“NUTRACEUTICALS IN TENDINITS”

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By

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CERTIFICATE

This is to certify that Shubham Singh in partial fulfilment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur has successfully completed his internship at Sundyota Numandis Pharmaceuticals during 22 February 23 to 22 May 2023.

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SIGNATURE

IIHMR UNIVERSITY
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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **NUTRACEUTIACALS IN TENDINITS** is the Bonafede record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Date:
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DECLARATION BY THE FACULTY GUIDE

This is to certify that the dissertation titled **"NUTRACEUTIACALS IN TENDINITS",** Uttar Pradesh" is the record of the research work undertaken by **Shubham Singh** in partial fulfilment of the requirement for the award of the degree of MBA – Pharmaceutical Management from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific and analytical.

Date: 29-05-2023 **Signature of Guide**

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ABSTRACT

A problem that frequently occurs is tendinitis. Although it can impact people of various ages and activity levels, it is most typically seen in adults who work strenuous or repetitive jobs, such as athletes, manual workers, and musicians. A smaller number of people have tendinitis or have a history of having it, therefore according to the poll, people are not using any nutraceuticals or dietary supplements.

According to the poll, there is still debate and research being done on the topic of how well nutraceuticals, or nutritional supplements, work to treat the signs and symptoms of tendinitis. Even though some consumers of particular supplements assert to have experienced symptom relief or improvement, the scientific support for these assertions is typically lacking or confusing. according to the poll.

The likelihood of adverse reactions or side effects of taking nutraceuticals or dietary supplements for tendinitis can vary based on the supplement, the individual, and combinations with other prescription drugs or medical conditions. It's important to keep in mind that supplements, whether they're natural or organic, can still pose risks and may not be fully free of side effects. Many supplements are considered safe when used appropriately, while some individuals may experience adverse reactions or side effects. They might range from minor. According to the survey, it is normal for patients to take nutraceuticals in addition to standard tendinitis therapies. Several methods are usually employed in dealing with tendinitis. Rest, physical therapy, dietary adjustments, and medications are some tactics that are often incorporated into a comprehensive approach. For tendinitis, using nutraceuticals or dietary supplements may cause patients to have reservations or limitations. Various concerns are often raised, such as: The effectiveness of different supplements in treating tendinitis lacks research support, causing some serious concerns. Taking different medications along with dietary supplements can bring about interactions that worry some patients. While being supervised by a physician, it's been suggested that tendinitis patients use dietary supplements or nutraceuticals for a short term, especially if their insurance doesn't pay the cost. These are generally thought of as stopgap fixes rather than enduring treatments that can be used in conjunction. .

How long the use should last is influenced by the degree of the symptoms, the effectiveness of the supplements and the overall treatment plan. To effectively

manage tendinitis symptoms, it’s critical to regularly evaluate the effectiveness of supplements.

If you have any concerns or notice any changes in your symptoms, you should also consult a healthcare professional. Lack of oversight and regulation: The supplement sector is less carefully regulated than the pharmaceutical industry. This may lead to questions about the efficacy, reliability, and purity of supplements. Yes, a lot of people have heard of and use nutraceuticals and nutritional supplements as a management method for tendinitis. Tendinitis, a common condition that causes inflammation and irritation of a tendon, can be uncomfortable and painful. Even though rest, physical therapy, and medication are regularly suggested as standard therapies, some patients have opted for alternative treatments such the use of nutraceuticals and nutritional supplements.

ACKNOWLEDGEMENT

There is a different road to being an ethical and knowledgeable professional than what is taught in a classroom. I gained experience at IQVIA during my internship that allowed me to better understand the course's theoretical and practical components. Like every act of adoration, this effort needed the labour of several people. I'm very grateful to everyone who has supported us along this journey.

I'd want to extend my appreciation to the whole faculty of pharmaceutical sciences for their unwavering support, leadership, and willingness to share their knowledge.

I also want to thank Dr. Sudhinder Singh Chowhan for being such a strong leader during the training.

Lastly, I might wish to thank my family for their constant support and for keeping me throughout the journey.

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CHAPTER-1 Introduction

A tendon which is dense fibrous tissue that connects muscle to bone and becomes inflamed and irritated when a person has tendinitis. The tendons of the shoulder, elbow, wrist, knee and ankle are often affected. Tendinitis can develop as a result of overuse, repetitive motion, sports-related injuries, aging, or other health problems. Pain, swelling, tenderness and limitation of movement are all symptoms of tendinitis in the affected area.

Traditional methods such as rest, physical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroid injections are often used to treat tendinitis. Nevertheless, the potential of nutraceuticals in diagnosis, treatment of tendinitis is attracting considerable interest. Known as nutraceuticals, foods or dietary ingredients offer additional medical or health benefits beyond their basic nutritional value.

The ability of nutritional supplements to reduce inflammation, promote tissue repair, and enhance overall joint health has gained attention. They cover a wide range of chemicals, including vitamins, minerals, antioxidants, omge-3 fatty acids, plant antioxidants properties of these organic substances have been investigated because they are important for the Treatment of tendinitis.

The use of nutritional supplements for tendinitis is in line worth the growing demand for natural and comprehensive healthcare practices. They provide a potentially safer and more sustainable alternative to conventional pharmaceutical therapies, which may have drawbacks in terms of long-term use or adverse side effects.

Market Access for Nutraceuticals in Tendinitis

A number of critical factors such as research and development, regulatory concerns, market demand and distribution strategies need to be considered before bringing tendinitis nutraceuticals to market. The ingredients of each product are as follows.

Research and Development: To develop a health treatment for tendinitis. It is necessary to study the cause, symptoms and homeopathic remedies. Scientists are studying various herbs, herbal combinations, vitamins, minerals and other bioactive for their ability to reduce inflammation, promote tissue healing, and reduce tendonitis and inflammation.

Regulatory considerations: Market access to nutraceuticals is subjects to regulations and standards established by the authorities. The safety, efficacy and labelling of nutraceuticals are regulated by regulatory agencies in many countries, including the Food & Drug administration (FDA) in the United States and the European Food Safety Authority (EFSA) in Europe or similar organizations.

Market Needs: Before introducing Nutraceuticals for Tendonitis treatments, market research is essential to identify market needs and targets. For this, it is necessary to determine the target market and evaluate the competition. IT's helpful to get feedback from doctors, patients and professionals business professionals to identify unmet needs and develops a strong marketing strategy.

Distribution Strategy: To enter the tendinitis, market nutraceuticals must be prepared to distribute their products to consumers. This may include partnering with pharmacies, doctors, e-commerce sites or creating direct to consumer sales.

Clinical trials and evidence: It is important to ensure reliability for clinical trials and to provide evidence for efficacy and safety claims. Research studies suggests the supplements in the treatment of tendinitis. When rigorous testing is done using standardized methods and sufficient participants, it is easier to demonstrate product quality and gain market acceptance.

Business and public awareness: Tendinitis food products must be well known to the public in order to be successful in the business world.

Marketing will include advertisements aimed at patients, physicians and the general public. Interest and trust in a product can be increased by emphasizing its benefits,

safety and clinical evidence through a variety of media, including social media, treatment, media, social media and advertising.

Overall, successful tendinitis nutrition for the market requires a good strategy that integrates market analysis, distribution planning, management, research science and good business.

Nutraceutical Strategies for Tendinitis

When it comes to Tendinitis nutraceuticals, different enemies may employ different strategies. Nutraceuticals are products made from food sources that have the potential to be healthy. In the context of tendinitis, nutraceutical approaches often focus on reducing inflammation, promoting tissue healing, and alleviating the pain caused by the condition.

1. **Formulation developments:** Contestants can create original formulations combining several nutraceuticals recognized for their anti-inflammatory and tissue properties. These preparations may contain boswellia serrata extract, collagen peptides, ginger, curcumin, omega-3 fatty acids and curcumin. A synergistic combination is desirable to successfully target tendinitis symptoms.
2. **Clinical Trials:** Competitors may invest in conducting clinical trials to gather data demonstrating the effectiveness of their nutraceutical products in treatment of tendinitis. RCTs (Randomised Controlled Trials) that compare the product to a placebo or received treatments may be used in this research. The market position and credibility of nutraceuticals can be improved by publishing the good results of these research.
3. **Distribution Channels:** In order to make their nutritional products widely available to consumers, competitors may deliberately choose which distribution channels to use. This may include working with pharmacies, online marketplaces, health and wellness retailers and medical specialists. Offering affordable prices, attractive packaging and convenient delivery options can all help businesses expand their market reach and improve customer satisfaction.

4. **Customer education:** It is essential. Customers must be educated about tendinitis, its causes, and the benefits of nutraceutical therapies. Competitors can offer instructional materials such as articles, blogs, and videos that describe the science behind their products and how they can help treat tendinitis symptoms. This could increase trust and make competitors reliable sources in the industry.
5. **Collaborating with Medical Professionals:** Competitors can work with medical professionals such as orthopaedic surgeons, sports medicine specialists, and physical therapists to gain credibility and acceptance within the medical community. This may include offering product samples for testing, holding educational seminars or funding research projects. These partnerships can improve the company's reputation and encourage healthcare professionals to suggest it.

