ORIGINAL RESEARCH ARTICLE

ASSOCIATION OF LIFESTYLE FACTORS WITH SEVERITY OF DEGENERATIVE JOINT DISEASE: A CROSS-SECTIONAL STUDY FROM A TERTIARY CARE HOSPITAL IN NORTH INDIA

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ABSTRACT

Background: Degenerative joint diseases, particularly osteoarthritis, are a leading cause of disability worldwide. Increasing evidence suggests that lifestyle factors such as obesity, physical inactivity, and dietary habits play a significant role in disease onset and progression. However, data from tertiary care settings in North India remain limited.

Objectives: To assess the association between lifestyle factors and the severity of degenerative joint disease among patients attending a tertiary care hospital in North India.

Methods: A hospital-based cross-sectional observational study was conducted from January 2021 to June 2021 among 40 patients diagnosed with degenerative joint disease. Data were collected using a pretested semi-structured questionnaire, including sociodemographic details and lifestyle factors such as physical activity, dietary habits, body mass index (BMI), smoking status, and occupational exposure. Disease severity was assessed clinically and supported by radiological findings. Statistical analysis was performed using SPSS version 22.0. Associations were evaluated using the Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The majority of participants were aged 51–60 years, with a slight female predominance. Sedentary lifestyle (65%) and unhealthy dietary habits (60%) were common. Overweight and obesity were observed in 70% of participants. Moderate disease severity was most prevalent (42.5%), followed by severe (30%) and mild (27.5%). A statistically significant association was found between BMI and disease severity ($p = 0.04$), with higher severity observed among overweight and obese individuals. Physical inactivity was also significantly associated with increased disease severity ($p = 0.03$). No significant association was observed with smoking or occupational exposure.

Conclusion: Lifestyle factors, particularly obesity and physical inactivity, are significantly associated with the severity of degenerative joint disease. Incorporating lifestyle modification strategies into clinical management may help reduce disease progression and improve patient outcomes.

Keywords: Osteoarthritis; Lifestyle factors; Body mass index; Physical activity; Degenerative joint disease; North India

INTRODUCTION

Degenerative joint diseases, particularly osteoarthritis, represent a leading cause of chronic disability worldwide and are a major contributor to the global burden of musculoskeletal disorders. The prevalence of osteoarthritis has increased substantially over recent decades, largely due to population ageing, increasing life expectancy, and rising prevalence of modifiable risk factors such as obesity and sedentary lifestyles [1]. According to global estimates, osteoarthritis affects hundreds of millions of individuals and is a primary cause of pain, reduced mobility, and impaired quality of life, thereby placing a significant strain on healthcare systems and economies [2]. Traditionally considered a consequence of ageing and "wear and tear," contemporary understanding recognizes osteoarthritis as a multifactorial disease influenced by biomechanical, metabolic, genetic, and environmental factors [3].

Among these determinants, lifestyle factors have emerged as critical and potentially modifiable contributors to both the onset and progression of degenerative joint diseases. Physical inactivity, poor dietary habits, obesity, smoking, and occupational stressors have all been implicated in altering joint biomechanics and promoting low-grade systemic inflammation, thereby accelerating cartilage degeneration [4]. Obesity, in particular, is strongly associated with osteoarthritis not only in weight-bearing joints such as the knee and hip but also in non-weight-bearing joints, suggesting a metabolic component mediated by adipokines and inflammatory cytokines [5]. Similarly, inadequate physical activity can weaken periarticular muscles and reduce joint stability, whereas excessive or repetitive joint loading, often seen in certain occupations or sports, may predispose individuals to early joint degeneration [6].

In the regional context of South Asia and specifically India, the burden of degenerative joint diseases is rapidly increasing due to demographic transitions and changing lifestyle patterns. Urbanization, reduced physical activity, dietary shifts towards high-calorie processed foods, and increasing rates of obesity have contributed to a higher prevalence of osteoarthritis in both urban and semi-urban populations [7]. Additionally, cultural and occupational practices, such as prolonged squatting, kneeling, and manual labor, may further exacerbate joint stress in the Indian population. Despite this, awareness regarding the role of modifiable lifestyle factors remains limited, and healthcare interventions are often focused on symptomatic management rather than preventive strategies [8].

