goldenseal	Treatment of cold/ respiratory infection; alleviate menstrual complications	Hydrastine, berberine	(Hermann and von Richter 2012)

2.5. Interaction between Nutritional Supplements and Drugs

Depending on the mode of action, dietary supplement–drug interactions can be generically characterized as pharmacodynamic or pharmacokinetic (Radler, D.R., 2008). To the best of our knowledge, there are no clinically significant interactions between acetaminophen and any of the other analgesics we've studied, making it an excellent choice for patients who may be taking dietary supplements. The best antibiotics for dietary supplement users include amoxicillin, cephalexin, metronidazole, and penicillin. (Connor, E., 2008; Starr, R.R., 2015)

There is no clinically significant dietary supplement–drug interactions with topical chlorhexidine or any of the antifungal medicines (clotrimazole, fluconazole, and nystatin) given most frequently for oral thrush. Both topical and parenteral local anaesthetics have this property. (Donaldson, M. and Goodchild, J.H., 2012; Rosenberg, M., 2010)

Significant interactions exist between St. John's wort or valerian and the most regularly used benzodiazepines (alprazolam, lorazepam, midazolam, and triazolam), as well as zaleplon and zolpidem, when it comes to sleep aids. The safest option for patients who require anxiolysis for a dental treatment and are taking these supplements is inhalational sedation with nitrous oxide–oxygen. Finally, doctors should always deliver emergency medication since the value of doing so outweighs the danger of the patient having a dietary supplement–drug interaction. Dentists can prescribe or deliver common dental drugs without fear of dietary supplement–drug interactions if patients are not taking ginkgo, St. John's wort, evening primrose, or valerian. Patients who are taking one of these four supplements should cease taking it for at least four half-lives before a dental session that involves the administration of a medicine the responsible practitioner may ask (Connor, E., 2008; Starr, R.R., 2015).

Using a first-order pharmacokinetics method, which states that the body needs four half-lives to remove 90% of an eaten medicine, is a good way to go (Winter, M.E., et al., 2004). It is recommended to stop taking ginkgo 28 hours prior to a dental checkup in order to avoid a possible dietary supplement–drug interaction with ginkgo extract. It is recommended to stop taking St. John's wort up to four days before a dental checkup in order to avoid a possible dietary supplement–drug interaction. (Barnes, J., et al., 2001)

In the United States, the use of dietary supplements is widespread. 1.8% of the 31,044 people surveyed acknowledged taking dietary supplements in the largest population-based survey to date (Barnes, P.M., et al., 2004). Referral bias and inclusion of patients with medical disorders like cancer, fibromyalgia, and chronic pain led to a larger percentage of patients taking dietary supplements.

Dietary supplement usage was assessed at the point-of-care in a study of 458 veteran outpatients in the United States in 1999 (Peng, C.C., et al., 2004). It was discovered that prescription drugs were taken through Veterans Administration pharmacy selected databases. Supplement use was reported by 197 of the participants in the study. 40% of patients were at risk for prescription medication–dietary supplement interactions. Because of the inclusion of vitamins and minerals in the study's possible interactions, the study's findings are more accurate. In that research, the most prevalent products with a chance of contact were also the most likely to interact (i.e., garlic, ginseng, and ginkgo biloba).

Other research has shown that herbal items and prescription pharmaceuticals can be taken at the same time. 18.4 percent of prescription medicine users in the United States were found to be concurrently using herbal remedies and prescription pharmaceuticals in a national survey (Eisenberg, D.M., et al., 1998). There was, however, no mention of the potential for interactions.

People over the age of 50 are taking an average of 5.91 supplements and 2.26 prescription drugs, according to a British study (Canter, P.H. and Ernst, E., 2004). A particular assessment of the possibility for interactions was not provided, however. A smaller study of 76 cancer patients found that 27% had the potential for herbal or vitamin items to interact with chemotherapy (McCune, J.S., et al., 2004).

A total of 33 current herbal medicine users were discovered in a Canadian survey of 195 people over the age of 65 (Dergal, J.M., et al., 2002). Eleven potential interactions between herbs and medications were found in nine of the patients (27 percent). There were 214 potential interactions discovered in a Canadian study of osteoarthritis patients aged 65 and older. Of them, 30 were deemed clinically important (Putnam, W., et al., 2006).

There are a number of antithrombotic drugs that have been mentioned as potentially interfering with herbal products (Heck, A.M., et al., 2000; Norred, C.L. and Brinker, F., 2001). Warfarin was shown to be the most frequently interacted with herbal products in a study comprising a search of computerized databases. (Fugh- Berman, A. and Ernst, E., 2001)

This was the case in a trial of intravenous vitamin B12. Acetaminophen's half-life may be increased by roughly 50% if vitamin C is taken in high amounts (more than 3000 mg) (from 2.3 to 3.1 hours) (Jellin, J.M. and Gregory, P.J., 2007).

With oral contraceptives or hormone replacement treatment, vitamin C can increase plasma oestrogen levels by up to 55 percent. Niacin with simvastatin (Zocor) may elevate high-density lipoprotein (HDL) cholesterol. Supplementing with antioxidants such as vitamins C and E and beta-carotene may help reduce this increase in HDL. An interaction with other protease inhibitors, such as ritonavir or nelfinavir (Viracept), has not yet been established. Vitamin C, on

the other hand, appears to diminish indinavir concentrations (Fortovase, Invirase). Dietary diarrhoea and decreased warfarin absorption may result from high doses of vitamin C (up to 16 grams). (Jellin, J.M. and Gregory, P.J., 2007)

Zinc has been linked to an increase in the production of metallothionein by tumour cells, which renders cisplatin inactive. As a result, zinc may inhibit the absorption and activity of penicillamine and other antibacterial agents such as quinolones and tetracyclines. Manganese may inhibit the absorption of quinolones theoretically. Vitamin B12 supplementation may be affected by chloramphenicol in some people, according to case reports. (Jellin, J.M. and Gregory, P.J., 2007)

Antithrombotic drugs were found to be the most likely to interact with dietary supplements in this investigation, which assessed a wide range of patients. It's impossible to tell how much harm may be done in a well-designed study to look for negative impacts, therefore there's no way to know for sure. Antithrombotic medicine users should be advised to avoid dietary supplements that may interact with warfarin or have an antiplatelet impact until further research is completed.

It is critical to distinguish between an actual risk of injury and a hypothetical interaction. Despite the high prevalence of interaction risk, none of our patients experienced any major side effects including hospitalization or life-threatening bleeding as a result of drug interactions. In some cases, the results of the study may be considered speculative. If the claimed treatments have not been shown to have a favorable biologic effect, however, it may be prudent to take a balanced but cautious approach even if some cause and effect links are not clearly established. Furthermore, considering the widespread use of dietary supplements, even the tiniest risk of injury could have a significant impact on public health.

Table 3: Interactions between drugs and dietary supplements that are of clinical concern

DRUG-DIETARY SUPPLEMENT (BOTANICAL NAME) INTERACTION	LEXI-COMP DATABASE*	NATURAL MEDICINES COMPREHENSIVE DATABASE†
Aspirin-Ginkgo (<i>Ginkgo biloba</i>) ²³⁻²⁴	Risk rating = D	Severity = high Occurrence = possible
Aspirin-Evening Primrose (<i>Oenothera biennis</i>) ^{23,25}	Risk rating = D	Severity = high Occurrence = possible
Azithromycin-St. John's Wort (<i>Hypericum perforatum</i>) [†]	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Benzodiazepines-St. John's Wort (<i>H. perforatum</i>) ⁵²⁷	Risk rating = C	Severity = high Occurrence = probable
Benzodiazepines-Valerian (<i>Valeriana officinalis</i>) ⁵²⁸⁻³²	Risk rating = C	Severity = high Occurrence = probable
Clarithromycin-St. John's Wort (<i>H. perforatum</i>) ⁵³³⁻³⁸	Risk rating = C	Severity = high Occurrence = probable
Clindamycin-St. John's Wort (<i>H. perforatum</i>) ⁵³⁴⁻⁴⁰	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Codeine-St. John's Wort (<i>H. perforatum</i>) ^{†59,50}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Codeine-Valerian (<i>V. officinalis</i>) ^{529, 32}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Dexamethasone-St. John's Wort (<i>H. perforatum</i>) ^{527,43-48,52-57}	Risk rating = C	Severity = high Occurrence = probable
Diphenhydramine-St. John's Wort (<i>H. perforatum</i>) ^{†54}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Diphenhydramine-Valerian (<i>V. officinalis</i>) ^{†51,32}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Doxycycline-Calcium Supplements ^{†28-32}	Risk rating = D	Severity = moderate Occurrence = probable
Doxycycline-St. John's Wort	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable

DRUG-DIETARY SUPPLEMENT (BOTANICAL NAME) INTERACTION	LEXI-COMP DATABASE*	NATURAL MEDICINES COMPREHENSIVE DATABASE†
Doxycycline–St. John’s Wort (<i>H. perforatum</i>) ^{514,55-57}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Erythromycin–St. John’s Wort (<i>H. perforatum</i>) ^{517,45-48,55-58}	Risk rating = C	Severity = high Occurrence = probable
Hydrocodone–St. John’s Wort (<i>H. perforatum</i>) ^{517,45-50,55-57}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Hydrocodone-Valerian (<i>V. officinalis</i>) ^{511,52,64-67}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Ibuprofen–Evening Primrose (<i>O. biennis</i>) ⁵⁰⁰	Risk rating = D	Severity = high Occurrence = possible
Ibuprofen-Ginkgo (<i>G. biloba</i>) ^{520,79,72,65,69-76}	Risk rating = D	Severity = high Occurrence = possible
Ibuprofen–St. John’s Wort (<i>H. perforatum</i>) ^{514,45,47,48,77}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Oxycodone–St. John’s Wort (<i>H. perforatum</i>) ^{519,50,78}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Oxycodone-Valerian (<i>V. officinalis</i>) ^{511,52}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Prednisone–St. John’s Wort (<i>H. perforatum</i>) ^{517,45-48,52-57,79}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Tetracycline–Calcium Supplements ^{50,80-84}	Risk rating = D	Severity = moderate Occurrence = probable
Tetracycline–St. John’s Wort (<i>H. perforatum</i>) ^{514,55-57}	Risk rating = C	Severity = high Occurrence = probable
Tetracycline–St. John’s Wort (<i>H. perforatum</i>) ^{514,55-57}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Zaleplon–St. John’s Wort (<i>H. perforatum</i>) ^{517,45-48,52,54,79,85}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Zaleplon-Valerian (<i>V. officinalis</i>) ^{511,52,64-67}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Zolpidem–St. John’s Wort (<i>H. perforatum</i>) ^{517,45-48,52,54,79,85}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable
Zolpidem-Valerian (<i>V. officinalis</i>) ^{511,52,64-67}	Risk rating: no interactions of risk level A or greater identified in database	Severity = high Occurrence = probable

