INFLUENCE OF NUTRACEUTICALS ON MUSCULOSKELETON DISORDERS: A CROSS SECTIONAL STUDY IN TWIN CITIES OF PAKISTAN

Submitted by:

Name of member	Sap id
Ahsham Ali	23125
Muhammad Asif	22549
Mohsin Aziz	22590
Musab Adeem	22758
Osama Khalid	22566

Supervisor: Dr. Syed Muzammil Masaud

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Title: The Influence of Nutraceuticals on Musculoskeletal Disorders: A Cross-Sectional Study in twin cities of Pakistan

Authors: Ahsham Ali[1], Mohsin Aziz[1]
Muhammad Asif[2], Osama Khalid[2], Musab Adeem[2]

Affiliations: [1]Department of Pharmacy, Riphah Institute of Pharmaceutical Sciences, Riphah International University, Islamabad, Pakistan
[2]Co-authors, Department of Pharmacy, Riphah Institute of Pharmaceutical Sciences, Riphah International University, Islamabad, Pakistan

Abstract:

Background: Musculoskeletal disorders (MSDs) significantly impair daily function and quality of life. Nutraceuticals are increasingly recognized for their role in managing pain and improving mobility.

Objective: To evaluate the prevalence of MSDs and assess the impact of nutraceuticals on symptom relief and mobility.

Methods: A cross-sectional study was conducted using a structured, self-administered questionnaire among 240 participants. Data were analyzed using SPSS; chi-square and ANOVA tests were applied.

Results: Significant symptom relief was observed in nutraceutical users compared to non-users. Commonly used nutraceuticals included calcium, vitamin D, and omega-3.

Conclusion: Nutraceuticals demonstrate potential in alleviating MSD symptoms. Awareness and regulated use can enhance patient outcomes.

Keywords: Musculoskeletal Disorders, Nutraceuticals, Pain Relief, Mobility, Cross-sectional Study

Introduction: Musculoskeletal disorders (MSDs) are one of the leading causes of chronic pain, disability, and reduced quality of life globally. These conditions affect the muscles, bones, joints, tendons, and ligaments, presenting in forms such as back pain, osteoarthritis, rheumatoid arthritis, and tendonitis. According to the Global Burden of Disease (GBD) Study, MSDs are among the top causes of years lived with disability worldwide, and their burden is increasing due to an aging population, sedentary lifestyles, and occupational hazards.

In Pakistan, the prevalence of MSDs is significant, particularly among women and individuals engaged in physically demanding occupations. Daily tasks, lack of ergonomic awareness, nutritional deficiencies, and inadequate access to healthcare further exacerbate this burden. Hospital records and community health data consistently show high incidences of joint pain, lower back pain, and neck stiffness among adults.

Traditional management of MSDs includes pharmacological treatment, physiotherapy, exercise, and in severe cases, surgical interventions. However, a growing interest has emerged in alternative or complementary approaches, particularly the use of nutraceuticals. Nutraceuticals are food-derived products that provide medical or health benefits, including the prevention and treatment of disease. These include vitamins (e.g., vitamin D, C), minerals (e.g., calcium, magnesium), herbal supplements (e.g., turmeric, Boswellia), amino acids, and fatty acids such as omega-3.

Nutraceuticals are often perceived as safer alternatives to conventional medicines due to their natural origin. They are widely available over the counter and are increasingly recommended by healthcare professionals for chronic conditions, especially those involving inflammation, pain, and bone health. For instance, calcium and vitamin D are essential for bone mineralization and prevention of osteoporosis, while omega-3 fatty acids have demonstrated anti-inflammatory properties beneficial for joint conditions.

Scientific studies have indicated that regular intake of nutraceuticals can lead to improvements in joint flexibility, mobility, and pain reduction, particularly among individuals with osteoarthritis and similar chronic conditions. Their appeal lies in the belief that they improve health outcomes without the side effects commonly associated with synthetic medications. However, despite their popularity, the use of nutraceuticals often lacks robust clinical oversight. In Pakistan, awareness

about their appropriate use, dosage, and potential drug interactions remains limited among the general public.

Recent literature also points to an increasing trend in self-medication with nutraceuticals in South Asian countries. According to a study published in the International Journal of Pharmaceutical Research (IJPR), a considerable percentage of the population reported using supplements like glucosamine and omega-3 without professional guidance. This indicates both a positive attitude towards nutraceuticals and a potential risk of misuse due to inadequate knowledge.

This study aims to bridge the knowledge gap by evaluating the real-world prevalence of MSDs and the role of nutraceuticals in relieving musculoskeletal symptoms and improving patient mobility in the twin cities of Rawalpindi and Islamabad. By comparing symptom improvement between nutraceutical users and non-users, this research provides a clearer understanding of their therapeutic relevance.

A cross-sectional approach was adopted using a structured questionnaire to gather data from a diverse sample of the population. Participants were surveyed both online and at key hospitals, including NESCOM Hospital, Benazir Bhutto Hospital, and Railway Hospital. The data collected included demographic information, types of musculoskeletal symptoms experienced, awareness and use of nutraceuticals, and self-reported outcomes related to pain relief and mobility.

Additionally, the study investigates which specific nutraceuticals are most commonly used in this population and how their usage patterns correspond to reported improvements. Calcium, vitamin D, and omega-3 were identified as top choices among users, supporting existing literature that associates these with better joint and bone health.