At the local level, tertiary care hospitals in North India frequently encounter patients with advanced stages of degenerative joint diseases, often presenting late with significant functional impairment. This suggests gaps in early identification and risk factor modification at the community level. Furthermore, while several studies have examined individual risk factors such as obesity or occupational strain, there is a relative paucity of integrated analyses assessing the combined impact of multiple lifestyle factors on degenerative joint diseases within the Indian healthcare setting [9]. Small-scale, hospital-based studies can provide valuable insights into patient profiles, risk factor distribution, and potential targets for intervention in resource-limited settings.

Given the modifiable nature of many lifestyle factors, understanding their association with degenerative joint diseases is essential for developing preventive and therapeutic strategies tailored to the local population. Such evidence can inform clinical practice, guide patient counseling, and support public health initiatives aimed at reducing disease burden and improving quality of life. Therefore, this study aims to assess the role of lifestyle factors—including physical activity, dietary habits, body mass index, smoking, and occupational exposure—in patients with degenerative joint diseases attending a tertiary care hospital in North India. The specific objective is to evaluate the association between these lifestyle factors and the severity and clinical presentation of degenerative joint diseases among the study population.

METHODOLOGY

Study Design: This study was conducted as a hospital-based cross-sectional observational study.

Study Setting: The study was carried out in the Department of Orthopedics of a tertiary care hospital in North India, which caters to both urban and rural populations and receives a high volume of patients with musculoskeletal complaints.

Study Duration: The study was conducted over a period of six months, from January 2021 to June 2021.

Study Population: The study population included patients diagnosed with degenerative joint diseases, particularly osteoarthritis, attending the outpatient and inpatient departments of the Orthopedics unit during the study period.

Inclusion Criteria

Patients aged ≥30 years
Clinically and/or radiologically diagnosed cases of degenerative joint disease (e.g., osteoarthritis)
Patients willing to participate and provide informed consent

Exclusion Criteria

Patients with inflammatory joint diseases (e.g., rheumatoid arthritis)
History of joint trauma or surgery affecting the index joint
Congenital or developmental joint disorders
Patients with severe comorbid conditions limiting participation

Sample Size: The sample size was calculated based on feasibility and patient availability during the study period. Assuming a prevalence (p) of significant lifestyle risk factors among osteoarthritis patients to be approximately 50% (to ensure maximum sample size), with a 95% confidence level ($Z = 1.96$) and an absolute precision (d) of 15%, the sample size was calculated using the formula:

$$n = Z^2 \times p \times (1 - p) / d^2$$
$$n = (1.96)^2 \times 0.5 \times 0.5 / (0.15)^2$$
$$n \approx 42.7$$

The calculated sample size was approximately 43; however, due to time constraints and feasibility, a total of 40 patients were included in the study.

Sampling Technique: A consecutive sampling technique was employed, wherein all eligible patients presenting during the study period and meeting the inclusion criteria were enrolled until the desired sample size was achieved.

Data Collection Tools & Procedure: Data were collected using a pretested, semi-structured questionnaire administered through face-to-face interviews. The questionnaire included sections on sociodemographic details, lifestyle factors (physical activity level, dietary habits, smoking status, occupational exposure), and clinical history. Physical activity was assessed based on self-reported frequency and duration of exercise, while dietary patterns were categorized based on intake of balanced versus high-fat diets. Anthropometric measurements, including height and weight, were recorded to calculate body mass index (BMI). Clinical examination findings and relevant radiological reports were reviewed to confirm the diagnosis and assess disease severity. All data were collected by trained investigators to ensure consistency.