Source: Donaldson, M. and Touger-Decker, R., 2013

Consumption of dietary supplements is primarily justified by the need to meet daily dietary requirements for trace elements and vitamins. In other words, although prescribing nutritional supplements to children and adolescents is a therapeutic approach for the treatment of certain nutritional disorders, the consumption of these products in various forms such as tablets, capsules, powders, and ampoules may contribute to an increase in the frequency and amount of their intake. Children and teenagers may develop a habit of taking drug-form supplements, regardless of their substance, which could lead to an increase in their use. Adolescents might develop a worrying tendency to repeatedly take drug forms with different ingredients, which could be harmful or even illegal, if this new pattern of behavior persists. Many people think we're seeing a shift from traditional to industrial drug use, and that oral medications are taking the place of traditionally smoked substances (EBRAHIMNEGAD, S.M. and Pourabbasi, A., 2015).

If the regular use of a prescription with health benefits like nutritional supplements becomes normalized and internalized, it may lead to the abuse of oral pharmaceuticals in various forms, such as pills, capsules, powders and so on. Using legal sports supplements has been linked to the use of anabolic steroids and other illegal doping substances, which lends credence to this claim. Another important consideration is the influence of external reinforces, such as family, community, and peers. However, more research is needed to confirm or deny this theory's veracity. If this is the case, parents should be made aware of the dangers of overdosing on drug-form dietary supplements so that they can better protect their children (Hildebrandt, T., et al., 2012).

Rather than relying on pharmaceuticals to meet the nutritional needs of vulnerable populations, alternative measures such as fortifying milk and bread can be used instead. These measures may

help to keep oral supplement usage from becoming routine, which could lead to the development of harmful misuse behaviors and their associated effects (Hildebrandt, T., et al., 2012).

To stay abreast of any novel dietary supplements or possible dietary supplement–drug interactions not covered in this study, physicians should refer to the databases referenced or consult a pharmacist. It's important to remember, however, that even pharmacists may not be able to discover dietary supplement–drug interactions if the supplement is new to market, contains a proprietary blend that the manufacturer is not allowed to declare and hence may not be on the product label, or if the tertiary databases provide little to no information on suspected interactions since there are no case reports or clinical trial results.

Chapter III: Methodology

3.1. Introduction

This chapter describes the way in which research objectives are achieved. The primary objective of the research is to determine the use of nutritional supplements as an essential part of the pharmacological treatment of diseases and other health conditions among those participated in the proposed theoretical model. This chapter describes study methodology, including research design, population, sampling, instrumentation and measurements, data collection, analysis and reliability and Validity of the data collection tool.

3.2. Research Design

Research design helps researchers to establish boundaries for research, which involve defining the study environments, the type of research to be carried out, the analysis unit and the other research-related issues. A research design is a research project plan for investigating and responding to research questions. Three main types of research projects exist, namely: (1) descriptive (2) exploratory design and (3) incidental or explanatory design;

This study focuses mainly on testing an integrated model that identifies the factors affecting project success. The research problem and goal clearly indicates. In the next phase, a descriptive research concept was used to describe the respondents' characteristics and to determine the frequencies, percentages, mean and standard deviations of the buildings used.

In this study, several hypotheses are quantitative based on critical success factors, theory of leadership styles and the success of projects. The empirical link between the independent variable, i.e. organizational factors, project team factors and the dependent variable, i.e. project success was evaluated by statistical analyses such as structural equation modeling.

A quantitative data set and survey method were used in this study. Data were collected from a group of doctors and patients at Al-Muqtada Hospital with the aim of determining the use of nutritional supplements as an essential part of the pharmacological treatment of diseases and other health conditions and discussion in focus group. After that the completion of the data analysis framework was done. The data were collected in writing and editing using the survey method. What is the scanning method? It is used and required because it is designed to interact directly with the thoughts, feelings, and opinions of the participants.

A) Analytical study:

This chapter contains an overview of the study curriculum, the study community, the study sample, and the study tool, in addition to the study variables, the indications of validity and reliability, and the statistical treatments used in them.

B) Study methodology:

The descriptive approach was used because it suits the subject of the study as it depends on the study of reality or phenomenon, as it exists on the ground, in addition to its accurate description in addition to its quantitative and qualitative expression.

The study sample:

The study sample consisted of 100 individuals, and in addition to the simple randomization of the sample, the main objective of the research is to determine the use of nutritional supplements as an essential part of the pharmacological treatment of diseases and other health conditions.

Frame for sampling

Sampling is a process in which researchers select a sample of available individuals from the population (e.g. a specified number of selected participants). Everyone is an employee of a government company in this research

Each department was instructed to distribute a target response questionnaire. The required sample size was determined using SPSs, and we found that the sample here is 200 distributed among doctors and patients in Makassed Hospitals.

Statistical methods:

- SMA
- standard deviation
- Measures of central tendency
- Alpha Cronbach

Research Instruments

With an objective description, the research instruments such as measurement scales, questionnaires and scoring systems must be defined. These instruments should be tested prior to their use, and it is mandatory for research personnel to use them correctly to prevent any bias. To anyone involved in the analysis, these tools should be clear and easily understandable (Cook & Beckman, 2006).

Typical methods of quantitative data collection include:

- Surveys of closed-end questions (e.g., face-to-face, mobile, mail, etc.) are performed.
- Well-defined event observation and recording
- Recapture of applicable information systems management files



Figure 5: Quantitative Data collection tools

Types of quantitative data collection

The research tool was self-questionnaires to know the effect of nutritional supplements on medicines. Three parts of the questionnaire were used in this study; The first part dealt with the social information related to the study. The second part consists of questions about literary studies and a theoretical part. The third part included statistical analysis. Included a survey

Three points (1 = strongly agree, 2 = agree, 3 = disagree) rating Use a Likert scale

The tools used in data collection (questionnaire, observation, etc.) and the variables examined and used in these tools, as well as the methods used to assess the validity and reliability of the tool.

Population Study

Population refers to the sum total of people, things, events, etc., i.e., units of observation that are of interest to investigation and remain a subject. The group from which the result of the study can be extrapolated is this reference group or target group. After defining this target population, the researcher has to determine if all the individuals can be studied in order to get a result. Usually, not everyone can be included, so a sample is taken from the research community. An important feature of the sample is that each person must have an equal and non-zero probability of being included in the analysis. The survey must be performed separately, that is, one of the options does not affect the inclusion or exclusion of the other.

The sample population was considered to be a group of doctors and patients in Al-Makassed Hospital

3.3. Data Collection Tool

Collection of data is the collection process and evaluating information in a defined systematic fashion on variables of interest, which helps one to answer specified research questions, test hypotheses, and analyze. The research aspect of data collection is popular in all fields of study, including physical and social sciences, humanities, industry, etc. Although methods differ by discipline, the focus remains the same on ensuring precise and truthful selection. The purpose of all data collection is to capture quality information that then converts to rich data analysis and enables a compelling and credible response to questions that have been asked to be established. Accurate data collection is crucial to preserving the integrity of science, regardless of the field of study or preference for identifying data. The risk of errors occurring is minimized by both the selection of suitable data collection instruments (existing, updated, or newly developed) and clearly delineated instructions for their correct use.

A cross-sectional study will be conducted on a sample of doctors and patients treated with nutritional supplements. The characteristics of patients will be analyzed from the period of October 2021 – February 2022 in Saudi Arabia where they were prescribed. Data will be collected from patients of all ages and genders, who used these medications, attended outpatient clinic visit at least three months of continuous treatment will be required for inclusion. For the purpose of monitoring medication tolerance and adherence, this criterion will be put in place to make sure patients were on an approximately steady treatment. It wasn't taken into account any exclusion factors.

There are a number of characteristics that need to be collected from patients, including sociodemographic and pharmacological variables (such as gender, age, and city), as well as the dosage and frequency of the prescribed medication. To measure use, the daily defined dosage (DDD) will be employed. Analgesics (nonsteroidal anti-inflammatory drugs, acetaminophen, and corticosteroids), antirheumatics (rheumatoid arthritis), and antidepressants (depressive disorder) are all examples of medications that can be used as a proxy for chronic disease, as are lipid-lowering agents and thyroid hormone preparations.

3.4. Data Analysis

An IBM SPSS Statistics version 23.0 for Windows will be used in the analysis of the data. There will be descriptive statistics utilized, including measures of central tendency, location, and dispersion based on the normal behavior of continuous variables (Shapiro-Wilk or Kolmogorov-Smirnov test) and frequencies, proportions, and percentages for categorical data.

ANOVA or t-tests will be used to compare numerical variables. Co-variables in the bivariate analyses will be those factors that show significant relationships with the use of nutritional supplements as monotherapy, combined therapy, or no use of co-medication as dependent variables in the logistic regression models. The level of statistical significance is set at a p-value 0.05.

3.5. Ethical Consideration

Diener and Crandall (1978) essentially divided ethical standards into four main areas:

- If the participants are at risk, it is the responsibility of the researcher to adequately assess the potential harm to the participants in the study and to minimize the potential harm to the extent possible. It guarantees that the identities and records of individuals and groups can be kept confidential.
- If there is a lack of informed consent: it is increasingly normal for researchers to obtain written consent by asking them to complete and sign a questionnaire, rather than verbal consent from study participants, particularly when research involves the collection of personal data. This is generally accompanied by an information sheet that explains what the research is about and how the researchers plan to do it.
- If there is a privacy breach: the prosecutor treats each case sensitively and independently, giving the respondent a real chance to withdraw.
- Where deception is involved: at the beginning of the interview, the respondent should be told if observation techniques or monitoring tools are to be used.