CHAPTER-2 REVIEW OF LITERATURE

Kannus, P; Józsa, L ET AL DECEMBER 1991

We examined biopsy specimens from spontaneously ruptured tendons in 891 patients treated between 1968 and 1989. 397 Achilles tendons, 302 biceps brachii tendons, forty extensor pollicis longus tendons, eighty-two quadriceps tendons and patellar ligaments, and seventy additional tendons were removed during restoration. Age and sex-matched control specimens were acquired and examined from 445 tendons removed now of death from the cadaver of previously healthy individuals who died unintentionally. Light and polarised light microscopy, as well as scanning and transmission electron microscopy, were used to examine the specimens' histopathology. Although no spontaneously burst tendon had a healthy structure, two-thirds of the control tendons did (p less than 0.001).

Henry F. Chambers ET AL 15 NOEMBER 2005

Soft-tissue infections are widespread, usually of mild to moderate severity, and can be treated with a variety of medications. For patients with minor signs and symptoms of disease, an etiologic diagnosis of uncomplicated cellulitis is frequently difficult and generally unnecessary. Clinical evaluation of infection severity is critical, and numerous classification schemes and algorithms have been developed to help clinicians [1]. Most clinical assessments, however, have been established from either retrospective research or an author's own "clinical experience," highlighting the necessity for prospective investigations with defined severity measurements paired to management concerns and outcomes.

M. Wilson ET AL 5 MAY 2006

Tendon diseases are frequent and account for a large proportion of rheumatology referrals. The Achilles, patella, rotator cuff elements, forearm extensors, biceps brachi, and tibialis posterior tendons are particularly prone to degenerative disease. Tendon disorders are frequently chronic and might be difficult to manage adequately in the long run.

Understanding the pathophysiology of these disorders has advanced significantly. Histopathological evidence, together with developments in imaging tools, has increased our understanding of these diseases' degenerative (rather than inflammatory) character. Furthermore, the existence of neovascularization in long-standing tendinopathy is now well recognised.

Salvatore Bisicchia ET AL MAY 2016;

Background: Nutraceuticals are a frequent kind of support therapy for tendinopathies. Even if they are extensively disseminated, our understanding remains limited. The purpose of this systematic review is to look at the most regularly used nutraceuticals and how they affect tendons. Methods included glucosamine and chondroitin sulphate, vitamin C, hydrolazed type 1 collagen, arginine alpha-ketoglutarate, bromelain, curcumin, boswellic acid, and methil-sulfonil-methane. During the last week of December 2015, a thorough search of major databases for each chemical in relation to tendinopathy was conducted. Articles that were duplicated, articles that were not in English or Italian, articles that were not common nutraceuticals, and articles that had nothing to do with tendons or tenocytes were all excluded.

Wael N. Hozzein & Gamal Badr ET AL 21 JUNE 2017

The role of cytokines and growth factors in tissue repair and their frequent anti-infective effects are now well established. Engineering such elements for widespread use, even in the most isolated locations, is not practical. Instead, we suggest examining how these components function and assessing the generous reparative tools offered by "nature." To achieve these goals, we adopted two strategies. The first step was to revaluate the internal potential of the components of blood platelets, which are responsible for the majority of the body's healing processes. The second was to review organic substances including propolis, (honey) bee venom, and whey proteins. The platelet method explains the range of inflammation from physiology to pathology, whereas milk and honey derivatives hasten the healing of diabetic wounds.

CARLO LOIACONO ET AL 7 AUGUST 2019.

Tendinopathies are quite common in the general population, and a large number of tendon-related surgeries are performed each year around the world, with major socioeconomic consequences. Tendon diseases are widely treated with a variety of methods. Nutrition, in addition to pharmaceutical and physical therapy, could be an additional strategy for preventing and treating this complicated condition that requires a multidisciplinary approach. Nutraceutical products have grown in popularity in recent years because they appear to favour the prevention and healing processes of tendon injuries. This narrative literature review attempts to summarise current knowledge and areas of active research for the treatment of tendinopathies with oral supplements.

FANJI QUI ET AL 17 MARCH 2022

The effectiveness of dietary supplements alongside physiotherapy on pain and functional outcomes was investigated using a comprehensive review and meta-analysis of randomized controlled trials. PubMed, The Cochrane Library, Web of Science and Embase (Prospero registration: CRD42021291951) were searched from November 2021 to the present. Studies were considered acceptable if they reported measures of pain and/or function and if therapies used physiotherapy techniques combined with dietary supplements. The meta-analysis included data from six investigations. Review Manager was used to construct and examine standardized mean differences (SMDs) and 95% confidence intervals (CIs). Subgroup analysis was conducted to examine potential relationships between study characteristics and intervention success.

ANNA-LENA MUELLER ET AL 12 MAY 2022

The pro-inflammatory and painful tendon disease known as tendinitis (tendinopathy) is often associated with drug addiction, poor diet and physical inactivity, as well as mechanical overuse and related injuries. Due to its high incidence, tendinitis is a significant financial burden for healthcare systems. A number of events such as cytokines, endotoxins, physical and chemical stresses, hypoxia and other pro-inflammatory factors can cause the transcription factor nuclear factor kappa B (NF-

B), one of the major pro-inflammatory transcription factors, to be activated. Numerous genes involved in the inflammatory response, cell deterioration and cell death are known to be regulated by their activation. Effective and long-term treatment of tendinitis is lacking and its pathophysiology is still poorly understood.

CHAPTER-3 METHODOLOGY

1. To study the of Nutraceuticals in tier cities as well as globally with a wide variety of products.

Products that are produced from food sources and provide additional health advantages above and beyond their fundamental nutritional value are referred to as Nutraceuticals. These goods might include everything from medications to personal care items to functional foods, beverages, and nutritional supplements.

Nutraceuticals in tier cities:

Tier cities have a complicated and wide-ranging supply chain for Nutraceuticals. The supply chain can be divided generally into three stages:

Raw material procurement: Most natural ingredients used to make Nutraceuticals are fruits, plants, and herbs. Different vendors and producers, many of whom are situated in rural areas, are used to supply raw materials. The procurement process entails choosing the correct kind and number of raw materials, haggling over rates, and making sure the finished goods comply with legal standards.

Manufacturing: The manufacturing facilities are where the raw materials are processed and turned into finished goods after being transported there. There are several steps in the manufacturing process, including extraction, purification, blending, encapsulation, and packing.

Distribution and retail: Once the finished goods are prepared, they are shipped to different outlets for distribution, including wholesalers, brick-and-mortar stores, and online marketplaces. Nutraceuticals are often offered for sale in tier cities through pharmacies, health food stores, and internet marketplaces. Supply chain partners, logistics, and inventory management are all part of the distribution process.

The supply chain for Nutraceuticals globally:

The worldwide supply chain for Nutraceuticals is also intricate and comprises some parties and stages. By 2028, the need for natural and organic goods will help the global market for Nutraceuticals grow to $658.11 billion, led by rising consumer awareness of these products.

The following phases make up the worldwide supply chain for Nutraceuticals:

Raw material procurement: The global supply chain for Nutraceuticals likewise entails sourcing raw materials from numerous vendors and growers situated in various parts of the world, much as the supply chain in tier cities. Managing quality, quantity, pricing, and regulatory compliance are all part of the procurement process.

Manufacturing: Manufacturing facilities for Nutraceuticals can be found throughout the world, with some nations specializing in particular product groups. For instance, the US is well-known for its dietary supplement sector, whereas Japan is renowned for its expertise in functional foods. There are several steps in the manufacturing process, including extraction, purification, blending, encapsulation, and packing.

Distribution and retail: Through a variety of channels, including wholesalers, retailers, and online marketplaces, Nutraceuticals are sold all over the world. Managing inventories, logistics, and supply chain partners across many global regions is an element of the distribution process.

In general, the supply chain for Nutraceuticals is intricate and encompasses numerous local and international stages and parties. Managing risks in the supply chain, as well as quality, safety, and regulatory compliance, are the main problems facing the Nutraceuticals sector.

2. The study of the challenges in Nutraceuticals and opportunities or Regulations-

Challenges in Nutraceuticals:

Quality control: Making sure the items are both high-quality and safe is one of the industry's biggest difficulties. The ingredients used in Nutraceuticals are derived from natural sources, and their composition and quality might differ based on several variables like climate, soil, and harvesting techniques.

Regulatory compliance: Adhering to the many rules and specifications established by various regulatory organizations presents another problem for the Nutraceuticals sector. The laws might differ from one nation to the next, and navigating them can be difficult and time-consuming.

Supply chain management: In the Nutraceuticals sector, managing the supply chain can be difficult because it entails obtaining raw materials from several vendors,

assuring their quality, and controlling transportation and distribution. In the case of multinational supply networks, this can be extremely difficult.

Communality and: In the Nutraceuticals sector, managing the supply chain can be difficult because it entails obtaining raw materials from several vendors, assuring their quality, and controlling transportation and distribution. In the case of multinational supply networks, this can be extremely difficult.

Opportunities in Nutraceuticals:

Growing demand: The market for Nutraceuticals is expanding with consumers' interest in natural and organic products and increased health consciousness.