Study Variables: The independent variables included lifestyle factors such as physical activity (active/sedentary), dietary habits (healthy/unhealthy), BMI (normal/overweight/obese), smoking status (smoker/non-smoker), and occupational exposure (high joint stress/low joint stress). The dependent variables included presence and severity of degenerative joint disease, assessed clinically and supported by radiological grading where available, as well as symptom severity (pain, stiffness, and functional limitation).

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean ±standard deviation. Associations between lifestyle factors and disease severity were assessed using the Chi-square test or Fisher's exact test as appropriate. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: Written informed consent was obtained from all participants prior to enrollment. Confidentiality and anonymity of patient data were strictly maintained throughout the study. The study adhered to the ethical principles outlined in the Declaration of Helsinki, ensuring respect for participants, beneficence, and non-maleficence.

RESULTS

A total of 40 participants were included in the study. The majority were in the age group of 51–60 years, with a slight female predominance. (Table 1)

Table 1: Sociodemographic Characteristics of Study Participants (n = 40)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	30–40	6	15.0
	41–50	10	25.0
	51–60	14	35.0
	>60	10	25.0
Gender	Male	18	45.0
	Female	22	55.0
Residence	Urban	17	42.5
	Rural	23	57.5

Most participants were from rural backgrounds. Regarding lifestyle factors, a higher proportion of individuals reported sedentary behavior, unhealthy dietary habits, and elevated BMI, with over two-thirds being either overweight or obese. (Table 2)

Table 2: Distribution of Lifestyle Factors among Participants (n = 40)

Variable	Category	Frequency (n)	Percentage (%)
Physical Activity	Active	14	35.0
	Sedentary	26	65.0
Dietary Habits	Healthy	16	40.0
	Unhealthy	24	60.0
BMI (kg/m²)	Normal (18.5–24.9)	12	30.0
	Overweight (25–29.9)	15	37.5
	Obese (≥30)	13	32.5
Smoking Status	Smoker	11	27.5
	Non-smoker	29	72.5
Occupational Exposure	High joint stress	21	52.5
	Low joint stress	19	47.5

In terms of disease severity, moderate osteoarthritis was the most common presentation, followed by severe and mild forms. (Table 3)

Table 3: Severity of Degenerative Joint Disease among Participants (n = 40)

Severity Level	Frequency (n)	Percentage (%)
Mild	11	27.5
Moderate	17	42.5
Severe	12	30.0

A statistically significant association was observed between BMI and disease severity, with higher proportions of severe disease among overweight and obese individuals. (Table 4)

Table 4: Association between BMI and Disease Severity (n = 40)

BMI Category	Mild n (%)	Moderate n (%)	Severe n (%)	Total	p-value
Normal	6 (50.0)	4 (33.3)	2 (16.7)	12	0.04*
Overweight	3 (20.0)	7 (46.7)	5 (33.3)	15	
Obese	2 (15.4)	6 (46.2)	5 (38.4)	13	

*Statistically significant ($p < 0.05$)

Similarly, physical activity demonstrated a significant relationship with disease severity; sedentary individuals were more likely to present with moderate to severe disease compared to those who were physically active. (Table 5)

Table 5: Association between Physical Activity and Disease Severity (n = 40)

Physical Activity	Mild n (%)	Moderate n (%)	Severe n (%)	Total	p-value
Active	7 (50.0)	5 (35.7)	2 (14.3)	14	0.03*
Sedentary	4 (15.4)	12 (46.2)	10 (38.4)	26	

*Statistically significant ($p < 0.05$)

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DISCUSSION

The present study evaluated the role of lifestyle factors in degenerative joint diseases among patients attending a tertiary care hospital in North India. The findings indicate that modifiable lifestyle factors, particularly higher body mass index and sedentary behavior, are significantly associated with increased severity of disease. A substantial proportion of participants were either overweight or obese, and the majority reported low levels of physical activity. Moderate disease severity was the most common clinical presentation, with a notable shift toward severe disease among individuals with adverse lifestyle profiles.