Chapter IV: Results and Discussion

4.1. Statistical analysis:

First: Demographic Features of the study Population (n=100)

Most of the sample consisted of 105 women, while men were 95. We found that the proportion of men from the sample represents 44.8, and that women represent 50 percent. By looking at the research variables, we found that the study sample of 110 of them ranges in age between 25-34 years and 60 years, whose ages range between 35-49 and 30 over fifty. As shown in table (4), we found that there are 128 Bachelor or above (University), 43 Secondary technical school, 15 Junior College, and 14 Senior high school or below. We found that there are fifty individuals from the sample whose experience ranges between 5 to 10 years and 80 individuals are less than 10 years and 70 more than ten years.

Table 4: Demographic features of the study population (n=100)

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	95	44.8	47.3	47.3
	female	105	50.0	52.7	100.0
	Total	200	94.8	100.0	
Age	25 - 34 Years	110	55.0	55.0	55.0
	35 - 49 Years	60	30.0	30.0	85.0
	50 - Above	30	15.0	15.0	100.0
	Total	200	100.0	100.0	
Education	Bachelor or above (university)	128	60.4	63.7	63.7
	Secondary technical school	43	20.8	21.9	85.6
	Junior college	15	7.1	7.5	93.0
	Senior high school or below	14	6.6	7.0	100.0
	Total	200	94.8	100.0	

Experience	5 - 10 years	50	25.0	25.0	25.0
	Less than 5 years	80	40.0	40.0	65.0
	More than 10 years	70	35.0	35.0	100.0
	Total	200	100.0	100.0	

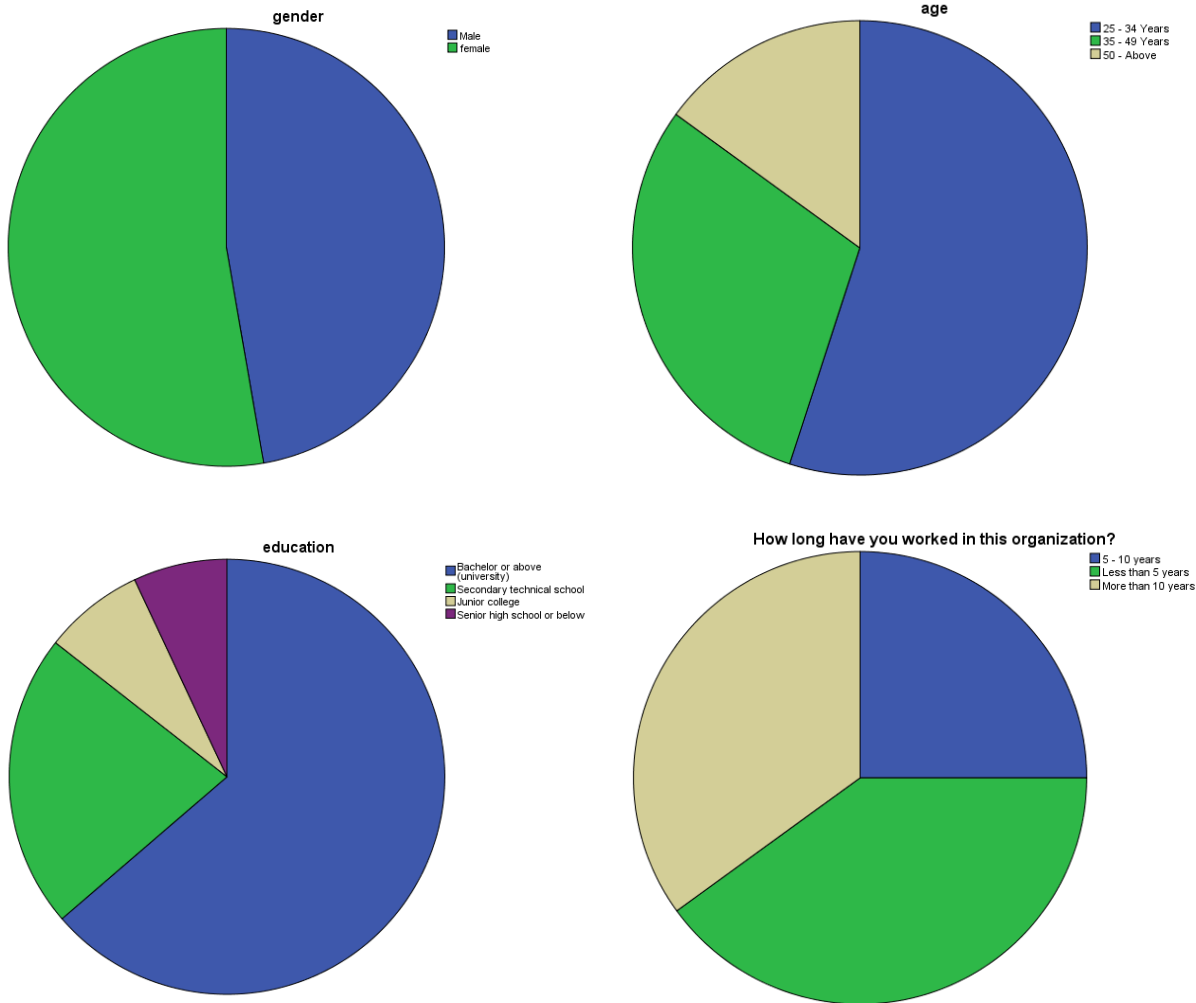


Figure 6: Demographic Features of the study population (n=100)

Second: Analysis of the questionnaire phrases

When asked about the forms of nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, the participants showed that they are available in pill, tablet, capsule, and liquid form. We found that there are 6 (3%) participants who agreed and 194 (97%) strongly agreed that they are available in pill, tablet, capsule, and liquid form.

Table 5: The degree of agreement on the nutritional supplements forms among the study sample (n=100)

Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	6	3.0	3.0	3.0
	Strongly agree	194	97.0	97.0	100.0
	Total	200	100.0	100.0	

Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.

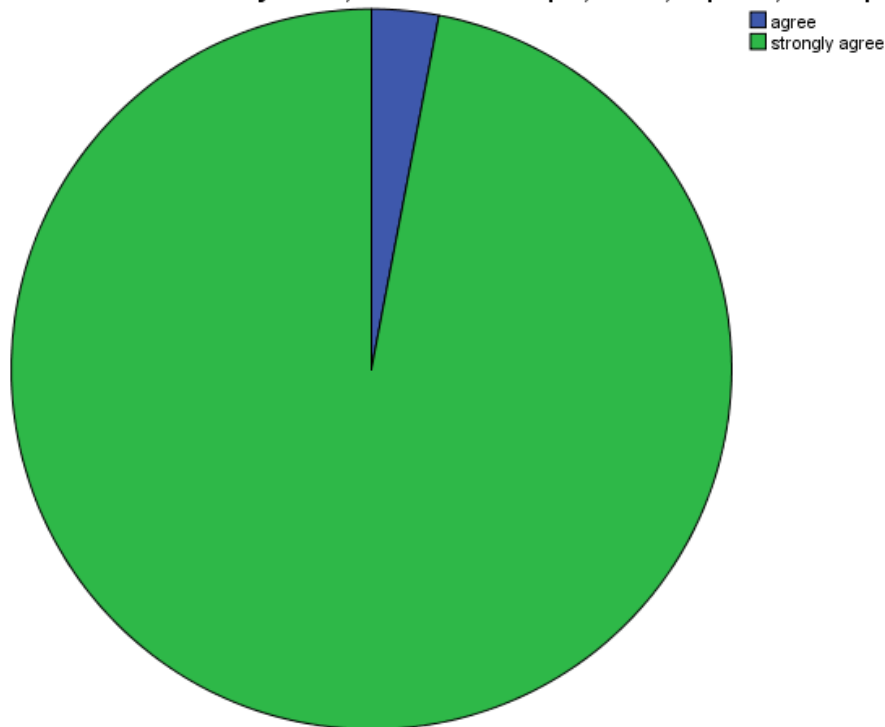


Figure 7: The degree of agreement on the nutritional supplements forms among the study sample

When asking the sample about the consequences of delaying the use of nutritional supplements, we found that 85 of the sample agreed on the danger of ignoring the use of nutritional supplements, and 115 strongly agreed, representing 57.5% of the sample.

Table 6: The degree of agreement on the health consequences disregarding the usage of the nutritional supplements (n=100)

There are serious health consequences of disregarding the use of nutritional supplements					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	85	42.5	42.5	42.5
	Strongly agree	115	57.5	57.5	100.0
	Total	200	100.0	100.0	

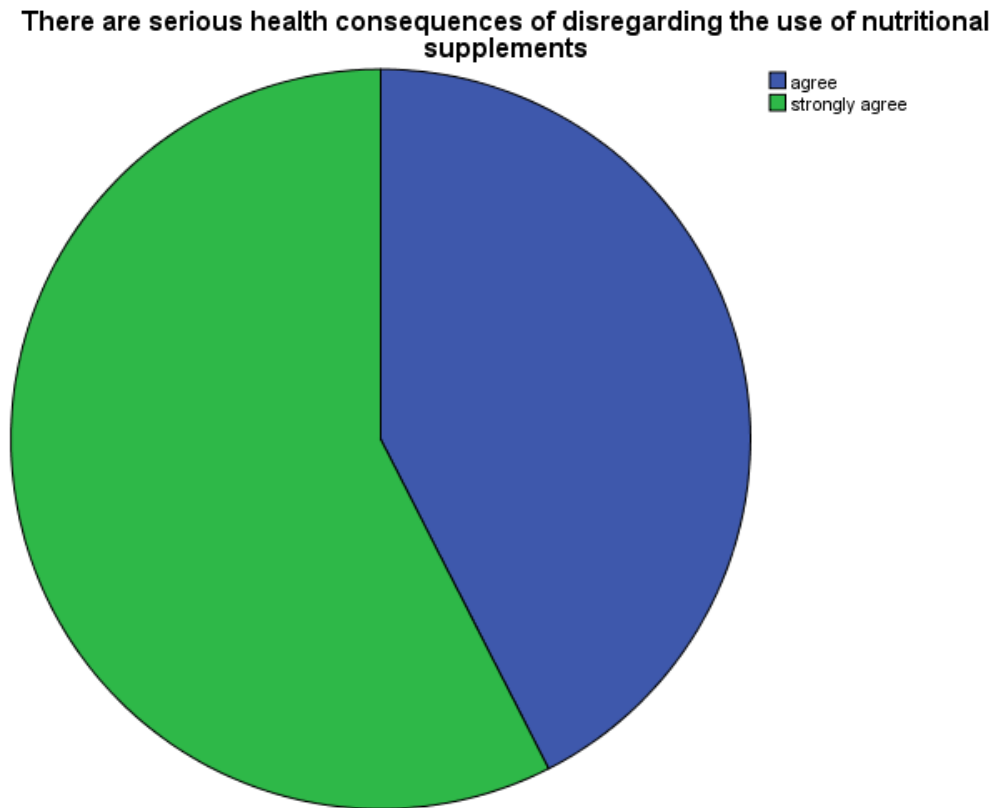


Figure 8: The degree of agreement on the health consequences disregarding the usage of the nutritional supplements

When asking the sample about the components of nutritional supplements, they have a role in the treatment of chronic diseases. We found that 81 of the sample agreed that the ingredients of nutritional supplements have a role in the treatment of chronic diseases and 119 strongly agreed, representing 59.5% of the sample.

