

Kinesiophobia in Non-Specific Chronic Low Back Pain Patient and Its Correlation with Pain and Disability. A Cross-Sectional Study.

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ABSTRACT

Background: Chronic low back pain is a common cause of disability among the population worldwide. It is one of the common musculoskeletal disorders that affects global health. Chronic non-specific low back pain is mainly linked with factors like Kinesiophobia, pain and disability. The aim of the study is to find the prevalence of Kinesiophobia among NSCLBP patients and its correlation with pain and disability.

Method: A total of 402 patients with NSCLBP were assessed for Kinesiophobia, pain, and disability using the TAMPA scale, NPRS scale, and ODI questionnaire, respectively. Among them the prevalence of Kinesiophobia

Result: From this cross sectional, it is found that the prevalence of Kinesiophobia is 92.29% among NSCLBP patients. Research also demonstrated that females have higher level of Kinesiophobia (71.60%) than males (28.40%) and (p value 0.32). Statistical analysis revealed mean age of the patients was 42.68 with (SD 9.06). Pearson's correlation has proved a strong positive correlation between Kinesiophobia and pain intensity ($r(400) = .931, p < .001$) and between Kinesiophobia and disability ($r(400) = .924, p < .001$). The multiple linear regression analysis showed that both Pain Intensity and Kinesiophobia were significant predictors of Disability ($F(2, 399) = 3275.71, p < .001, R^2 = 0.94, R^2_{adj} = 0.94$).

Conclusion: Kinesiophobia is highly prevalent in patients with NSCLBP and is positively correlated with Pain and Disability. Physical therapy interventions along with other strategies like graded exercise therapy, cognitive therapy and behavioural therapy can be implemented to treat Kinesiophobia.

Keywords: Backache, Fear, Lumbago, Mobility Limitation, Persons with Disabilities.

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INTRODUCTION

OVERVIEW:

Non-specific chronic low back pain: Chronic low back pain is a debilitating musculoskeletal condition affecting the global population. This pain limits activities and affects the mental status of the individual. [1] Studies have shown that 84% of people will suffer from low back pain. [2] It is found that chronic low back pain is characterized by discomfort that lasts for more than 12 weeks. [3] A study has revealed that 25.9% of adult patients had chronic low back pain. [4]

Chronic low back without any specific pathology is termed as non-specific chronic low back pain (NSCLBP). This pain is the result of mechanical strain on lumbar structures, such as muscles, nerves, fascia, and tissues. It also occurs due to postural malalignment. [5] It is most

prevalent and affects almost all age groups. Although it is commonly present in adulthood, studies have also confirmed its presence in 30% of children and teenagers. [6] A prevalence of 15% was found among patients with non-specific chronic low back pain (NSCLBP), and specific low back pain was 9.3% among middle-aged and elderly populations. [7] After completing a detailed discussion of the influence of NSCLBP, this study aims to explore a deeper aspect that is less known but is a potentially influential contributor: Kinesiophobia.

Various risk factors are the causative factors of NSCLBP. There is physical as well as psychological factors that result in the persistence of low back pain. Physical factors such as disability [8] and reduced quality of life (QOL) are found in affected individuals. [9] Psychological elements like depression, anxiety and fear of movement are linked with NSCLBP. In the past few years, Kinesiophobia has

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become a focal point in the discussion of chronic low back pain. It is defined as excessive fear of pain due to recurrent exposure to painful re-injury.^[10] Kinesiophobia is commonly seen in patients with NSCLBP. Research conducted in Nigeria found a high prevalence rate of Kinesiophobia (92%) among NSCLBP patients.^[11]

Kinesiophobia: Patients with Kinesiophobia avoid physical activities and becomes reluctant to exercises that leads to disability.^[12] Kinesiophobia can also be considered a predictor of pain. A higher level of Kinesiophobia can predict a higher intensity of pain. Patients with more fear of movement show exaggerated symptoms of pain suffering that brings distress and unpleasant sensation.^[13] Kinesiophobia not only affects physical outcomes but also affects mental health.^[14] Due to fear of movement, the patient withdraws from social and leisure activities that reduce quality of life. This lowers patients' confidence and increases anxiety.^[15] Studies have reported that a high level of Kinesiophobia is associated with a low level of self-efficacy and moderate pain intensity and disability.^[11] Increased fear of movement along with severe pain intensity and reduced self-efficacy and the factors that determine disability in patients with non-specific low back pain.^[16]