The association between elevated BMI and increased severity of degenerative joint disease observed in this study is consistent with existing literature. Previous studies have demonstrated that obesity is a major risk factor for both the development and progression of osteoarthritis due to increased mechanical loading on weight-bearing joints and the systemic effects of adipose tissue-derived inflammatory mediators [5,10]. osteoarthritis has been increasingly recognized as a metabolically influenced condition, where adipokines such as leptin and adiponectin contribute to cartilage degradation. The statistically significant association identified in this study supports these mechanisms and underscores the importance of weight management in clinical practice.

Similarly, the significant relationship between physical inactivity and greater disease severity aligns with findings from prior research [6,11]. Sedentary individuals in the present study were more likely to have moderate to severe disease compared to those who were physically active. Physical activity is known to improve joint mobility, strengthen periarticular muscles, and reduce pain, thereby slowing disease progression. Conversely, lack of activity leads to muscle weakness, joint stiffness, and functional decline. These findings highlight the protective role of regular, moderate exercise in maintaining joint health and preventing progression of degenerative changes.

Although unhealthy dietary habits and occupational exposure to high joint stress were prevalent among participants, their associations with disease severity were not statistically significant in this study. This may be attributed to the relatively small sample size, which limits statistical power and may obscure weaker associations. Nevertheless, existing evidence suggests that poor diet, particularly one rich in saturated fats and low in antioxidants, may contribute to systemic inflammation and cartilage degeneration [4,12]. Similarly, occupations involving repetitive joint loading, prolonged kneeling, or heavy lifting have been linked to increased risk of osteoarthritis, particularly of the knee and hip joints [6]. The lack of significant findings in these domains in the present study should therefore be interpreted with caution.

Smoking, another lifestyle factor examined, did not show a significant association with disease severity. The relationship between smoking and osteoarthritis remains controversial, with some studies suggesting a protective effect while others report detrimental outcomes [13]. The absence of a clear association in this study may again be due to limited sample size or confounding factors not accounted for in the analysis.

From a public health perspective, the findings of this study emphasize the need for targeted interventions focusing on modifiable lifestyle factors. In the context of India, where rapid urbanization and lifestyle transitions are contributing to an increasing burden of non-communicable diseases, incorporating preventive strategies such as weight control, promotion of physical activity, and lifestyle counseling into routine clinical care could significantly reduce disease burden. Early identification of at-risk individuals and community-based awareness programs may further enhance outcomes and delay disease progression.

The study has several strengths. It provides context-specific data from a tertiary care setting in North India and evaluates multiple lifestyle factors simultaneously, offering a more comprehensive understanding of their combined impact. The use of standardized data collection methods and clear inclusion criteria enhances the reliability of findings. However, certain limitations must be acknowledged. The small sample size limits generalizability and reduces the ability to detect weaker associations. The cross-sectional design precludes establishing causality between lifestyle factors and disease severity. Additionally, reliance on self-reported data for variables such as physical activity and diet may introduce recall bias.

Despite these limitations, the study contributes valuable insights into the role of lifestyle factors in degenerative joint diseases and highlights the importance of integrating preventive and lifestyle-based approaches into patient management. Further large-scale, longitudinal studies are warranted to establish causal relationships and evaluate the effectiveness of targeted interventions.

CONCLUSION

This study demonstrates that modifiable lifestyle factors, particularly increased body mass index and physical inactivity, are significantly associated with greater severity of degenerative joint disease. A considerable proportion of patients exhibited sedentary behavior and unhealthy lifestyle patterns, which likely contributed to disease progression and functional impairment. The findings reinforce the multifactorial nature of degenerative joint diseases and highlight the importance of addressing lifestyle-related determinants alongside conventional clinical management.From a clinical and public health perspective, these results underscore the need for early identification of at-risk individuals and the integration of lifestyle modification strategies into routine care. Interventions focusing on weight reduction, promotion of regular physical activity, and patient education may play a critical role in reducing disease burden and improving quality of life. Further large-scale and longitudinal studies are recommended to establish causal relationships and evaluate the effectiveness of targeted preventive strategies in similar settings.

DECLARATIONS

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