Table 7: The degree of agreement among the participants on the statement that Components of nutritional supplements have a role in the treatment of chronic diseases (n=100)

Components of nutritional supplements have a role in the treatment of chronic diseases.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	81	40.5	40.5	40.5
	Strongly agree	119	59.5	59.5	100.0
	Total	200	100.0	100.0	

Components of nutritional supplements have a role in the treatment of chronic diseases.

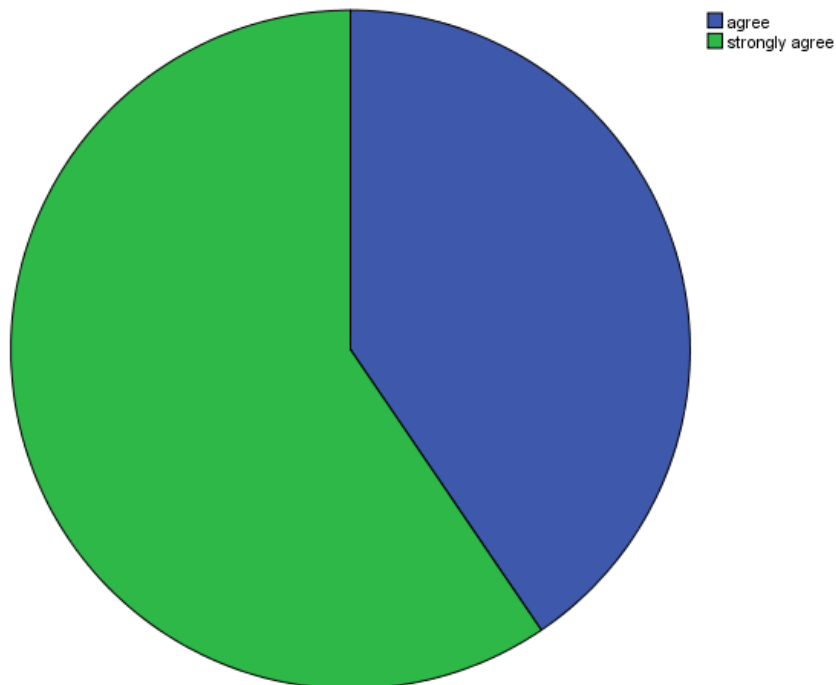


Figure 9: The degree of agreement among the participants on the statement that Components of nutritional supplements have a role in the treatment of chronic diseases

When asked about the sample, the supplement delivers the missing components to the body in order to maintain the latter in a good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided., We found that there are 90 who agree that supplementation helps provide the body with supplements that the body loses and 110 strongly agree.

Table 8: The degree of agreement among the participants on the statement that Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition (n=100)

Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	90	45.0	45.0	45.0
	Strongly agree	110	55.0	55.0	100.0
	Total	200	100.0	100.0	

supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.

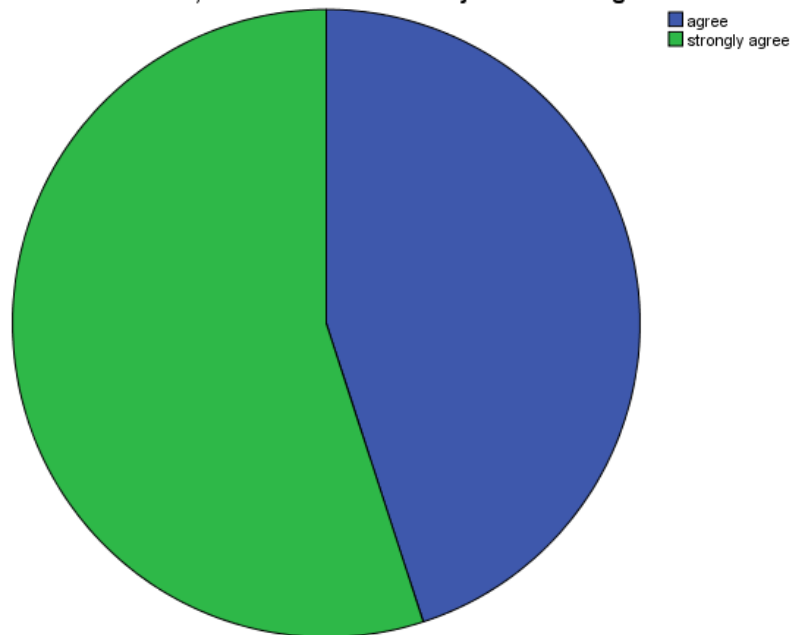


Figure 10: The degree of agreement among the participants on the statement that Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition

We found that in subjects who agreed with me, people who systematically received supplements should know that they may be taking in more vitamins and other nutrients than the body can tolerate. We found that 85 agreed (42.5%) and 115 strongly agreed (57.5%).

Table 9: The degree of agreement among the participants on the statement that individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate (n=100)

individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	85	42.5	42.5	42.5
	Strongly agree	115	57.5	57.5	100.0
	Total	200	100.0	100.0	

individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate

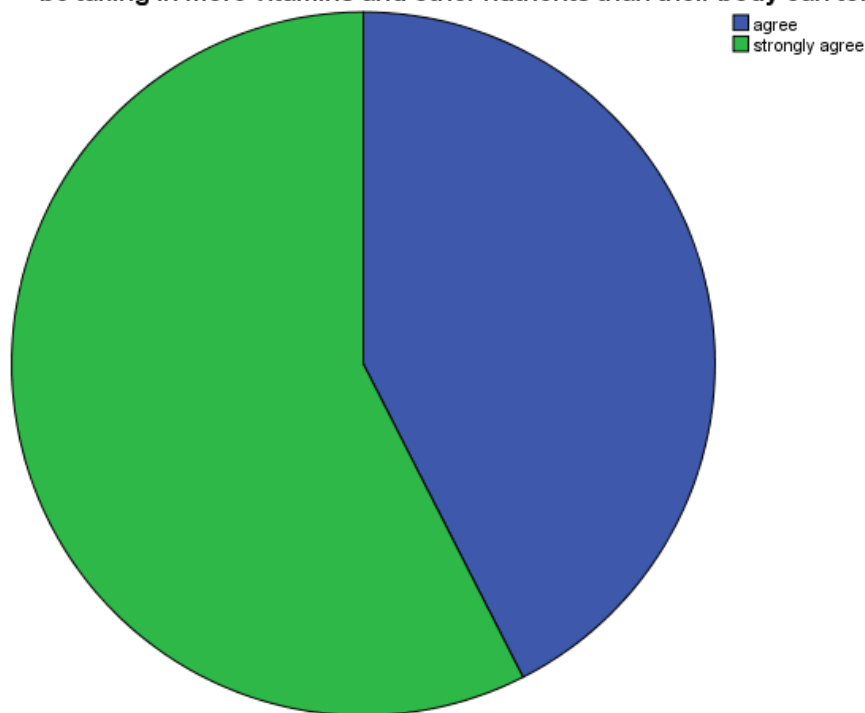


Figure 11: The degree of agreement among the participants on the statement that individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate

When asking the sample about the classification of food supplements according to the legislation, the labeling of such substances should include such a statement that the food supplement does not replace a balanced and varied diet. We found that 90 of the sample agreed with 45 percent and 110 strongly agreed with 55 percent.

Table 10: The degree of agreement among the participants on the statement that dietary supplements do not replace a balanced and varied diet (n=100)

classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	90	45.0	45.0	45.0
	Strongly agree	110	55.0	55.0	100.0
	Total	200	100.0	100.0	

classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.

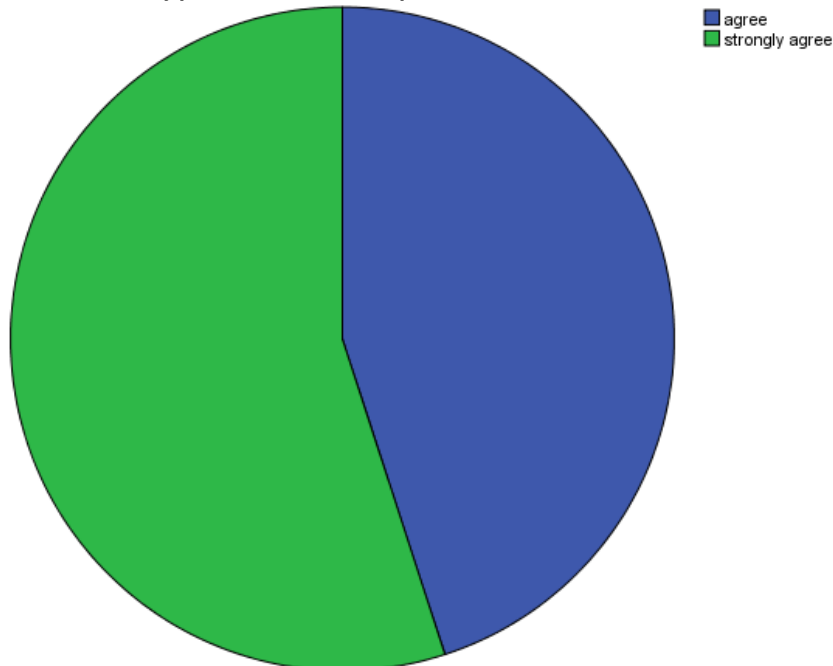


Figure 12: The degree of agreement among the participants on the statement that dietary supplements do not replace a balanced and varied diet

When asking the sample about the abilities to obtain nutritional supplements that differ according to the individual and his health condition, we found that 71 of the sample agreed with a percentage of 35.5 and 129 strongly agreed with a percentage of 64.5.