However, Kinesiophobia also brings a setback in the progress of the rehabilitation process for low back pain. They have negative pain perception that hinders them from adhering to therapeutic exercises and delays their treatment time. Hence, as a result Kinesiophobia should be taken into consideration as a key factor in the management of NSCLBP. Fear of movement can be assessed using a 17-item questionnaire called TAMPA scale. It is a valid scale used for assessing Kinesiophobia in patients with NSCLBP.^[17] Other associated factors are pain intensity and disability, which are measured with the VAS scale^[18] and ODI questionnaire.

Study's Rationale: Exploring this phenomenon is important for understanding the critical relationship between psychological elements and physical symptoms in patients with NSCLBP. Kinesiophobia or fear of movement hampers a person's ability in performing daily activities, that leads to decreased mobility, loss of muscle strength and endurance, low self-esteem and increased pain perception. By delving into Kinesiophobia, researchers and healthcare professionals can obtain valuable insights that can deal with pain-related disability, diminished physical functions, and lower quality of life in those with NSCLBP.

Furthermore, investigating Kinesiophobia in NSCLBP can pave the way for introducing more effective treatment strategies and interventions. Understanding the mechanism of Kinesiophobia and its impact on patients' beliefs and fear can help clinicians to design target-based rehabilitation protocols to overcome both its physical and psychological challenges. This knowledge can guide the implementation of cognitive-behavioural therapies, graded exercise programs, and patient education that can

significantly reduce negative pain perceptions, fear avoidance behaviours, and promote more active involvement in physical activities.

In the current study, developing a comprehensive understanding of Kinesiophobia in NSCLBP can result in better results, effective management, and low-cost treatment management of back pain. Hence, focussing this outcome measures was essential for gaining potential benefit in the treatment of chronic low back pain. Therefore, this study hypothesizes to find a huge percentage of people suffering from Kinesiophobia among NSCLBP and a positive correlation between its associated factors.

OBJECTIVES:

Primary: To find the prevalence of Kinesiophobia among non-specific chronic low back pain patients.

Secondary: To find if there is any correlation between Kinesiophobia, Pain and Disability among non-specific chronic low back pain patients.

Materials and Method:

- A. **Study design:** The current study was an observational cross-sectional study conducted in the Physiotherapy Department of Jorhat Medical College and Hospital, Assam.
- B. **Participant selection criteria:** 402 no. of patients with non-specific chronic low back pain were included in the study based on the inclusion and exclusion criteria.
- C. **Ethics Committee and Approval:** As this study included human subjects so ethical permission was obtained from Jorhat Medical College and Hospital, Jorhat.

ETHICAL STATEMENT: The study protocol was reviewed and approved by the Institutional Ethics Committee of **Jorhat Medical College and Hospital (Approval No. EC/NEW/INST/2020/1221)**. This research was conducted in accordance with the relevant ethical guidelines. Written informed consent was obtained from all participants prior to their inclusion in the study. Participant confidentiality and anonymity were strictly maintained throughout the research process.

Inclusion Criteria

- a) Patients with low back pain (>3 months), without underlying pathology of the spine.
- b) Both male and female.
- c) Age 18-65

Exclusion Criteria

- a) Back pain is associated with infection, cancer, and fracture.
- b) Neurological involvement, such as disc herniation or cauda equina syndrome.

- c) Cognitive impairment
- d) Current pregnancy.
- e) Any history of surgery on vertebral column.

Assessment tools for Kinesiophobia: A valid 17 item questionnaire called the TAMP scale was used to assess Kinesiophobia. [23]

Assessment tools for Pain and Disability: Visual Analog Scale (VAS) [24] and Oswestry Disability Index (ODI) questionnaire [25].

Protocol: The study comprised of 402 patients both male and female gender. All those patients were selected based on inclusion and exclusion criteria. At the beginning informed consent was taken and signed from all the patients. Patients were assessed for Kinesiophobia, Pain and Disability using the TAMP scale, VAS scale, and

ODI questionnaire, respectively. The prevalence of Kinesiophobia was assessed using the standard formula mentioned below. The correlation of Kinesiophobia with Pain and Disability was also analysed.

