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To Determine the Correlation of Pain and Functional Disability Status In Patients With Chronic Non-Specific Low Back Pain

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ABSTRACT

Background: Low back pain refers to any type of pain or discomfort that is felt below the costal border and above the inferior gluteus folds, including leg pain. Non-specific LBP is usually classified according to its duration as acute (less than 6 weeks), sub-acute (between 6 weeks and 3 months), or chronic (longer than 3 months) LBP.

Study Design: A Correlation study

Aim: To determine association between pain And Functional Disability Status in Patients with Chronic Non-specific low back pain.

Objective: To evaluate association between pain and functional disability status in patients with chronic non-specific low back pain.

Participants: A total of 28 patients according to inclusion and exclusion criteria were included in the study through convenient sampling technique.

Method: This is a Correlation study; a total 28 patients were selected between 30- 60 years of age. The outcomes of the intervention were assessed using VAS and BDI and ODI outcome measure.

Result: The age distribution of patients reveals that the smallest number of patients, just 2 individuals, falls within the 30–34 age range. The largest group, comprising 13 patients, is between the ages of 35 and 39. Meanwhile, the 40–44 age group includes 7 patients, and the 45–49 age group consists of 6 patients. The Phi coefficient, with a value of 3.051 and an approximate significance of 0.021, indicates a strong association between the variables. Similarly, Cramer's V, with a value of 0.881 and the same significance level, suggests a substantial relationship. These measures, derived from 28 valid patients, highlight a significant correlation between pain levels and functional disability, implying that as pain increases, functional disability also tends to rise.

Conclusion: The data on pain, functional disability, and depressive symptoms indicate high levels of pain and depression, with moderate functional disability among participants. The significant associations between pain and functional disability, supported by various statistical tests, underscore the strong relationship between these variables.

Keywords: LBP, VAS, ODI, BDI, Functional Disability Status

INTRODUCTION

Low back pain is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without leg pain.[1]

The term "low back pain" refers to any type of pain or discomfort that is felt below the costal border and above the inferior gluteus folds, including leg pain. It is one of the most frequent reasons for doctor visits, the second most common reason for sick days, and due to direct and indirect expenses, it has significant medical, social, and economic effects on the individual, family, and society. Non-specific low back pain is described as low back pain that cannot be linked to a specific pathology that can be identified, as opposed to specific low back pain that has a recognized pathophysiologic explanation.[1]

Most people with low back pain only need a comprehensive clinical examination and history collection. After identifying warning signs, further diagnostic testing is required in the event of nerve root/radicular discomfort and significant spinal pathology, respectively. Furthermore, there needs to be a focus on psychosocial risk factors, sometimes known as "yellow flags," which raise the possibility of long-term disability (including employment loss, due to low back pain) and chronic low back pain.[1]

The lifetime prevalence of low back pain is reported to be as high as 84%, and the prevalence of chronic low back pain is about 23%, with 11-12% of the population being disabled by low back pain[2]

The vast majority of low back pain (LBP) patients (up to 90%) are labelled as having non-specific LBP, which is defined as symptoms without a clear specific cause, that is, LBP of unknown origin[3]. Non-specific LBP is usually classified according to its duration as acute (less than 6 weeks), sub-acute (between 6 weeks and 3 months), or chronic (longer than 3 months) LBP [4]

The cause of the vast majority of LBP is unknown; current tests cannot identify a pathological cause for the pain in at least 85% of cases.[5] That is, in 85% of cases, even when the most extensive testing is conducted, no apparent cause can be established. For this reason, such LBP is now usually termed non-specific low back pain. Our inability to reliably identify pathology has given rise to numerous hypotheses concerning the cause of LBP, including reduced trunk extensor

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endurance,[6] psychological distress,[7] hamstring inflexibility,[8] poor muscle control of the trunk,[9] poor posture, and low body mass.[10]

The assessments for functional capacity and disability in patients with CNSLBP can be done with physical performance tests and self-administered questionnaires, respectively. Pfingsten et al found the differences in ability to perform eight physical performance tests such as stair climbing, prolonged flexion, stand-to-floor, fingertip-to-floor, lift test, sock test, sit-up test and pick-up test, between LBP patients and healthy controls. Stand-to-floor was the most discriminatory test whereas pick-up and lift test produced moderate results.[11] Rudy et al also reported the significant difference between older individuals with and without CLBP regarding physical and psychosocial functions.[12]

Functional reach test has been used as a clinical measure of dynamic balance with core muscle control. Five time sit to stand and two-minute step are promising because these tests are relevant to the dynamic function of trunk and lower limb muscles similarly to everyday working activities. Those tests were also used to measure in older adults representing dynamic balance and aerobic endurance.[1]

Chronic low back pain is one of the causes leading to long term disability and pain. This study is to investigate the association between pain, disability, and functional capacity in CNSLBP patients with higher levels of disability.