Table 11: The degree of agreement among the participants on the statement that Abilities in order to meet nutritional supplements vary according to the individual and his health status (n=100)

Abilities in order to meet nutritional supplements vary according to the individual and his health status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	71	35.5	35.5	35.5
	Strongly agree	129	64.5	64.5	100.0
	Total	200	100.0	100.0	

abilities in order to meet nutritional supplements vary according to the individual and his health status

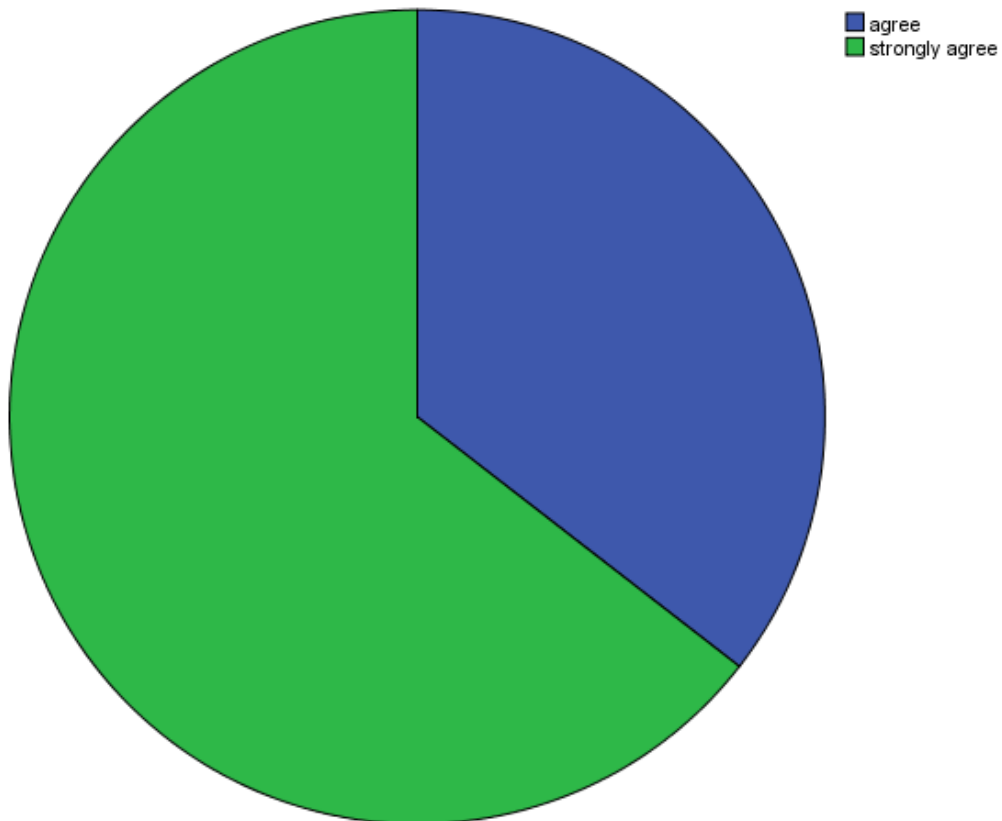


Figure 13: The degree of agreement among the participants on the statement that Abilities in order to meet nutritional supplements vary according to the individual and his health status

When asking the sample about whether individuals who regularly take nutritional supplements should be told that they may eat more nutrients than the body can tolerate, we found that 41 of the sample agreed with a percentage of 20.5% and 159 strongly agreed with.

Table 12: The degree of agreement among the participants on the statement that individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate (n=100)

individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	41	20.5	20.5	20.5
	Strongly agree	159	79.5	79.5	100.0
	Total	200	100.0	100.0	

individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate

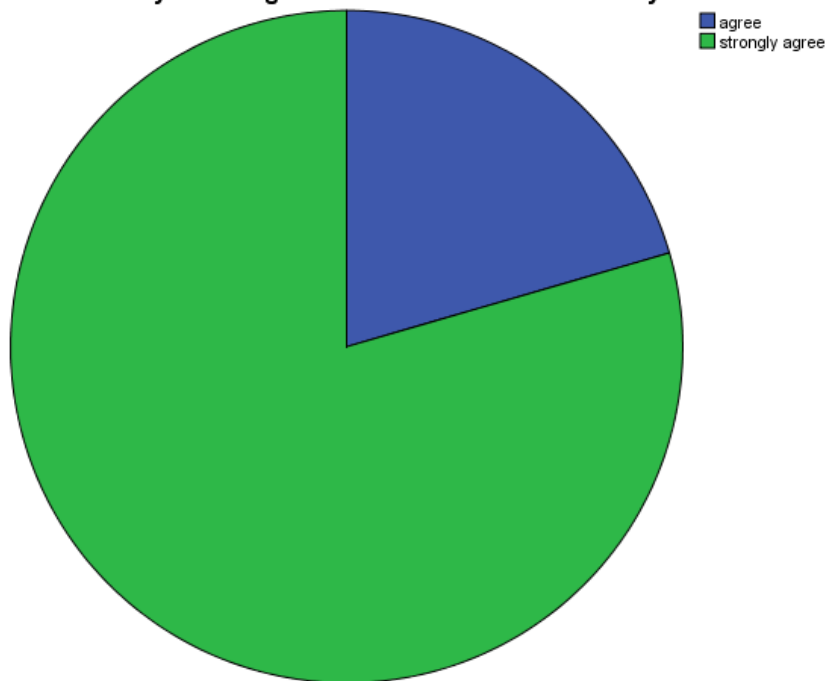


Figure 14: The degree of agreement among the participants on the statement that individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate

When knowing the sample's answers about people may not realize that there are risks that may arise from these combinations, we found that 114 of the sample agreed and 86 strongly agreed.

Table 13: The degree of agreement among the participants on the statement that People may not realize that there are risks that may arise from these formulations (n=100)

People may not realize that there are risks that may arise from these formulations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	114	57.0	57.0	57.0
	Strongly agree	86	43.0	43.0	100.0
	Total	200	100.0	100.0	

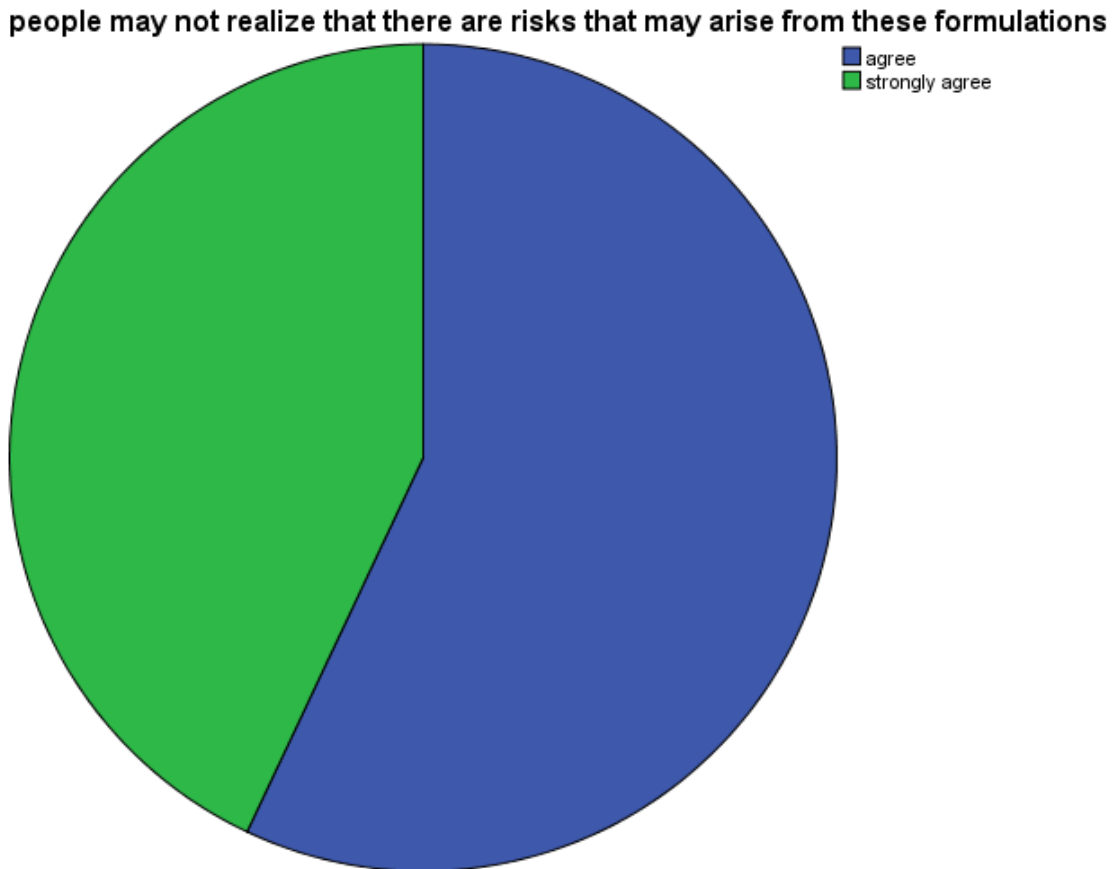


Figure 15: The degree of agreement among the participants on the statement that People may not realize that there are risks that may arise from these formulations

When asked about dietary supplement users, they should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits.