Total no. of sample: 402

Tampa score below 37 (Kinesiophobia = -ve) = 31

Tampa score above 37 (Kinesiophobia = +ve) = 371

Formula: - Prevalence = (Number of existing cases) / (Total population) x 100

Prevalence of Kinesiophobia (371/402x100) = 92.29%

Statistical analysis methods: In current study age and gender distribution was evaluated using Chi Square test. The correlation among the variables of Kinesiophobia, Pain and Disability was found using the Pearson correlation coefficient with a significant P value ($p > 0.01$).

FIG1: Summary of Participants ' Age Distribution

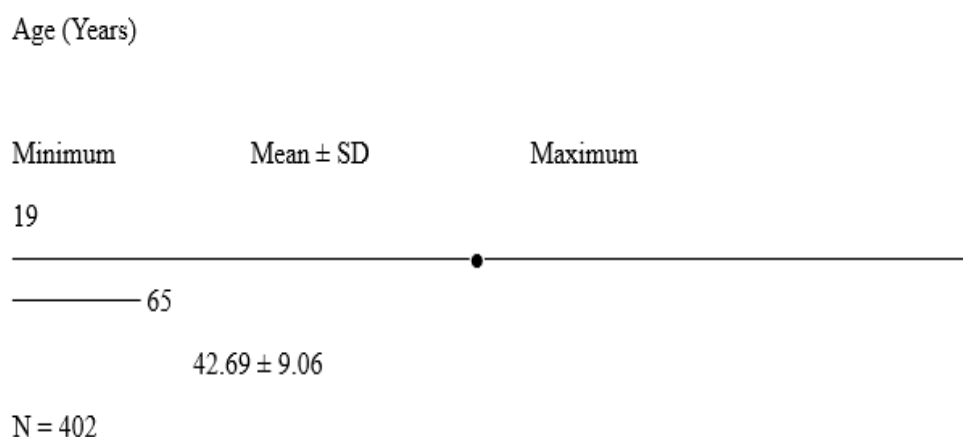


FIG 1: [The mean age of participants was 42.69 ± 9.06 years, with ages ranging from 19 to 65 years and $n = 402$].

FIG 2: Gender Distribution of Participants (N = 402)



Fig 2: [Out of 402 participants, 288 (71.6%) were female and 114 (28.4%) were male. The difference in gender distribution was not statistically significant (Chi-square = 2.277, $p = 0.32$)].

Results: Research reveals that 92.29% of people with non-specific chronic low back pain have Kinesiophobia, measured with the TAMPA scale. The mean age of the participants was 42.68 (SD 9.06), as mentioned in Table 1. The study revealed that the female population had a significantly higher level of Kinesiophobia (71.60%) than the male population (28.40%) ($p=0.32$) (Table 2 and Fig 2).

Pearson's correlation indicated a positive correlation between Kinesiophobia and Pain intensity ($r(400) = .931, p < .001$) (Table 3 and Fig 3). A strong correlation between Kinesiophobia and Disability was found with a coefficient at ($r(400) = .924, p < .001$) in Table 4 and Fig 4, respectively.

Table 1. Correlation of Kinesiophobia (Tampa Score) with Pain Intensity (VAS) and Disability (ODI)

Variable Correlated with Kinesiophobia (Tampa score)	Sample size (n)	Statistic	Pearson Correlation Coefficient (r)	r^2	P-value	Covariance
Pain	402	50.8605	0.9306	0.8661	0.001	5.1457
Disability	402	48.4923	0.9245	0.8546	0.001	26.9158

Table 1: [Data are presented as Pearson's correlation analysis between Kinesiophobia (Tampa Scale of Kinesiophobia [TSK]) and pain intensity (Visual Analog Scale [VAS]) as well as disability (Oswestry Disability Index [ODI]). r = Pearson's correlation coefficient; r^2 = coefficient of determination; $p < 0.05$ indicates statistical significance. Covariance values represent the direction and magnitude of the joint variability between the paired variables. The analysis was performed on **402 participants (n = 402)**, and all correlations were statistically significant at $p = 0.001$].

Multiple Linear Regression:

Results of the multiple linear regression indicated that there was a very strong collective significant effect

between the X_1 , X_2 , and Y , ($F(2, 399) = 3275.71, p < .001, R^2 = 0.94, R^2_{adj} = 0.94$).

The individual predictors were examined further and indicated that X_1 ($t = 24.727, p < .001$) and X_2 ($t = 5.193, p < .001$) were significant predictors in the model.