METHODOLOGY

This study was reviewed, discussed and approved by the Santosh Occupational Therapy Institutional Ethical Committee. The study was done with population of Ghaziabad in Santosh Hospital. Prior to participate in the study, participants were explained about the study. As per inclusion criteria, patients who were diagnosed with chronic non-specific low back pain, with above age of 30-60 years for both male and female genders were included in the study. As per exclusion criteria any specific and radicular low back pain, neurological, cardiovascular diseases and history of spine or lower limb fracture or surgery were excluded from the study. There was total 28 number of patients with chronic non-specific low back pain. After the complete purpose, procedure, benefits and consequences of this study was explained to the clients in details. A consent was obtained from each client. Patient's pain and disability among low back pain was assessed based on patient's history, and using standardized scale i.e., Visual Analog Scale (VAS), Oswestry Disability Index (ODI), and Beck Depression Inventory (BDI) and score was calculated. After the data collected using outcome measure, data was analyzed.

Outcome measures

1. VAS

The visual analog scale (VAS) is a valid and reliable measure of chronic pain intensity. The scale comprises a 10-centimeter line with the endpoints labelled as ‘no pain’ and ‘worst ever pain’. The respondents were instructed to indicate their pain level on a mark on a line that represented their current status. The level of pain was then reported as the distance along the line from the point marked ‘no pain’ and, subsequently, this was given a score out of 10 using a ruler [14]

2. OSWESTRY LOW BACK DISABILITY QUESTIONNAIRE

The ODI has been developed to assess pain related disability in people with acute, subacute, or chronic low back pain. The ODI covers 1 item on pain and 9 items on activities of daily living (personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and traveling). Each item is measured on a 6-point ordinal scale, ranging from the best scenario to the worst scenario. The ODI has high internal consistency (Cronbach’s 0.71– 0.87) and test–retest reliability (intraclass correlation coefficient 0.84, 95% confidence interval 0.73– 0.91). The standard error of measure has been reported to be between 4 and 6 (49,50). Content and face validity. The ODI has adequate content validity, as it covers activities of daily living that are commonly experienced by patients with back pain. However, it lacks generic activities such as work, leisure, recreation, or sporting activities. Internal construct validity. The ODI has high internal consistency, with Cronbach’s alpha between 0.71 and 0.87 (40,41). External construct/convergent validity. [15]

3. Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI) is a 21-item self-reporting questionnaire for evaluating the severity of depression in normal and psychiatric populations. The questionnaire was developed from clinical observations of attitudes and symptoms occurring frequently in depressed psychiatric patients and infrequently in non-depressed psychiatric patients. Ranked 0–3 for severity. The questionnaire is commonly self-administered. Its development marked a shift among mental health professionals, who had until then, viewed depression from a psychodynamic perspective, instead of it being rooted in the patient's own thoughts.[30]

DATA COLLECTION

A total of 28 patients were included in the study according to convenient sampling. The patients were selected from Santosh hospital Ghaziabad as per inclusion and exclusion criteria. Patient's pain and disability among low back pain was assessed based on participant's history, and using standardized scale i.e., Visual Analog Scale (VAS), Oswestry Disability Index (ODI) and Beck Depression Inventory (BDI).

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DATA ANALYSIS

After completion of all evaluation, results were collected and data were put in the master chart and analyzed by using IBM Statistics Version 26. The data of outcome measures VAS, ODI and BDI scale were analyzed using IBM Statistics Version 26 for statistical significance result.

RESULT.

The data was analyzed using a histogram method and the results indicated that the data is normally distributed. Chi-square tests, specifically the paired t-test, was applied in this study.

The age distribution of patients, grouped into specific age ranges. It shows that the smallest number of patients, just 2 individuals, falls within the 30–34 age range. The largest group, comprising 13 patients, is between the age range of 35 - 39. Meanwhile, the 40–44 age group includes 7 patients, and the 45–49 age group consists of 6 patients. This distribution highlights that most patients are in their mid to late thirties, with fewer in their early thirties or late forties.

An equal representation of [males and females] both groups consist of 14 patients, suggesting a perfectly balanced gender composition in the study or group. This even distribution ensures that the data gathered are equally influenced by both male and female patients.

Table 1.0 Descriptive Statistics of VAS, ODI and BDI

Stats	***VAS***	***ODI***	***BDI***
Mean	7.25	24.893	31.679
Standard Error	0.160	1.763	1.290
Standard Deviation	0.844	9.331	6.826
Sample Variance	0.713	87.062	46.597

Chi-Square Analysis

VAS * BDI

Table:2.0 VAS * BDI

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	73.762[a]	36	<.001
Likelihood Ratio	55.886	36	.018
Linear-by-Linear Association	16.935	1	<.001
N of Valid Cases	28		

a. 52 cells (100.0%) have expected count less than 5. The minimum expected count is .04.