Table 14: The degree of agreement among the participants on the statement that Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits (n=100)

Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	61	30.5	30.5	30.5
	Strongly agree	139	69.5	69.5	100.0
	Total	200	100.0	100.0	

dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits. Nothing

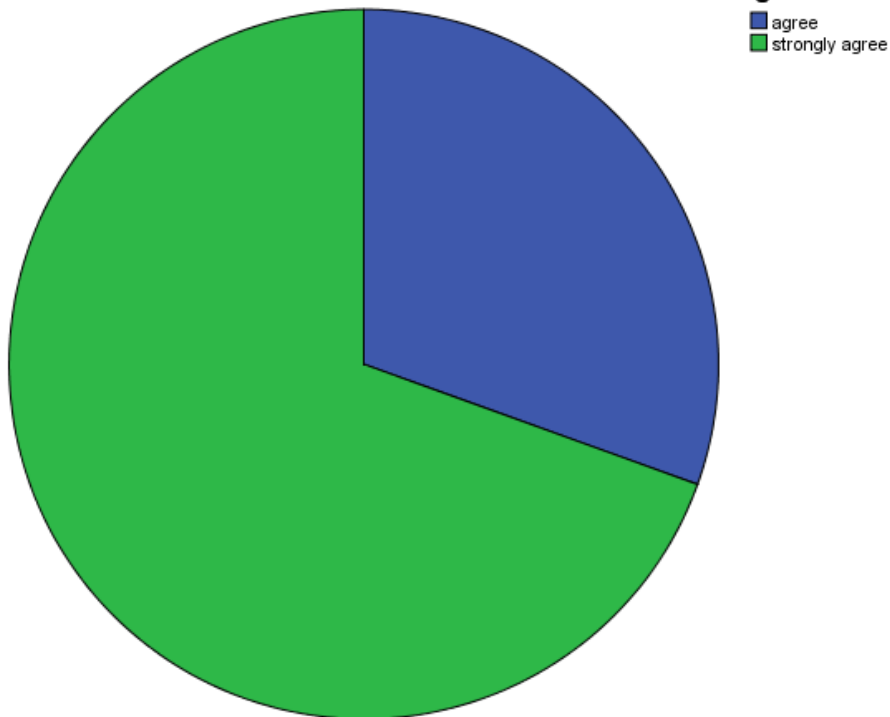


Figure 16: The degree of agreement among the participants on the statement that Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits

When asking the sample about that nutritional supplements improve the use of medications, we found that 94 of the sample agreed with 47 percent and 106 strongly agreed with 53 percent.

Table 15: The degree of agreement among the participants on the statement that The use of nutritional supplements along with medicines improves the result (n=100):

The use of nutritional supplements along with medicines improves the result					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	94	47.0	47.0	47.0
	Strongly agree	106	53.0	53.0	100.0
	Total	200	100.0	100.0	

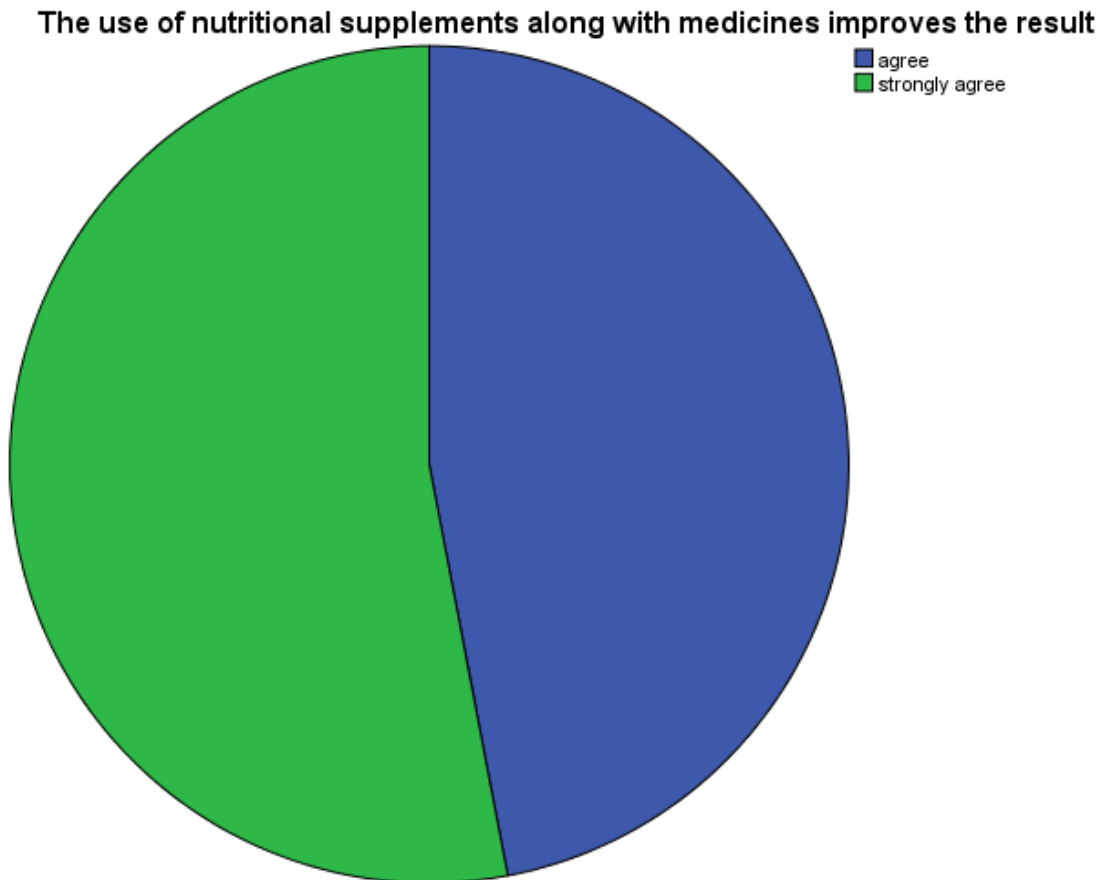


Figure 17: The degree of agreement among the participants on the statement that The use of nutritional supplements along with medicines improves the result

The validity of the study tool:

Notes and suggestions of the referees will be taken into consideration and taken into consideration for the questionnaire to be ready and finally prepared.

Honesty and the internal consistency of the tool (structural validity):

The researcher will apply the questionnaire to an exploratory sample, the number of which will be determined later, the responses will be recorded, and entered by the Statistical Package for Social Sciences (SPSS), and then the Pearson correlation coefficient is calculated; To find out the internal validity of the questionnaire by calculating the correlation coefficient between the degree of each paragraph of the questionnaire, and we will explain the results, for example, as follows:

- We found that the role of nutritional supplements while taking medications. 31.75 As for the other questions, we found that the average (Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.) 3.90 and the standard deviation 1.334, as for the second question (There are serious health consequences of disregarding the use of nutritional supplements.), averaging 4.05.
- We found that people may not realize that there are risks that may arise from these combinations, and while individuals who regularly take nutritional supplements should be told that they may eat more nutrients than the body can tolerate, we found that the Pearson correlation coefficient is equal to 96 percent, which means that the questionnaire items are in correlation It can be relied upon after the Alpha Cronbach test

The validity of the internal consistency of the questionnaire items regarding the presence of an effect of nutritional supplements on taking medications.

Table 16: The validity of the internal consistency of the questionnaire items regarding the presence of an effect of nutritional supplements on taking medications

Correlations								
The validity of the internal consistency of the questionnaire items regarding the presence of an effect of nutritional supplements on taking medications			A1	A2	A3	A4	A5	A6
The validity of the internal consistency of the questionnaire items regarding the presence of an effect of nutritional supplements on taking medications.	Pearson Correlation	1	.960**	.991**	.969**	.967**	.984**	.979**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	200	200	200	200	200	200	200
B1	Pearson Correlation	.960**	1	.932**	.939**	.956**	.912**	.902**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	200	200	200	200	200	200	200
B2	Pearson Correlation	.991**	.932**	1	.961**	.950**	.985**	.970**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	200	200	200	200	200	200	200
B3	Pearson Correlation	.969**	.939**	.961**	1	.953**	.940**	.930**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	200	200	200	200	200	200	200
B4	Pearson Correlation	.967**	.956**	.950**	.953**	1	.926**	.918**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	200	200	200	200	200	200	200
B5	Pearson Correlation	.984**	.912**	.985**	.940**	.926**	1	.985**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	200	200	200	200	200	200	200

Reliability

Table 17: Case Processing Summary

Case Processing Summary			
		N	%
Cases	Valid	200	100.0
	Excluded ^a	0	.0
	Total	200	100.0

a. Listwise deletion based on all variables in the procedure.

Table 18: Cronbach's Alpha Based on Standardized Items

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.967	.961	11

Table 19: Mean and Variance of Items

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Max. / Min.	Variance	No. of Items
Item Means	1.628	1.430	1.970	.540	1.378	.022	11
Item Variances	.215	.029	.250	.221	8.560	.004	11
Inter-Item Covariances	.156	.013	.249	.236	19.186	.006	11

Through the previous tables, it is clear to us that the resolution enjoys a large degree of stability, as the Alpha Cronbach coefficient is high 96.

Kruskal-Wallis:

As shown in the next tables, we found that the Kruskal test is 0.000, which is less than .05, and therefore we reject the null hypothesis and accept the alternative that there is a relationship and the effect of nutritional supplements on medicines.