Where X_1 =Pain

X_2 = Kinesiophobia

Y =Disability

Model: $\hat{Y} = \beta_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_2$

$\hat{Y} = -9.767342 + 4.267617 X_1 + 0.244363 X_2$

Disability = $-9.7673 + 4.2676 \cdot \text{Pain} + 0.2444 \cdot \text{Kinesiophobia}$

Table 2. Multiple Linear Regression

Predictor	Coefficient	Estimate	Standard Error	t-statistic	p-value
Constant	β_0	-9.7673	1.1463	-8.5208	0
Pain	β_1	4.2676	0.1726	24.7268	0
Kinesiophobia	β_2	0.2444	0.0471	5.1931	0

Table 2: [β_0 represents the intercept (constant), while β_1 and β_2 represent the unstandardized regression coefficients for Pain and Kinesiophobia, respectively. Standard Error (SE) indicates the precision of the coefficient estimates,

the t-statistic tests whether each coefficient differs significantly from zero, and p-values less than 0.05 indicate statistical significance. All predictors in the model were statistically significant ($p < 0.001$)].

Table 3. Anova Table

Source	df	Sum of Square	Mean Square	F Statistic	P-value
Regression (between $\hat{y}_i$ and $\bar{y}$)	2	15799.18732	7899.593659	3275.708322	0
Residual (between y_i and $\hat{y}_i$)	399	962.215668	2.411568		
Total (between y_i and $\bar{y}$)	401	16761.40299	41.79901		

Table 3 [df = degrees of freedom; Sum of Squares (SS) measures the variation attributable to each source; Mean Square (MS) = SS/df; F statistic = MS (Regression) ÷ MS (Residual); P-value indicates the statistical significance of

the regression model. A p-value < 0.001 (reported here as 0 due to rounding) indicates that the regression model is highly statistically significant].

X and Y relationship:

R Square (R^2) equals to 0.942593. Thus, the predictors (X) explain 94.3% of the variance (Y).

Adjusted R square equals to **0.942306**.

The coefficient of multiple correlation (R) equals **0.970872**. It means that there is a very strong correlation between the predicted data ($\hat{y}$) and the observed data (y).

Goodness of fit:

Overall regression: right-tailed, $F_{(2,399)} = 3275.708322$, p-value = **0**. Since p-value < α (0.05), we reject the H_0 . The linear regression model, $Y = b_0 + b_1X_1 + \dots + b_pX_p + \varepsilon$, provides a better fit than the model without the independent variables resulting in, $Y = b_0 + \varepsilon$.

All the independent variables (X_i) are significant.

The Y-intercept (b): two-tailed, $T = -8.52084$, p-value = **6.66134e-16**. Hence b is significantly different from zero.

DISCUSSION:

This observational cross-sectional study provides valuable insights into the prevalence of Kinesiophobia and its associated factors in non-specific chronic low back pain. The analysis interprets a higher score of Kinesiophobia (92.29%) among non-specific chronic low back pain that clearly signifies that most patients suffering from chronic pain have Kinesiophobia.

This research also demonstrates that the prevalence of Kinesiophobia is higher among women than men.

Current research shows a positive correlation of Kinesiophobia with its other associated factors of Pain and Disability. Patients with higher pain intensity have shown greater levels of Kinesiophobia. They become reluctant to perform various activities due to fear of pain. Patients experiencing high level of pain are more prone to develop severe fear of movement that leads to entering a cycle of avoiding physical activity, increased pain perception and increased disability.

Research also highlights from regression analysis that both independent factors Kinesiophobia and Pain are strong predictors of dependent variable disability over time. Kinesiophobia, due to anticipated pain or reinjury, contributes substantially to the increase in disability by limiting patients' physical activity and engagement in rehabilitation. This avoidance behaviour can exacerbate functional decline, leading to a worsening of disability outcomes. Simultaneously, the intensity and persistence of Pain directly influence the level of disability by impairing daily functioning and reducing overall quality of life.

The findings align with the previous literature review on Kinesiophobia and its association with pain and disability. Meca L J, Sanchez MG and Herrador JM in their study concluded that Kinesiophobia is significantly prevalent among older patients. It is positively correlated with pain,

disability, and functional limitation in patients with knee osteoarthritis. ^[19]

Study conducted by Antunes RS stated that low back pain and depression cause higher pain intensity and increased fear of movement ^[27] and is in the same line with the current study that highlights an increase in pain intensity increases fear of movement.