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	1.623	<.001
	Cramer's V	.937	<.001
N of Valid Cases		28	

ODI * BDI

Table 5.0 ODI*BDI

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	260.556[a]	216	.021
Likelihood Ratio	118.281	216	1.000
Linear-by-Linear Association	18.540	1	<.001

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N of Valid Cases	28		
a. 247 cells (100.0%) have expected count less than 5. The minimum expected count is .04.			

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	3.051	.021
	Cramer's V	.881	.021
N of Valid Cases		28	

These measures, derived from 28 valid cases, highlight a significant correlation between pain levels and functional disability, implying that as pain increases, functional disability also tends to increase markedly.

DISCUSSION

The present study evaluates the association between pain and functional disability status in patients with chronic non-specific low back pain.

The study was done with population of Ghaziabad in Santosh Hospital who were diagnosed with chronic non-specific low back pain, with above age of 30-60 years for both male and female Gender. There was total 28 number of patients with chronic non-specific low back pain above 30-60 years were chosen for this study. After the complete purpose, procedure, benefits and consequences of this study was explained to the clients in details. A consent was obtained from each client. Patient's pain and disability among low back pain was assessed based on patient's history, and using standardized scale i.e., Visual Analog Scale (VAS), Oswestry Disability Index (ODI), and Beck Depression Inventory (BDI and score were calculated. After the data collected using outcome data was analyzed. The study was done with in a period of last three months.

Statistical data on pain and functional disability, measured using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI), and Beck Depression Inventory (BDI), reveals high pain levels (VAS mean score of 7.25), moderate functional disability (ODI mean score of 24.893), and significant depressive symptoms (BDI mean score of 31.679). The data shows varying degrees of consistency across these measures. The Pearson Chi-Square value of 73.762 with 36 degrees of freedom and a significance level of <.001 indicates a highly significant association between pain and functional disability. The Likelihood Ratio test and Linear-by-Linear Association further support this strong relationship. Despite potential data limitations, the significant p-values suggest a robust association. Phi and Cramer's V values also indicate a very strong relationship between pain and functional disability. Further analysis with a Pearson Chi-Square value of 260.556 and an asymptotic significance of .021 confirms the significant correlation, although the Likelihood Ratio test shows no significant association, possibly due to sample size or data distribution. This shows that lower pain intensity indicates a lower percent of disability. Most of the patients probably had a sedentary lifestyle or job which required prolonged sitting or standing in their daily life which could simply affect pain aggravation in sitting and standing activity. Overall, the data highlights a strong link between increased pain levels and higher functional disability**.** The results of the association between pain and functional capacity showed a low significant association between VAS and ODI.

Prasert Sakulsripraserta, et al study found significant association between pain intensity, disability level, functional capacity, and demographic data. Physical function assessment is an important out- come measure for CNSLBP patients. Pain intensity was significantly associated with ODI.[12]

In the study of **Salvetti et al**. evaluating the incidence of disability and factors affecting it with 177 patients with chronic LBP, it was shown that individuals with severe disability had higher pain severity and were exposed to pain for a longer time.[9] In the study conducted by **Kim et al.** in patients with chronic LBP, it was shown that there is a positive relationship between VAS scores and the ODI.[6]

In a study conducted by **Dündar et al** with 83 participants (41 chronic LBP, 42 healthy participants), they found that BDI scores were significantly higher in patients with chronic LBP compared to healthy participants, which negatively affected the QoL. This assessment consists of the construction of two domains: functional performance and functional capacity. This study focused on functional capacity because of its relevance and compatibility with activities in daily living.[14]

CONCLUSION

In conclusion, the analysis of patient's demographics and statistical data on pain and functional disability reveals several key insights. The age distribution shows a concentration of patients in their mid to late thirties, with an equal gender representation ensuring balanced perspectives. The data on pain, functional disability, and depressive symptoms indicate high levels of pain and depression, with moderate functional disability among participants. The significant associations between pain and functional disability, supported by various statistical tests, underscore the strong relationship between these variables. The findings highlight the critical interplay between pain and functional disability, suggesting that as pain increases, so does functional disability. These insights are crucial for understanding the patients' conditions and guiding future interventions.

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LIMITATIONS OF THE STUDY:
Patients with chronic non-specific low back pain experiences fluctuations in pain and disability, which affect the study's outcomes. The study does not have a control group, which makes it difficult to compare the findings to a reference group.

FUTURE RECOMMENDATION OF THE STUDY:
Future research could conduct intervention studies to examine the effect of different treatments on pain and functional disability in patients with chronic non-specific low back pain. Incorporate objective measures, such as physical performance tests, to complement self-reported measures.

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