Table 20: Kruskal-Wallis Test

Ranks

	The use of nutritional supplements along with medicines improves the result	N	Mean Rank
Abilities in order to meet nutritional supplements vary according to the individual and his health status	agree	94	60.47
	strongly agree	106	136.00
	Total	200	
Individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate	agree	94	77.38
	strongly agree	106	121.00
	Total	200	
People may not realize that there are risks that may arise from these formulations	agree	94	57.50
	strongly agree	106	138.63
	Total	200	
Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits	agree	94	66.11
	strongly agree	106	131.00
	Total	200	

Table 21: Chi-Square test showing that The use of nutritional supplements along with medicines improves the result

Test Statistics^{a,b}				
	Abilities in order to meet nutritional supplements vary according to the individual and his health status	Individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate	People may not realize that there are risks that may arise from these formulations	Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits.
Chi-Square	123.509	57.865	133.128	98.480
df	1	1	1	1
Asymp. Sig.	.000	.000	.000	.000
a. Kruskal Wallis Test				
b. Grouping Variable: The use of nutritional supplements along with medicines improves the result				

Table 22: Mean rank showing that The use of nutritional supplements along with medicines improves the result

Ranks

	The use of nutritional supplements along with medicines improves the result	N	Mean Rank
Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.	Agree	94	97.12
	Strongly agree	106	103.50
	Total	200	
There are serious health consequences of disregarding the use of nutritional supplements	Agree	94	52.57
	Strongly agree	106	143.00
	Total	200	
Components of nutritional supplements have a role in the treatment of chronic diseases.	Agree	94	54.83
	Strongly agree	106	141.00
	Total	200	
supplements deliver the missing components to the body in order to maintain the latter in good physical and	Agree	94	49.76
	Strongly agree	106	145.50

mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.	Total	200	
individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate	agree	94	52.57
	strongly agree	106	143.00
	Total	200	
classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.	agree	94	49.76
	strongly agree	106	145.50
	Total	200	

Test Statistics ^{a,b}						
	Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.	There are serious health consequences of disregarding the use of nutritional supplements	Components of nutritional supplements have a role in the treatment of chronic diseases.	Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.	individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate	classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.
Chi-Square	6.940	165.864	152.746	183.603	165.864	183.603
df	1	1	1	1	1	1
Asymp. Sig.	.008	.000	.000	.000	.000	.000
a. Kruskal Wallis Test						
b. Grouping Variable: The use of nutritional supplements along with medicines improves the result						

From the above, we found that the Kruskal test is 0.000, which is less than .05, and therefore we reject the null hypothesis and accept the alternative that there is a relationship and the effect of nutritional supplements on medicines.

ANOVA analysis of the main difference

Looking at the (Anova) table to find out the difference between them, we found that the sig. is greater than 0.05, which means that there are no differences between the three variables, and therefore we accept the null hypothesis and accept the alternative.

Table 23: ANOVA analysis of the main difference

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.	Between Groups	.000	2	.000	.000	1.000
	Within Groups	70.404	111	.634		
	Total	70.404	113			
There are serious health consequences of disregarding the use of nutritional supplements	Between Groups	.348	2	.174	.247	.781
	Within Groups	78.089	111	.704		
	Total	78.438	113			
Components of nutritional supplements have a role in the treatment of chronic diseases.	Between Groups	.086	2	.043	.068	.934
	Within Groups	70.319	111	.634		
	Total	70.406	113			

Post Hoc Tests

We found a difference between the field of hospital workers, whose experience period is less than five years and 5 to 10 years, and the sig is 1.00, which is higher than 0.05, which means that there is a difference between them, and we found in the second paragraph, which relates to the field of stable environment and the number of years of experience We also find that there is a difference because the sig is more than 0.05, which indicates a difference, and we found that all the sig paragraphs have a value greater than 0.05. The confidence interval is 95% and the highest value and the lowest value. The table shows the dimensional differences between years of experience less than 5, between 5 to 10 years, and more than 10 years.

Table 24: Post Hoc Tests

Multiple Comparisons							
Scheffe							
Dependent Variable	Number of years of service (I)	Number of years of service (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form. There are serious health consequences of disregarding the use of nutritional supplements	5 - 10 years	5 - 10 years	-.002-	.181	1.000	-.45-	.45
		Less than 5 years	.000	.189	1.000	-.47-	.47
	More than 10 years 5 - 10 years	More than 10 years	.002	.181	1.000	-.45-	.45
		5 - 10 years	.002	.180	1.000	-.44-	.45
	Less than 5 years	Less than 5 years	.000	.189	1.000	-.47-	.47
		More than 10 years	-.002-	.180	1.000	-.45-	.44
Components of nutritional supplements have a role in the treatment of chronic diseases. Nutritional supplements, which	5 - 10 years	5 - 10 years	-.046-	.191	.971	-.52-	.43
		Less than 5 years	-.137-	.199	.789	-.63-	.36
	More than 10 years 5 - 10 years	More than 10 years	.046	.191	.971	-.43-	.52

include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.		5 - 10 years	-.091-	.189	.891	-.56-	.38
	Less than 5 years	Less than 5 years	.137	.199	.789	-.36-	.63
		More than 10 years	.091	.189	.891	-.38-	.56
There are serious health consequences of disregarding the use of nutritional supplements	5 - 10 years	5 - 10 years	-.024-	.181	.991	-.47-	.43
	Less than 5 years	Less than 5 years	-.069-	.189	.936	-.54-	.40
	More than 10 years 5 - 10 years	More than 10 years	.024	.181	.991	-.43-	.47
		5 - 10 years	-.044-	.180	.970	-.49-	.40
	Less than 5 years	Less than 5 years	.069	.189	.936	-.40-	.54
			.044	.180	.970	-.40-	.49

ANOVA analysis of sub-questions

Table 25: ANOVA analysis of sub-questions

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.	Between Groups	.000	2	.000	.000	1.000
	Within Groups	60.404	111	.634		
	Total	60.404	113			
Individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate	Between Groups	.348	2	.174	.247	.781
	Within Groups	58.089	111	.704		
	Total	58.438	113			
Classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.	Between Groups	.086	2	.043	.068	.934
	Within Groups	50.319	111	.634		
	Total	50.406	113			

Post Hoc Tests

Multiple Comparisons								
Scheffe								
Dependent Variable	Number of years of service (I)	Number of years of service (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.	5 - 10 years	5 - 10 years	-.002-	.181	1.000	-.45-	.45	
	Less than 5 years	Less than 5 years	.000	.189	1.000	-.47-	.47	
	More than 10 years	More than 10 years	.002	.181	1.000	-.45-	.45	
	5 - 10 years	5 - 10 years	.002	.180	1.000	-.44-	.45	
	Less than 5 years	Less than 5 years	Less than 5 years	.000	.189	1.000	-.47-	.47
		More than 10 years	More than 10 years	-.002-	.180	1.000	-.45-	.44
Individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate.	5 - 10 years	5 - 10 years	-.046-	.191	.971	-.52-	.43	
	Less than 5 years	Less than 5 years	-.137-	.199	.789	-.63-	.36	
	More than 10 years	More than 10 years	.046	.191	.971	-.43-	.52	
	5 - 10 years	5 - 10 years	-.091-	.189	.891	-.56-	.38	
	Less than 5 years	Less than 5 years	Less than 5 years	.137	.199	.789	-.36-	.63
		More than 10 years	More than 10 years	.091	.189	.891	-.38-	.56
Classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.	5 - 10 years	5 - 10 years	-.024-	.181	.991	-.47-	.43	
	Less than 5 years	Less than 5 years	-.069-	.189	.936	-.54-	.40	
	More than 10 years	More than 10 years	.024	.181	.991	-.43-	.47	
	5 - 10 years	5 - 10 years	-.044-	.180	.970	-.49-	.40	
	Less than 5 years	Less than 5 years	Less than 5 years	.069	.189	.936	-.40-	.54
				.044	.180	.970	-.40-	.49

In the previous table, we see that there is a significant difference between the fields of hospital workers with less than five years of experience and those with five to ten years of experience, and the sig is 1.00, which is higher than 0.05, which indicates that there is a difference between them. All the sig paragraphs are greater than 0.05, which indicates a difference, and we also find that the sig is greater than 0.05, which indicates a difference. The highest and lowest values are within a 95% confidence interval. Years of experience less than 5, between 5 and 10, and over 10 are all shown in the table previous.

4.2. Summary of Main Results:

- No statistically significant effect of gender, age and years of experience was found on the answers to the questionnaire.
- There is a statistically significant relationship between taking nutritional supplements and medicines, as they work to improve the clinical experience, in addition to taking nutritional supplements leads to improving the intake of medicines and increasing their effectiveness.
- It is clear to us through the table that represents the results of the differences using the F-test for one-way analysis of variance ANOVA at the level of years of experience, that there are no statistically significant differences between the answers of the sample due to the years of experience, where we note that the average of squares between groups amounted to (740,933) and within groups It reached (87,704), and this value is considered a function, as the value of P reached (0.001) which is less than the significance level (0.05) between the two degrees of freedom (2 and 29).
- There is no supplement that is completely safe. The overdose of fat-soluble vitamins, for example, can lead to hypervitaminosis, which can be dangerous. A buildup of excess protein in the liver and kidneys can lead to disease. Ingesting a large amount of powdered carbohydrates can lead to weight gain.

4.3. Discussion of Results

The findings of our study have shown that there is a statistically significant relationship between taking nutritional supplements and medicines, as they work to improve the clinical experience, in addition to taking nutritional supplements leads to improving the intake of medicines and increasing their effectiveness. When food-based techniques like dietary modification, fortification, or food provision fail to attain adequate intake in low- and middle-income countries with specific micronutrient deficiencies (e.g. iodine, iron, zinc, and vitamin A), supplementation is recommended. People in high-income countries are more likely to consume amounts of vitamins and minerals that are overly high to begin with, which could be explained by the widespread use of dietary supplements.

Vitamin A and niacin levels were found to be above the upper limit in more than 80% of Canadian children aged 1-3 who used dietary supplements (Shakur, Y.A., et al., 2012). Over supplementation of vitamins A (97%) and zinc (68%) in toddlers in the United States has been documented (Berkel, L.A., et al., 2005). The long-term effects of high intake on various nutrients are unknown, thus it's not apparent if this is a problem.

A Supplement Facts label shows the active components, the amount per serving (dosage), as well as additional substances, such as fillers, binders, and flavorings, that are included in the product. However, a healthcare professional may choose to use less or more than the manufacturer's recommended serving size. Patients who don't eat a wide variety of healthful foods may benefit from taking dietary supplements. Supplements, on the other hand, can't take the place of a healthy diet's variety of foods.

In line with the previous analysis's first finding (Bailey et al. 2013). For example, according to his research, there is a high concentration in trace amounts, as well as unique nutritional compositions; and Nutritional supplements have a number of advantages, including the absence of fat, cholesterol, and purines, as well as complete coverage of specialized sport's needs. Multivitamins, multi-minerals, and vitamins and mineral supplements are currently the most popular nutritional supplements. In addition, nutritional supplements are essential, but they should not be viewed as a substitute for a healthy diet.