However, Comachio et al. in his study declared that a weak link was found between Kinesiophobia and pain intensity but revealed a statistically significant relationship between disability and quality of life in patients with chronic low back pain. ^[10] In this research it is revealed that Kinesiophobia is strongly correlated with disability in chronic low back pain patients. In another study conducted by Yahia A it was found that Kinesiophobia is significantly associated with disability and physical deconditioning in cases of non-specific chronic low back pain patients. ^[28] Abdelmoneem et al. also concluded that Kinesiophobia is correlated with disability. ^[20]

The findings of this study state that fear of movement is higher in women than in men. Harriet B et al in his study found that Kinesiophobia is higher in men (72%) than women (48%). ^[21]

Lundberg Mari et al. found that 54% of the total population seeking treatment in the department had higher levels of Kinesiophobia. The research confirmed that 47% of people suffered from psychological stress, 67% of men, and 56% of women had severe pain. The study confirms the prevalence of Kinesiophobia and its impact on pain severity in musculoskeletal pain conditions. ^[22]

Chronic low back pain is more commonly caused by thoracolumbar fascia dysfunction that results in stiffness and altered movement patterns in the lumbar region. ^[26] The patient suffers from balance loss and difficulty in performing ADLs. Subsequently, over time leads to Kinesiophobia.

In this present study, it is found that Kinesiophobia is considered as a psychosocial factor that should be focused in the management of chronic low back pain. As it is associated with both physical and psychological symptoms, cognitive-based therapy and physical interventions should be incorporated into treatment protocols for effective results and to improve patients' quality of life. Cognitive-based therapies focus on the psychological aspects of pain, reduce stress, and develop coping strategies to combat negative perceptions related to this condition.

Moreover, physical therapies target physical components of pain that include pain management strategies, exercises to increase muscle strength and flexibility, manual therapies, stretching exercises, and agility training.

Clinicians should thoroughly assess fear of movement and patients' pain-related beliefs as part of their treatment plan. By focusing on these factors, patients can benefit from potential results for positive outcomes and improved

quality of life. Considering a multifactorial treatment approach, patients' physical activity levels can be increased and functional capacity can be improved.

LIMITATIONS OF THE STUDY:

The cross-sectional nature of this study hinders our ability to find causal relationships between Kinesiophobia and other clinical factors. This study provides valuable feedback about the association between these factors only at specific points in time, but it cannot determine the actual changes in those variables over time. The continuous monitoring of all these current variables limits our ability to understand whether Kinesiophobia is a precursor or a result of changes in clinical variables. This challenge can be overcome by considering longitudinal designs or experimental studies in future research. Implementing such approaches can provide a better understanding of the interplay between these variables. This also enables the analysis of definite time-based relationships and draws concrete conclusions about Kinesiophobia and its associations with other factors.

FUTURE RECOMMENDATIONS:

From current research clinicians suggest that longitudinal studies are essential to determine the link between Kinesiophobia and NSCLBP. By monitoring patients over an extended period of time, clinicians can determine how fear of movement evolves along with NSCLBP. Future clinicians can also evaluate the effectiveness of various interventions to prevent and reduce fear of movement, which can reduce the hindrances in the rehabilitation of NSCLBP. The evaluation of various treatment techniques can guide future researchers to implement this into clinical research and practice. Healthcare professionals can now develop evidence-based techniques to reduce the effect of Kinesiophobia in NSCLBP.

CONCLUSION:

The conclusion of this study emphasizes Kinesiophobia as an important factor in the management of NSCLBP. Fear of physical activity hinders the rehabilitation period and negatively affects quality of life. The research findings suggest that Kinesiophobia is most commonly present in patients with NSCLBP and delays the process of rehabilitation. Hence, in the holistic approach of NSCLBP Kinesiophobia and its associated factors should be included in the comprehensive treatment protocol as target goals to achieve potential benefits.

This study emphasized the development of tailored treatment protocols that included Kinesiophobia reduction techniques along with conventional pain management strategies, which could improve the quality of life of patients with NSCLBP and reduce obstacles in the management of low back pain.

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Conflicts of Interest: The authors declare no conflict of interest.

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