Innovation: The Nutraceuticals industry offers significant potential for innovation since it is constantly working to create new ingredients, formulations, and delivery methods to meet changing consumer expectations.

Personalization: The Nutraceuticals industry can make use of data analytics and technology to offer customised products and service that are customised to the requirements of various clients.

Regulations in Nutraceuticals:

Labelling requirements: The contents, dosage, and warnings of Nutraceuticals products must all be truthfully and accurately disclosed on the label.

Good manufacturing practices: Manufacturers of Nutraceuticals must follow good manufacturing practices (GMPs) in order to preserve the quality and security of their products.

Regulatory approval: Depending on the country and the product kind, regulatory approval for Nutraceuticals products could be required before they can be marketed.

Adverse event reporting: Manufacturers of Nutraceuticals must alert regulatory agencies to any negative events related to their goods**.**

The Nutraceuticals industry also confronts challenges in the areas of quality assurance, legal compliance, supply chain management, and consumer education, despite the fact that it offers many opportunities for growth and innovation. Following

laws and regulations is crucial for ensuring the safety and efficacy of Nutraceuticals products as well as maintaining consumer confidence in the industry.

Natural or bioactive substances called nutraceutical are obtained from natural food sources and may have additional health benefits beyond their basic nutritional value. When it comes to tendinitis research, it is common to use a specific research methodology to investigate how nutraceuticals affect the condition. Depending on the specific objectives of the study, different research types, samples, and sample sizes may be used.

Research methodology

The gold standard for evaluating the effectiveness of interventions is the randomized controlled trial (RCT). To compare the effects of a nutraceutical intervention with a control group, participants are randomly assigned to different groups.

Sample type

For human study participants, recruitment of people with tendinitis would be necessary. Age, degree of tendinitis, and any relevant medical history are just some of the inclusion criteria that participants must meet based on study objectives.

Sample size

Several variables may influence the appropriate sample size for a study, including the effect size of the intervention, statistical power, and the expected dropout rate. It is very important to determine the sample size needed to find significant differences between the intervention and control groups. Statistical considerations and prior field research are usually used for this calculation.

Blinding as well as randomization

Randomization:

After participants are selected and meet the inclusion requirements, they will be randomloy assigned to either an intervention group that will receive a nutraceutical or a control group that will receive a placebo or standard treatment. Both groups are equal at the start of the study due to randomization, which also helps reduce selection bias.

Blinding: To reduce bias, it is important to keep both participants and researchers unaware of group assignments. Double blinding can be used to achieve this, as neither the participants nor the researchers will know whether they are receiving a nutraceutical or a placebo until the trial is over.

Intervention

The specific nutraceutical used in the study would depend on the research question and the evidence that was available. Omega-3 fatty acids, collagen peptides, curcumin, and vitamin C are a few examples of nutraceuticals that have been investigated in tendinitis research. Based on previous research and safety considerations, the dosage, frequency and duration of the nutraceutical intervention will be decided.

Measuring results

To determine whether a nutraceutical intervention for tendinitis was successful, a study would need to define precise outcomes. In tendinitis research, common outcome **measures include pain intensity, functional assessment, range of motion, markers of** inflammation, and imaging tests (such as ultrasound or MRI).

Data analysis

The result of the intervention and control groups would be compared using statistical analysis. Significant differences would be determined using appropriate statistical

test, such as t-tests or chi-square tests, depending on the type of the data and research questions.

Interpretation in Methodology

Clinical Studies:

These studies involve observation and analysis of real-world data to demonstrate the relationship between supplement use and disease outcomes. Observations, questionnaires and clinical records were used as research tools to collect data on the incidence or severity of tendinitis and nutritional supplements in clinical trials.

Scientific Research:

These studies used food products as interventions to examine their effects on tendinitis. Randomized controlled trail (RCTs) are often used in clinical trials. The nutraceuticals intervention group and the control group (placebo or conventional therapy) are two examples of how RCT participants can be selected.

RCTs use imaging techniques such as ultrasound and MRI to evaluate the effects of nutraceuticals on tendinitis symptoms as well as outcomes measures such as pain scales and functional assessments.

Biochemical Tests

Biochemical can be used to examine the benefits of nutraceuticals in the treatments of tendinitis. Research can use blood or tissue sample to measure biomarkers related to oxidative stress, collagen production, inflammation or other process. Polymerase chain reaction (PCR), western blot and enzyme-linked immunosorbents test (ELISA) are the methods used in biochemical analysis.

In Vitro research:

Research on cells or tissues in the absence of living organisms is called in vitro research.

These findings increase our understanding of how nutraceuticals directly affect the cellular processes associated with tendinitis research. Cell survival assays, Gerne analyses, and cell culture techniques are all used in in vitro research.

Meta-reviews and analyses:

In these investigations, information from several trials on dietary supplements for tendinitis has been compiled and assessed. While qualitative analyses seek to provide a thorough and objective assessment of the data, meta-analyses pool information from several research to provide overall predictive values. These methods help discover general patterns, evaluate the quality of the data, and provide insight into how beneficial a healthy diet is.

Patient-Reported Outcomes:

In order to fully understand how nutraceuticals, affect tendinitis, patient-reported outcomes must be taken into account. For this reason, data on the patient's level of discomfort, functional limitations, quality of life, and satisfaction must be obtained. Researchers typically use patient records, surveys, and questionnaires to collect this data.

This research used food products as therapies to look at the effects of diet on tendinitis. Randomised controlled trials, or RCTs, are often used in clinical investigations. The nutraceutical intervention group and the control group (placebo or conventional therapy) are two instances of how RCT participants may be chosen.

RCTs use imaging techniques like ultrasound and MRI, as well as outcome measures like pain ratings and functional assessments, to examine the effects of nutraceuticals on tendinitis symptoms.

Biochemical tests can be used to evaluate how well nutraceuticals cure tendinitis. Researchers can use blood or tissue samples to analyse biomarkers related to oxidative stress, collagen production, inflammation, or other processes.

The polymerase chain reaction (PCR), western blot, and enzyme-linked immunosorbent test (ELISA) are among the methods used in biochemical analysis.

RESEARCH STUDY

1. **How nutraceutical is different from drugs in tendinopathy?**

When it comes to how they are applied in tendinopathy, pharmaceuticals and nutraceuticals differ in a number of ways:

Composition and Source: Nutraceuticals are concentrated forms of nutrients such vitamins, minerals, antioxidants, or herbal extracts that are sourced from natural dietary sources. They are governed as such since they are regarded as dietary supplements. Contrarily, medicines are often man-made chemicals created specially to target specific biological functions or disease pathways. Before becoming on the market, they go through strict testing and approval procedures.

Nutraceuticals typically work by several different processes, including supplying vital nutrients, decreasing inflammation, encouraging tissue regeneration, or altering biochemical pathways. They frequently take a more all-encompassing approach to fitness and health. Contrarily, medications are made to specifically target one or more disease-related biochemical pathways or molecular targets. They frequently act with greater strength and focus.

utraceuticals typically work by several different processes, including supplying vital nutrients, decreasing inflammation, encouraging tissue regeneration, or altering biochemical pathways. They frequently take a more all-encompassing approach to fitness and health. Contrarily, medications are made to specifically target one or more disease-related biochemical pathways or molecular targets. They frequently act with greater strength and focus.

Regulation: In many nations, dietary supplements like nutraceuticals are subject to regulation. They are not scrutinised and regulated to the same extent as pharmaceuticals. The onus is on the producers to guarantee the reliability and excellence of their goods. Contrarily, before being approved, drugs go through rigorous preclinical and clinical testing, and government organisations strictly supervise their manufacturing, labelling, and distribution.

Requirement for a Prescription: Nutraceuticals are typically sold without a Prescription over the Counter. They can be bought through pharmacies, health food stores, or online merchants. However, drugs are categorised as either prescription or non-prescription (over the counter) drugs. A healthcare provider's prescription is required for prescription medications for tendinopathy.

It is crucial to remember that using medicines or nutraceuticals for tendinopathy requires the supervision of a medical practitioner. Based on a person's unique condition, medical history, and probable drug interactions, they can offer the right counsel.

2. Why tendinopathy take much time heal?

Due to several circumstances, tendon damage or tendinopathy frequently takes a long time to heal.

Limited Blood Supply: In comparison to other human tissues, tendon blood flow is quite limited. For tissue repair and regeneration, blood arteries supply the vital nutrients and oxygen required. The healing process is slowed down by the restricted blood supply to tendons because it takes longer for the healing substances to get to the wounded area.

Tendons have a slower metabolic rate than other tissues, which results in a slower rate of cellular turnover and repair. The delayed repair of tendons is a result of this slower metabolism.

Tendons are intricate structures made primarily of collagen fibres, which offer strength and suppleness. Tendons can endure strong forces due to the configuration of their fibres. However, it is also more difficult for cells and healing elements to effectively reach the wounded location due to the complexity of the tendon structure.

Tendinopathy frequently has a chronic nature and is characterised by frequent microtrauma and excessive tendon usage. The tendon tissue may experience continuous degenerative changes because of these repeated stressors, making it more difficult for the tendon to repair properly. Furthermore, the existence of persistent inflammation might make the healing process even more difficult.