Even though these micronutrients are essential for health, the lack of regular supplementation increases the risk of toxicity with higher doses (Mulholland and Benford 2007). It's so rare in wealthy countries to have micronutrient deficiencies that most people who take supplements get enough of these nutrients already. There is no convincing evidence of health benefits from trials of vitamin and mineral supplementation in people who do not have nutritional deficiencies, despite the widespread belief that supplementation is beneficial to health.

Vitamins, minerals, herbs, botanicals, amino acids, and enzymes are just some of the compounds included in dietary supplements, which are commonly taken by people of all ages. A whopping 34% of participants in the CDC's 2005-2008 National Health and Nutrition Examination Study (NHANES)—representing over 72 million Americans—took dietary supplements alongside a prescription medication. In spite of the fact that many individuals rely on supplements to ensure they get enough important nutrients, they should not be used as an alternative to eating a varied diet.

Medication's effect may be increased or decreased by certain dietary supplements. It is possible for certain dietary supplements to alter the absorption, metabolism or excretion of a medicine, hence reducing the treatment's effectiveness.

Consequently, the combination of dietary supplements and pharmaceuticals could result in severe or even fatal consequences. Customers may be tempted to believe that a "natural" product, like a herbal supplement or fish oil, can't harm them. It's not necessarily safe just because something is natural. It's possible that some weight reduction solutions claim to be natural, but their components may interact with prescriptions and could be dangerous for people who have preexisting medical concerns.

Supplements and drugs can harm children, especially those under the age of 18. Children's metabolisms are so diverse that different drugs are metabolized at varying rates depending on the age of the child. The combination of dietary supplements and other drugs might lead to serious side effects in children.

According to the study (Oikonomou, 2009), this is also true. There are several factors that can lead to side effects from poisoning in nutritional supplements, including: (a) the dose, because exceeding the recommended dose can cause side effects; (b) the duration of ingestion, because the human being is burdened by the specific substances contained in this supplement until they are eliminated; and (c) special chemical properties of certain substances.

This result is in line with what we expected (Barton et al., 2006). Poisoning can occur if you consume too many minerals and vitamins. Hyperchromatosis, an iron storage disorder that can lead to liver damage, can be caused by excessive iron or multimineral supplementation.

However, the results of the current study differ that dietary supplements are all beneficial but a study (Troesch et al., 2012). She doesn't agree with that and says it's impossible for any supplement to be completely harmless. Hypervitaminosis, for example, can result from an overdose of fat-soluble vitamins. The liver and kidneys can be damaged by excess protein.

Eating a lot of powdered carbohydrates can lead to an increase in body fat. The body's inability to manufacture some muscle proteins may be caused by an excessive intake of fatty acids. Performance-enhancing drugs may also cause problems with the endocrine system.

We conclude that supplementation improves the efficacy of drugs. However, animal studies on the SPI and toxicity of soy formula are unconvincing. According to Akingbemi et al., prenatal exposure to soy-based diets decreased steroidogenesis, decreased testosterone production, and increased Leydig cell proliferation in mice (2007). Additionally, neonatal milk-fed monkeys had lower testosterone concentrations (Tan et al., 2006).

Leydig cell loss has been linked to larger testes and more Leydig cells per testis, which is consistent with the monkeys' ability to compensate for the loss. Human breast cancer xenografts in female ovariectomized mice were more likely to proliferate when SPI was administered.

Chapter V: Conclusion and Recommendations

5.1. Future Perspectives

Attitudes toward safety, efficacy, and ideals about what is important in food and life will play a key role in deciding future supplement science needs. A better chain of custody and product characterization is needed for these items, particularly those that are traded in worldwide markets, to ensure their safety. Additionally, the product's efficacy/health promotion claims must be accurate and not deceptive. Clinical trials with well-defined goods and rigorous experimental designs are needed to demonstrate efficacy, and the research must be repeatable (Weber, W.J. and Hopp, D.C., 2020).

In addition, there are concerns of personal choice and values, often incorporating supplement efficacy as complementary and alternative therapies that are part of wider philosophical or religious world views and systems (Sebastian et al. 2017, González-Sarras et al. 2017).

Botanicals utilized in the treatment of disease (Costello et al. 2016) and those constituents that are supposed to slow down the ageing process (Latruffe, N., et al., 2015) must all have valid indicators of efficacy and exposure identified (Kuhman et al., 2015). Health outcomes in chronic degenerative disorders need to be better understood by supplement researchers (Yetley et al. 2016; Pérez-Cano and Castell 2016).

In order to move supplement science forward, scientists from a variety of countries need to collaborate. In any regulatory system, regardless of the type of health product, high-quality science is essential. Regulators need scientific evidence about the safety, quality, and efficacy of nutrients and other bioactive chemicals (Taylor and Yetley 2008)

5.2. Conclusion

The term "dietary supplement" refers to products that are meant to supplement a person's diet. It is common for supplements to contain vitamins, minerals or plants or amino acids in order to enhance the diet. CAM is a range of medical and health care systems, practices, and products that are not considered part of conventional medicine. Nutritional supplements are typically associated with CAM. Homeopathic and herbal treatments are two of the most common types of nutritional supplements on the market right now.

In recent years, the usage of nutritional supplements by CLBP sufferers has increased in popularity, and these items are readily available. In addition to pharmacies and health food stores, consumers can buy supplements through retail outlets such as supermarkets and convenience stores. Some naturopaths, doctors of Chinese medicine, homoeopaths, chiropractors, and physicians prescribe nutritional supplements, which can be purchased directly from these practitioners.

Medical professionals should avoid using them for any of these purposes because they are not meant to be used as medications. Food and Drug Administration regulations for dietary supplements are distinct from those for prescription or over-the-counter medicines. The FDA oversees both. Before medicines can be sold or marketed, they must be approved by the FDA. No, supplements don't have to be approved by the FDA. There must be proof that supplement products are safe and that label claims are accurate and not deceptive. A company doesn't have to show the FDA that the product is safe before it can go on sale if it doesn't contain a "new dietary ingredient."

Certain health claims may be made on the labels of dietary supplements. If a supplement promotes health or supports a body function, manufacturers are allowed to say so (like immunity or heart health). "This statement has not been evaluated by the Food and Drug Administration," must accompany these claims. Using this product does not imply that it should be used for the treatment or prevention of any disease."

Dietary supplements may be beneficial to human health in certain circumstances, but they should not be used as a substitute for a well-balanced daily diet composed of whole foods, according to scientists and health professionals. The market for dietary supplements that claim to improve a customer's health or well-being is massive. It's important to note that certain goods may not be suitable for everyone. Supplements that include active components that have a physiological or pharmacological effect are just as likely to generate side effects as normal medications in people who are vulnerable to them.

We must pay more attention to probable side effects and possible interactions in order to avoid significant medical consequences. Before initiating or recommending a regimen incorporating these substances, both users and physicians should examine the most recent scientific research. Many people take nutritional supplements, and medical doctors should be aware of this fact. As a result, patients should be asked about their supplement use in order to receive the best possible care. Patient education and advice from their doctors or pharmacists are essential when it comes to nutritional supplement self-prescription. This includes the elderly, pregnant women, children, and people with disabilities.

5.3. Recommendations

The main recommendations of the study are as follows

- Work to conduct more studies on the role of nutritional supplements in medicine
- Working to help hospital workers in applying the correct methods for using supplements in order to prevent cases of poisoning.
- Attention to encourage healthy practices, which constitute health care and nutrition for the individual.
- Controlling the medication regimen is the most important and most effective way to reduce the effect of supplementation.
- Working on holding seminars in all hospitals with the aim of clarifying the importance of nutritional supplements as an essential part of treatment, with an explanation of its effect before and after.
- Attention to placing the importance of nutritional supplements on the labels on supplement boxes and conducting television interviews on the methods and organization of taking supplements.
- Working on setting up competitions about research development that talks about the importance of nutritional supplements.

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Appendices

1. General Demographic Questions

1. Age

- 18 – 24 Years
- 25 – 34 Years
- 35 - 49 Years
- 50 Years and more

2. How long have you worked in this organization?

- Less than 5 years
- 5 to 10 years
- More than 10 years

3. Gender

- Male
- Female

2. Questions of the questionnaire

1. Nutritional supplements, which include everything from vitamins and minerals to amino acids and fatty acids, are available in pill, tablet, capsule, and liquid form.

- agree
- strongly agree
- neutral
- disagree
- strongly disagree

2. There are serious health consequences of disregarding the use of nutritional supplements.

- agree
- strongly agree
- neutral
- disagree
- Strongly disagree

3. Components of nutritional supplements have a role in the treatment of chronic diseases.

- agree
- strongly agree
- neutral
- disagree
- Strongly disagree

4. Supplements deliver the missing components to the body in order to maintain the latter in good physical and mental condition. Thus, the human organism is not exhausted, and at the same time injuries and fatigue are avoided.

- agree
- strongly agree
- neutral
- disagree
- Strongly disagree

5. Individuals who receive supplements systematically should know that they may be taking in more vitamins and other nutrients than their body can tolerate.

- agree
- strongly agree
- neutral
- disagree
- Strongly disagree

6. Classification of dietary supplements in accordance with the legislation, the labeling of these substances should include such a statement that dietary supplements do not replace a balanced and varied diet.
- agree
 - strongly agree
 - neutral
 - disagree
 - Strongly disagree
7. Abilities in order to meet nutritional supplements vary according to the individual and his health status.
- agree
 - strongly agree
 - neutral
 - disagree
 - Strongly disagree
8. Individuals who take dietary supplements systematically should be told that they may be taking in more nutrients than their body can tolerate
- agree
 - strongly agree
 - neutral
 - disagree
 - Strongly disagree
9. People may not realize that there are risks that may arise from these formulations
- agree
 - strongly agree
 - neutral
 - disagree
 - Strongly disagree

10. Dietary supplement users should read labels on nutritional supplements and fortified foods carefully and avoid taking multiple doses that exceed the recommended nutritional benefits.

- Nothing
- agree
- strongly agree
- neutral
- disagree
- Strongly disagree

11. The use of nutritional supplements along with medicines improves the result.

- agree
- strongly agree
- neutral
- disagree
- Strongly disagree