The analysis utilized SPSS to derive descriptive and inferential statistics. ANOVA and chi-square tests helped determine the significance of the association between nutraceutical use and symptom improvement. Findings indicated a statistically significant difference in reported pain relief and mobility scores between users and non-users of nutraceuticals, reinforcing the hypothesis that these products may contribute positively to musculoskeletal health.

Nonetheless, the study acknowledges certain limitations. The reliance on self-reported data introduces potential recall bias, and the cross-sectional nature of the study precludes any causal inference. The sample, though substantial, may not be representative of the entire population, limiting generalizability. Moreover, no follow-up was conducted to assess long-term outcomes, which is essential for evaluating the sustained efficacy of nutraceuticals.

Despite these limitations, the study contributes valuable insights into the practical benefits and usage patterns of nutraceuticals in the local context. As healthcare professionals increasingly consider integrative approaches, understanding public perception and real-life outcomes becomes critical.

In conclusion, the growing role of nutraceuticals in managing MSDs cannot be overlooked. Public awareness, combined with healthcare supervision, can enhance the benefits while minimizing risks. Regulatory bodies should also consider establishing guidelines for safe usage, labeling, and marketing to ensure informed consumer choices.

This research lays the groundwork for future longitudinal studies and clinical trials that can validate these findings and support policy development around nutraceutical use in Pakistan.

Materials and Methods:

Study Design: Cross-sectional descriptive study.

Study Setting: Data were collected via an online questionnaire and physically at NESCOM Hospital, Benazir Bhutto Hospital, and Railway Hospital.

Study Duration: 6 months

Study Population: Male and female participants aged 18 and above experiencing musculoskeletal symptoms.

Sample Size: 240 participants

Inclusion Criteria:

- Adults aged 18 and above
- Diagnosed or self-reported musculoskeletal issues
- Willing to provide informed consent

Exclusion Criteria:

- Acute traumatic injuries
- Pregnant women and patients with cancer-related bone disorders

Data Collection Tool: Structured, self-administered questionnaire with sections on demographics, MSD symptoms, nutraceutical usage, and treatment outcomes.

Data Analysis: SPSS version 25 was used. Descriptive statistics, chi-square test, and ANOVA were applied. Significance threshold was set at $p < 0.05$.

Results and Discussion:

Objective 1: Prevalence of MSDs

Results showed back pain and joint stiffness were the most reported MSDs, affecting 38% and 29% respectively. Females were more affected than males. The prevalence aligns with local and international studies, indicating lifestyle and occupational stress as contributing factors.

Objective 2: Commonly Used Nutraceuticals

Calcium, vitamin D, omega-3, and glucosamine were frequently used. A pie chart illustrated their distribution. This supports prior literature on the importance of these supplements in bone and joint health.

Objective 3: Effect on Pain and Mobility

Nutraceutical users reported greater symptom relief on average, with a statistically significant difference ($p < 0.05$). A line graph demonstrated improvement scores before and after use.

Objective 4: Comparison between Users and Non-Users

Chi-square analysis showed significant association between supplement use and symptom relief ($p < 0.05$). This suggests nutraceuticals may contribute positively to MSD management.

Limitations:

- Non-random sampling may limit generalizability
- Self-reported data introduces recall bias
- No follow-up conducted to evaluate long-term effects

Conclusion: This study supports the role of nutraceuticals in improving pain and mobility in MSD patients. Increased public awareness and further clinical trials are needed to substantiate long-term benefits.

Future Perspective:

- Conduct longitudinal studies to assess long-term impact
- Promote public education on nutraceutical safety and efficacy
- Advocate regulatory frameworks to ensure quality and dosage standards

Authors' Contribution Statement:

- **Ahsham Ali:** Conceptualization, Data Analysis, Initial Draft Writing

- **Mohsin Aziz:** Questionnaire Design, Literature Review & Editing

- **Muhammad Asif:** Data Collection, Results Compilation

- **Osama Khalid:** Statistical Analysis, Tables and Figures Preparation

- **Musab Adeem:** Discussion Writing, Final Review

Ethical Approval: This study was approved by the Ethics Review Committee of Riphah Institute of Pharmaceutical Sciences. Participants provided informed consent.

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References:

Calder, P. C. (2018). Omega-3 polyunsaturated fatty acids and inflammatory processes: Nutrition or pharmacology? *British Journal of Clinical Pharmacology, 75*(3), 645-662.

Global Burden of Disease Study. (2019). *Institute for Health Metrics and Evaluation*. Retrieved from https://www.healthdata.org/

National Institutes of Health. (2022). *Glucosamine and chondroitin for osteoarthritis*. National Center for Complementary and Integrative Health.

Vos, T., et al. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis. *The Lancet, 396*(10258), 1204–1222.

Zafar, S. N., Syed, R., & Waqar, S. (2020). Nutraceutical usage trends in Pakistan: A cross-sectional survey. *International Journal of Pharmaceutical Research, 12*(3), 123-129.

International Journal of Innovation. (2021). Trends and awareness of supplement use in South Asia. *IIJ Journal of Health Sciences*, *9*(1), 57–65.

PubMed Database. (2022). Nutraceuticals and osteoarthritis relief. Retrieved from https://pubmed.ncbi.nlm.nih.gov/