Tendons are constantly subjected to mechanical loads from motion and exercise, among other activities. The healing process for tendons might be sped up or even harmed with excessive or unsuitable loading, even though controlled loading is advantageous. For optimum tendon recovery, the correct ratio of rest to controlled loading must be struck.

Treatment Obstacles: Because traditional treatment methods can have erratic results, treating tendinopathy can be difficult. Although they are frequently

employed, rest, physical therapy, and conservative measures may not always result in the condition's full remission. In some circumstances, more intrusive therapies like injections or surgery might be required.

Due to these causes, tendinopathy necessitates patience and a thorough approach to treatment that deals with the underlying causes, encourages tissue healing, and gradually restores strength and function to the damaged tendon. In order to create a suitable treatment plan and to adhere to their instructions during the healing process, it is crucial to engage closely with healthcare professionals.

Key performance indicators of Nutraceuticals Products.

Key performance indicators (KPIs) are crucial measures for assessing the efficiency and performance of supply chain management in the production of Nutraceuticals. The supply chain management of Nutraceuticals goods can be measured using some of the KPIs listed below:

Inventory Management: Stock-out rate, carrying cost, and inventory turnover are KPIs for inventory management. The cost of maintaining inventory, including storage, insurance, and obsolescence, is measured by the carrying cost. The percentage of time that inventory is not accessible to clients is measured by the stock-out rate.

Supplier Performance: Lead time, defect rate, and on-time delivery are KPIs for supplier performance. The percentage of orders that are delivered on time, or earlier, is known as on-time delivery. The lead time measures how long it takes to fill an order and deliver it. The defect rate calculates the proportion of suppliers' flawed deliveries.

An approach to evaluating the effectiveness of the supply chain system is referred to as a supply chain performance measure. Measures of supply chain performance can be broadly divided into two categories:

Qualitative metrics, like customer satisfaction and product quality, are examples.

Customer Service: Order cycle time, order accuracy, and customer satisfaction are KPIs for customer service. The length of time it takes to complete an order from receipt to delivery to the consumer is called the order cycle time.

There are Different Aspects to Enhance Supply chain management-

1. **Train customer service reps:** Teach problem-solving techniques to customer service representatives: CSRs must learn how to recognise issues and offer solutions. To give the consumer the greatest service possible, they must be skilled in selling and knowledgeable about the products and services offered by the firm. CSRs with strong sales skills can pinpoint customer pain points and provide suitable internal solutions.

2. **Integrate Customer service with order entry systems:** Integrate order entry systems with customer service: In today's highly competitive industry, order fulfilment can occasionally become a point of contention between businesses and customers. The slow delivery of online orders may have an effect on customer satisfaction.

3. **Create a unified experience across all subsidiaries:** With branches and subsidiaries, today's businesses are scattered extensively over several states, nations, and even continents. In a variety of businesses, UK subsidiaries could have different quality requirements and experiences than US subsidiaries. If customers go to another country, their experiences could alter. The dynamics of the supply chain and customer service must be extremely similar, if not identical, across many locations and subsidiaries. Training the workforce on the relevant skills and corporate values is the best strategy to provide a cohesive experience.

Cost Management: Cost of products sold, transportation expenses, and overall logistics costs are KPIs for cost management. The overall cost of making and distributing the product is tracked by the cost of goods sold. Costs associated with the delivery and transporting of the product are referred to as transportation costs. The overall cost of all logistics-related activities, such as handling, storage, and transportation, is measured by total logistics expenses.

Quality Control: Defect rate, compliance rate, and product recall rate are KPIs for quality control. The percentage of manufactured defective goods is measured by the defect rate. The percentage of products that adhere to legal requirements is measured by the compliance rate. The product recall rate measures the percentage of items that are recalled due to safety or quality issues.

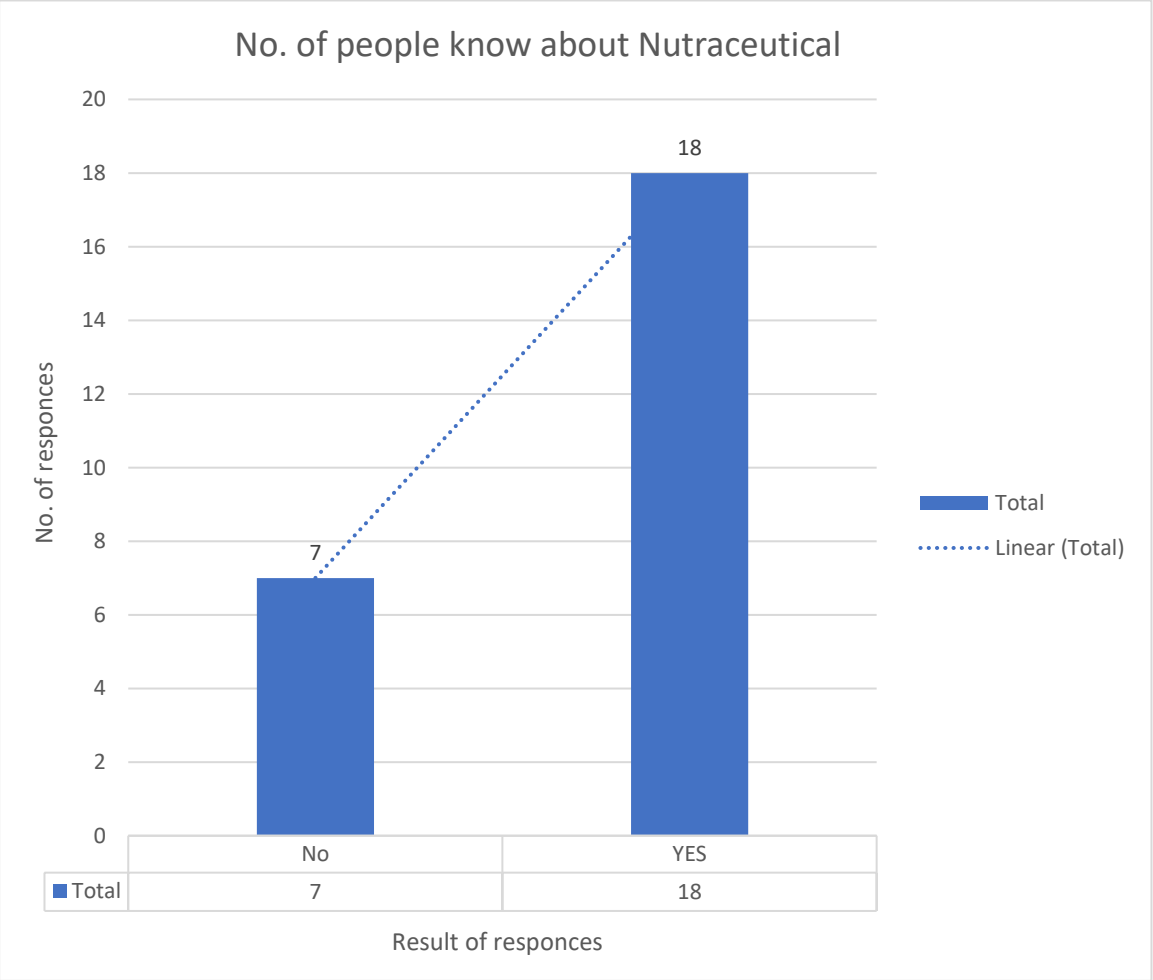
Brand	Company	MAT MAR'19	MAT MAR'20	MAT MAR'21	MAT MAR'22	MAT MAR'23	GROWTH
Tendocare	Pharmed	15.4	19.7	20.4	23.7	31.3	32%
Tendo forte	Pharmed	11.2	17.8	20.3	25.4	39.4	55%
T- heal	Alkem	12.5	12.4	10.6	14.1	15.7	11%
Tendofirm	Zuventus	8.3	10.5	8.7	9.3	11.4	23%
Tendomac	Macleods	5.3	6	6.1	7.8	9.3	19%
Tendofit	Pharmed	3.8	4.1	3.8	4.4	4.3	-2%
Tendoshot	Innovcare	2.8	4.1	3.8	5.6	6.2	11%
Tendopro	Micro-vivaa	0.4	2.7	2.9	4.8	5.6	17%
Rejoint t	Abbott	0.1	2.7	2.9	3.1	3.2	3%
Tendowell	Sundyota Numandis	2	1.6	1.4	1.6	1.7	6%

TOP 10 BRAND IN TENDINOPATHY

CHAPTER- 4 RESULT

Question: Have you heard of nutritional supplements used in the treatment of tendinitis?

Answer: Many people have heard and used nutritional supplements and nutritional supplements as a treatment for tendinitis. Tendonitis is a condition involving inflammation and irritation of the tendons that can cause pain and discomfort. While traditional treatments such as rest, physical therapy, and medication are often prescribed, some people have turned to other methods, such as eating health products and products.

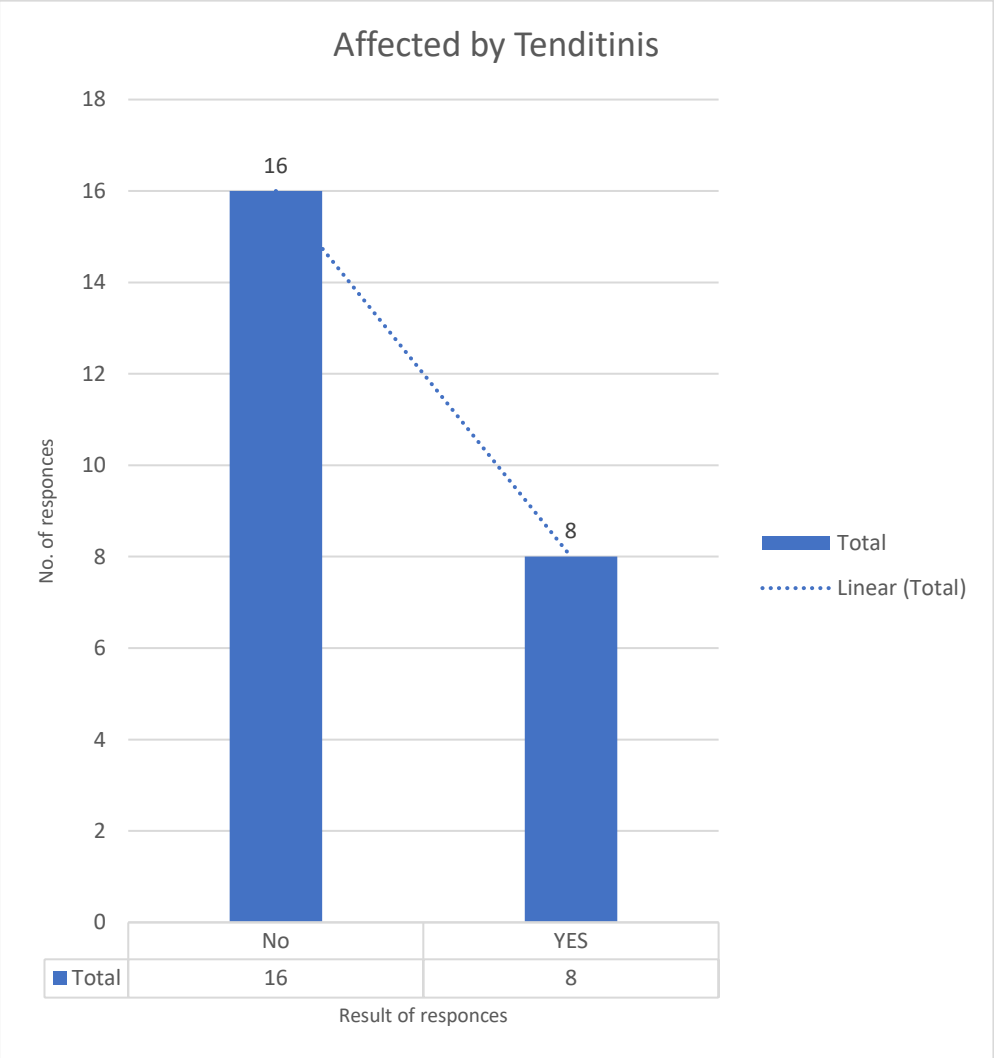


Graph No 1: Nutritional supplements used in the treatment of tendinitis.

GRAPH-2

Question: Do you now or have you ever suffered by tendinitis?

Answer: Tendinitis is a rather common problem, in response. It can affects people of all ages group and activity levels, it appears to impact adults who partake in demanding or repetitive activities more regularly, such as sports, jobs, or music. My research shows that just a small percentage of people now have tendinitis or even a history of it.

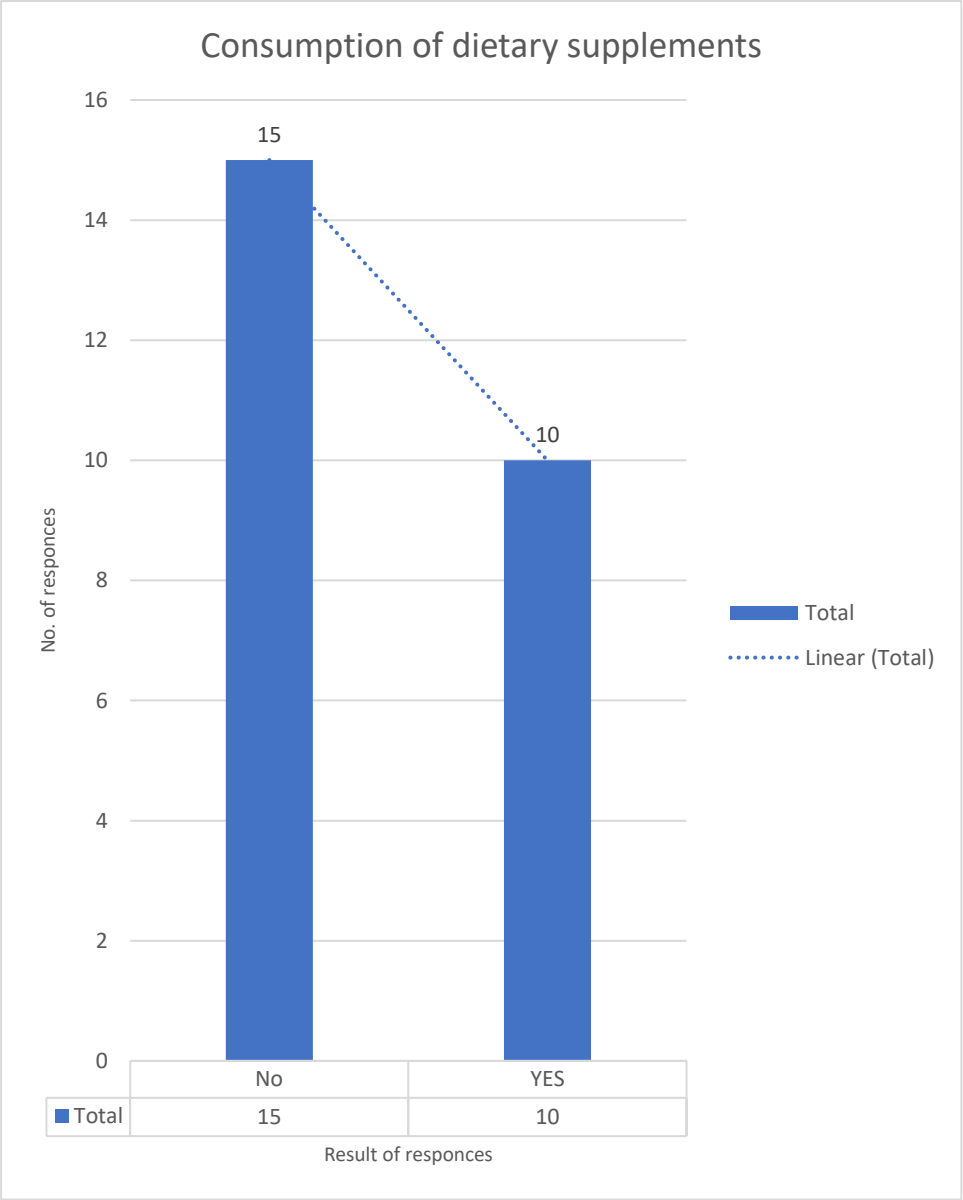


Graph 2: No of People suffered by tendinitis.

GRAPH-3

Question: Have you ever used dietary supplements or nutraceuticals to help you grow muscle?

Answer: Tendinitis is a chronic condition. Although it can affect people of all age groups and fitness levels, it frequently affects adults who engage in loud or repetitive activities like playing sports, working hard, or listening to music. According to studies, individuals do not use nutraceuticals or nutritional supplements, even if fewer people have a history of tendinitis or have tendinitis themselves.

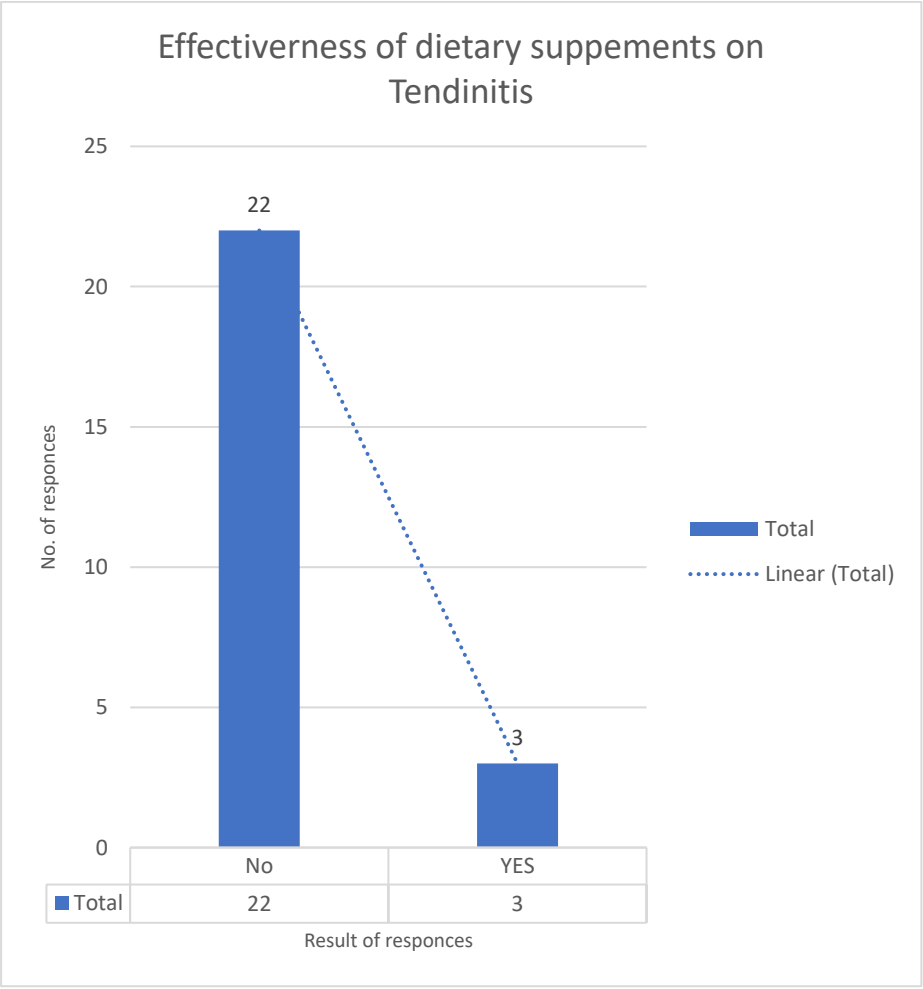


Graph 3: Consumption behaviour of people for dietary supplements

GRAPH-4

Question: Have you ever observed that medications or dietary supplements can help with the symptoms of tendonitis?

Answer: These studies show that the effectiveness of nutraceuticals, or nutritional supplements, in treating the symptoms of tendinitis, is a topic of ongoing discussion and research. The scientific evidence supporting certain users of specific drugs' claims that they can help cure or reduce symptoms is typically insufficient or confusing, according to studies.

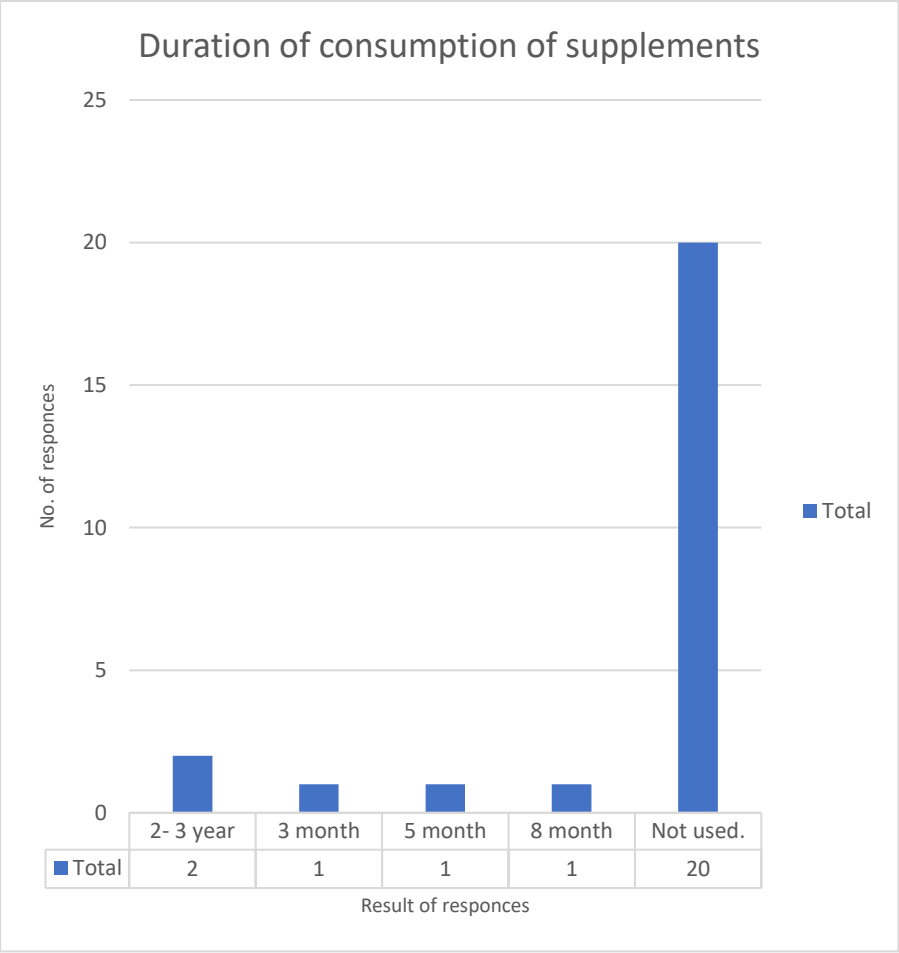


Graph 4: Effect of dietary supplements on symptoms of tendinitis on people

GRAPH-5

Question: How long have you been taking vitamins or medicines for aches in your muscles?

Answers: The patient's individual circumstances and the medications he is taking will determine whether he decides to ingest nutraceuticals for tendinitis or a healthy diet. According to the serve some patients have been utilising nutraceuticals supplements for last 2 years and others have been using them from past 8 months, and some have not been using any at all. Supplements consumption



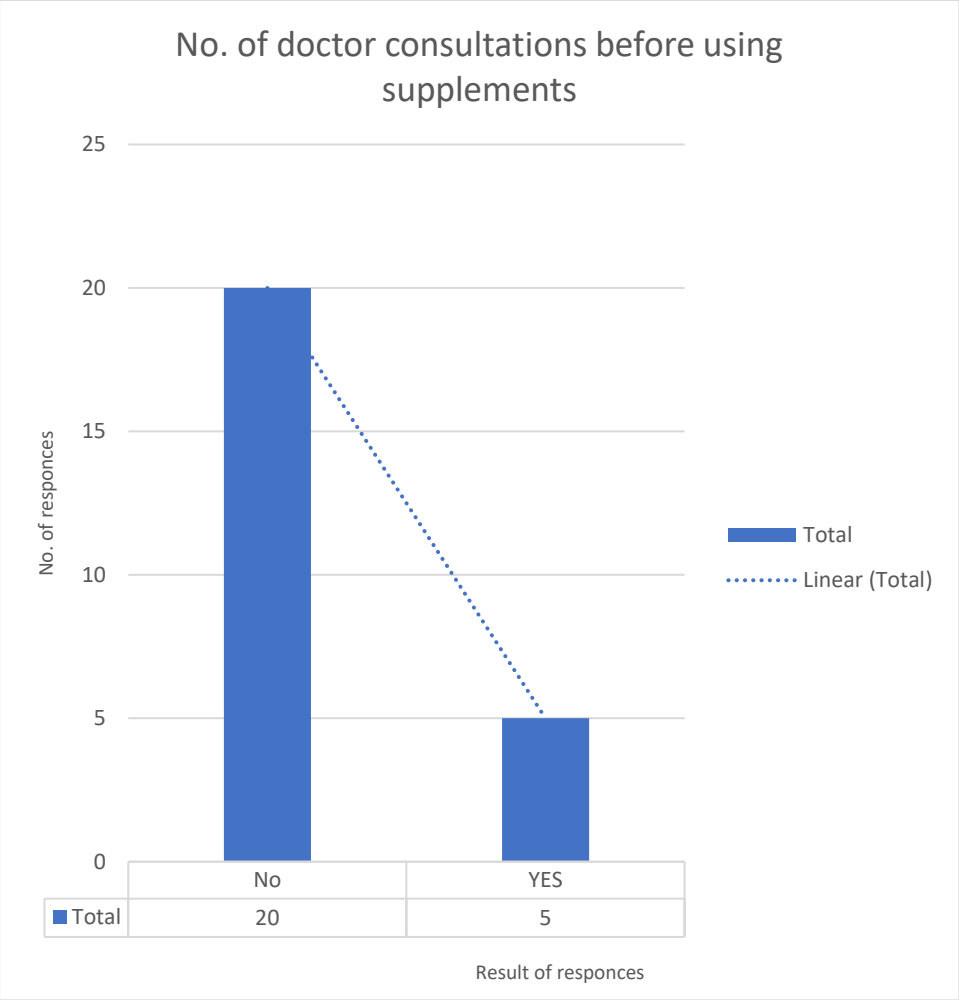
Graph 5: Duration of supplements for reliving aches in muscles

GRAPH-6

Question: Have you consulted a doctor before taking nutritional supplements to grow muscle?

Answer: This research show that a balanced diet that usage of nutraceuticals are among the short-term tendinitis remedies that doctors recommend in growing muscle. Instead of being complete, long-term remedies, they are generally viewed as short-term fixes.

How much time you take it, it's depended on the degree of the symptoms, the effectiveness of the supplement, and the scope of the therapy.



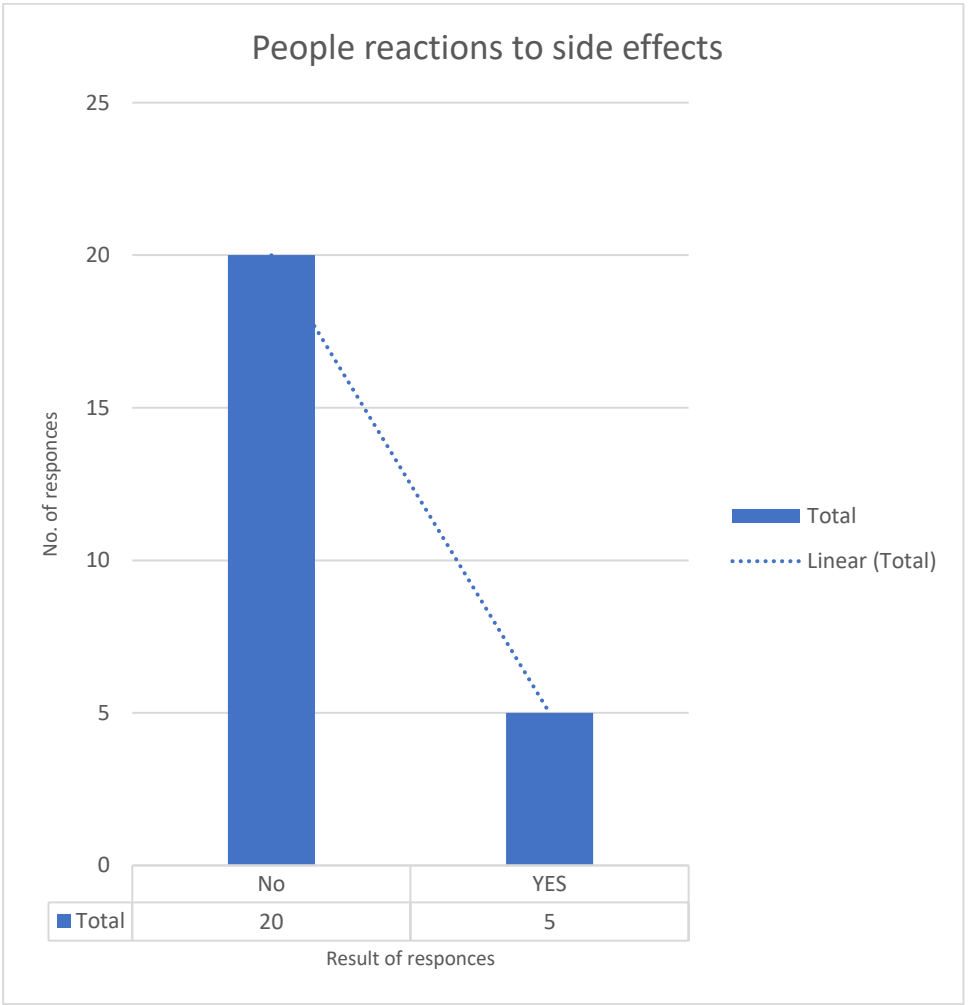
GRAPH 6: Consultation from healthcare professionals before using supplements.

GRAPH-7

Question: Have you ever experienced any unfavourable side effects from using health products?

Answer: A research found that the risk of adverse responses or side effects from utilising nutraceuticals or food products for tendinitis varied depending on the supplement, the individual, and the combination with other treatments. Remember that even natural or organic treatments might come with dangers and could not be completely risk-free.

Even though some people have side effects, most drugs are often thought to be safe when used correctly. From slight to severe, everything is possible.

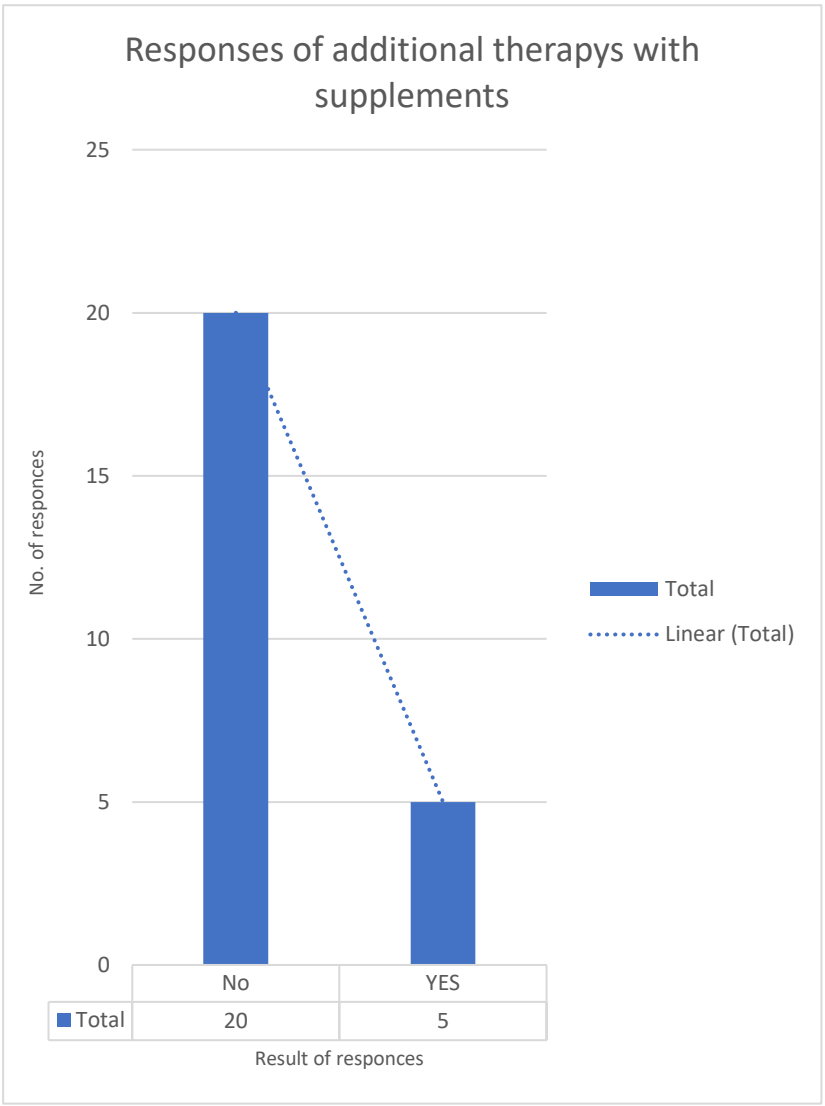


GRAPH 7: Side effect experienced by supplements.

GRAPH-8

Question: Did you also use any other tendinitis treatments, including physical therapy, medication, or rest, in addition to the nutritional supplements?

Answer: The paper claims that patients typically combine other tendinitis treatments with the use of nutraceuticals, or nutritional supplements. In actuality, a comprehensive strategy for tendinitis treatment often calls for a variety of methods, such as rest, physical therapy, pharmaceuticals, and lifestyle modifications.

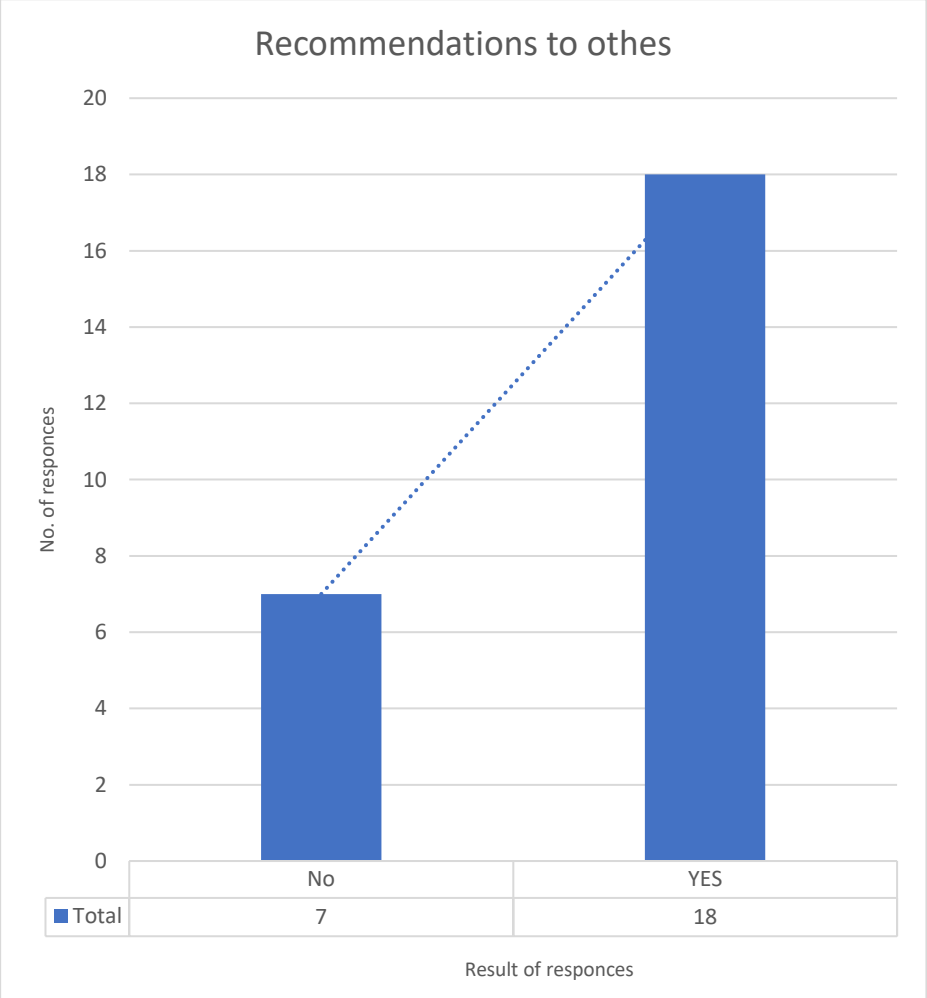


GRAPH 8: People acceptance to other therapies with nutraceuticals.

GRAPH-9

Question: Would you recommend the use of nutraceuticals or dietary supplements to others who are dealing with tendinitis?

Answer: The survey found that people with tendinitis should proceed cautiously when receiving advice about nutritional supplements and nutraceuticals. The scientific evidence in support of their efficacy is frequently scant or ambiguous, even though some people may find them useful in controlling their symptoms. The graph depicts that most of the people recommend the nutraceuticals or dietary supplements to others who are dealing with tendinitis.



GRAPH 9: No. of recommendations of supplements to other in tendinitis.

GRAPH-10

Question: Are there any concerns or limitations you have regarding the uses of nutraceuticals or dietary supplements for tendinitis?

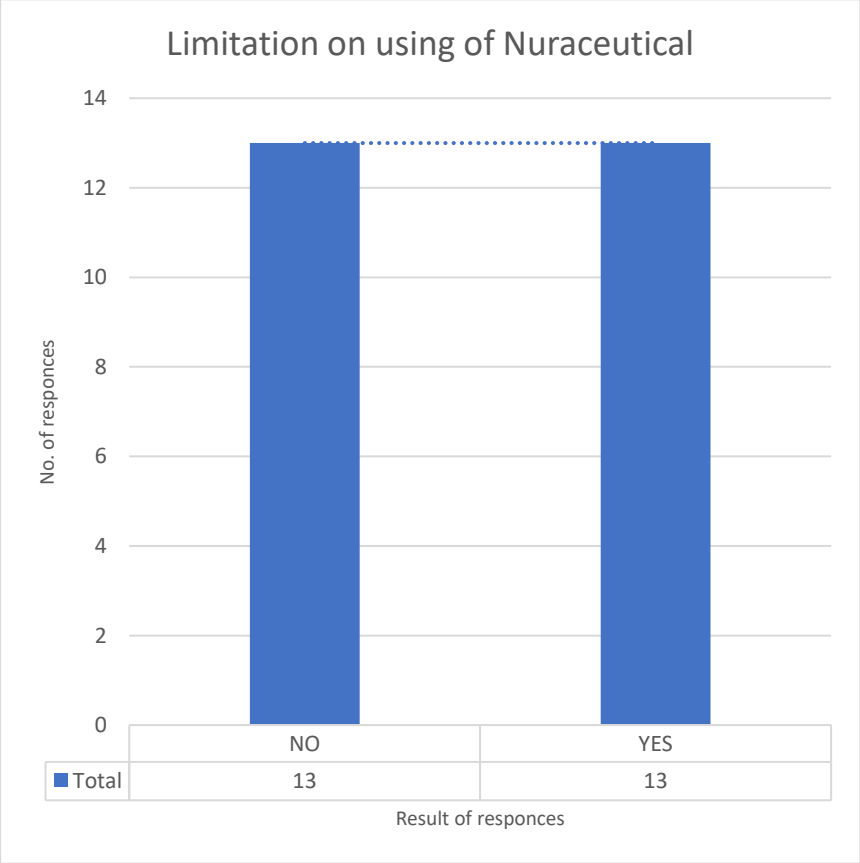
Answer: The use of nutraceuticals or dietary supplements for tendinitis may raise concerns from patients or impose restrictions. These are a few typical worries:

Lack of scientific backing for many supplements' usefulness in treating tendinitis raises serious concerns.

Lack of oversight and regulation: Compared to the pharmaceutical business, the supplement industry is less tightly controlled. Concerns over the effectiveness, consistency, and purity of supplements may arise because of this.

Potential interactions and adverse effects: Patients may worry about possible interactions between dietary supplements and other medications they are taking.

Cost: If a patient's insurance does not cover their supplement purchases, they may be concerned about the price.



Graphs 10: Responses of people on limitations of nutraceuticals for tendinitis

CHAPTER – 5 DISCUSSION

Unregulated: The supplement industry is less regulated than the pharmaceutical industry. This can lead to questions about the efficacy, safety, and purity of the supplement. Indeed, many people have heard of and used nutraceuticals and nutritional supplements as treatments for tendinitis. A type of inflammation called tendinitis can cause the tendon to swell and become painful, causing discomfort and pain. Although alternative treatments such as health and nutrition are sometimes recommended over rest, physical therapy and medication in the clinical setting, some people still choose to follow these standards.

In fact, tendinitis is a fairly common problem. It can affect anyone, regardless of age or activity level.

Adults who participate in strenuous or repetitive activities such as sports, physical activity, and music are more likely to have this condition. According to my research, only very few people currently suffer from tendinitis, or even have a history of tendinitis.

Tendinitis is a problem that often occurs. Even though it can impact people of various ages and levels of activity, it is most typically seen in adults who work in demanding or repetitive environments, such as athletes, manual workers, and musicians. Because fewer people have tendinitis or a history of having it in the past, the poll finds that people do not utilise any nutraceuticals or dietary supplements. According to the poll, there is still debate and research being done on the topic of how well nutraceuticals, or nutritional supplements, work to treat the signs and symptoms of tendinitis. Even though some consumers of supplements assert to have experienced symptom relief or improvement, the scientific support for these assertions is typically lacking or confusing. according to the poll.

The results of the survey suggest that a patient's capacity to take nutraceuticals or dietary supplements for tendinitis may depend on their circumstances and the supplement they are taking. For the past two years, a group of patients have been consuming supplements steadily, whereas there is another group who started taking them only eight months ago. Additionally, there is a third group of patients

who chose to abstain from taking any dietary supplements. All of these findings are depicted in the graph. Employing dietary supplements or nutraceuticals for tendinitis warrants a brief period of supervision from a medical professional. They should not be mistaken as long-term remedies, but rather as complementary alternatives. The study concludes that they can be used in conjunction with other treatments. The frequency and duration of supplement use will be influenced by the severity of symptoms, the efficacy of the supplements, and the holistic treatment approach. It is of utmost importance to continuously assess the ability of the supplements to manage tendinitis symptoms, and to raise any uncertainties or fluctuations in symptoms with a medical expert. From the survey, it was discovered that the chances of encountering negative effects or repercussions from utilizing dietary supplements or nutraceuticals for tendinitis can differ according to which supplement is used, individualistic factors, and combinations with other medications or medical conditions. Remember that, regardless of whether they're organic or natural, taking supplements still generates potential risks and may not be entirely void of unfavourable outcomes. The combination of nutraceuticals or dietary supplements with other tendinitis treatments was frequently reported by patients, according to a survey. While supplements can be safe, individuals may experience adverse effects, which can range from minor to major. Comprehensive tendinitis treatment requires the use of multiple approaches such as physical therapy, rest, medications, and lifestyle adjustments. The survey found that people with tendinitis should exercise caution when asking for advice about dietary supplements and nutraceuticals. Although some people may find them helpful in controlling their symptoms, the scientific support for their effectiveness is often scant or ambiguous. According to the graph, most people with tendinitis recommend using nutraceuticals or dietary supplements to others.

When taking nutritional supplements for tendinitis, patients may express concerns or place restrictions on their use. Following are a few typical worries:
There are significant problems with the numerous dietary supplements' ability to treat tendinitis not being supported by sufficient scientific.

CHAPTER – 6 CONCLUSION

The use of nutraceuticals in the treatment of tendinitis is a potential area of study, more research is needed to determine their efficacy and safety. Dietary supplements with anti-inflammatory and antioxidant properties, including omega-3 fatty acids, glucosamine, chondroitin sulphate, curcumin, and vitamin D, have been shown to help reduce pain and inflammation caused by tendinitis. However, research into the ideal amounts and composition of these substances is still ongoing, and their results may vary according to the type and severity of tendinitis. Before starting any nutraceutical supplements, people with tendinitis should talk to a health care provider to make sure they are not already taking any medications that may interfere with these substances. According to serve many of the people heard about nutraceuticals or dietary supplements and have been using it as well. Tendinitis is a common problem but mostly in adults engage in manual labours a lot but the target pollution for the serve in this case were mostly students that's why there is very low experience in tendinitis in people.

According to the market research, collagen type I is responsible for the treatment of tendinitis. Tendocare is one of the top brands which has 70cr of market share.

To conclude, Tendinitis is a common problem but still most of the people are not aware about it, Tendinitis takes longer time to heal and because of lack of education and awareness people get hopeless. It takes longer time as tendons doesn't contain blood vessels. So public awareness among adults is important and doctor should educate their patients regarding tendinitis foe a better therapy and treatment because overuse of tendon leads to tendinitis, so educating public regarding tendinitis is important.

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