

## Original Research Article

# Correlation of disability with anxiety and depression in patients with chronic non-specific neck pain: a cross-sectional observational study

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### ABSTRACT

**Background:** Neck Pain is a prevalent musculoskeletal condition usually associated with disability. Psychological illnesses like anxiety and depression are commonly seen in chronic pain. The purpose of this study was to evaluate the relationship between anxiety, and depression with disability in patients with chronic non-specific neck pain.

**Methods:** 87 patients with chronic non-specific neck pain were recruited in this cross-sectional study. The disability was evaluated with neck disability index, anxiety with the generalized anxiety disorder scale (GAD-7), and depression with patient health questionnaire (PHQ9).

**Results:** Out of 87, 60 were females and 27 were male. For correlation, Spearman's test was applied for the outcome measures. There was a moderate positive correlation found between disability and anxiety ( $r=0.55$ ) and between neck pain and depression ( $r=0.63$ ).

**Conclusions:** There is a moderate positive correlation between self-reported disability and anxiety (GAD7) and also between self-reported disability and depression (PHQ9) in patients with chronic non-specific neck pain.

**Keywords:** Chronic Non-specific, Neck pain, Anxiety, Depression

### INTRODUCTION

Neck pain (NP) has become a common public health problem all over the world, with a high rate of disability, a negative effect on people's health and quality of life, and a significant strain on individuals, communities, health systems, and the social economy.<sup>1</sup> With an annual prevalence rate of more than 30%, neck discomfort was designated the fourth biggest cause of disability after ischemic heart disease, cerebrovascular illness, and lower respiratory infection.<sup>2,3</sup>

The bone and joint decade 2000-2010 task force on neck pain and its associated disorders defined neck pain as an unpleasant subjective experience.<sup>4</sup> According to the International association of study of pain task force, pain

is defined as an 'unpleasant sensory and emotional experience associated with, or resembling with, actual or potential tissue damage, or described in terms of such damage.'<sup>5</sup> Non-specific neck pain includes any form of acute, subacute, and chronic neck pain where no anatomic structure can be identified as a cause of pain. Pain is said to be Chronic when it lasts for at least 12 weeks or more. Pain and disability are described as a multidimensional, dynamic interaction of physiological, psychological, and social factors that influence one another, resulting in chronic and complex pain syndromes explained by the biopsychosocial model. A substantial amount of empirical evidence supports the biopsychosocial model; however, in practice, psychosocial factors are frequently assigned secondary status and are viewed primarily as reactions to pain.<sup>6</sup>

Studies done by Bair et al and Asmundson et al have found that variables like anxiety and depression are predictors of chronic pain.<sup>7,8</sup> Depression and anxiety are common mental illnesses around the world. The world health organization (WHO) estimates that approximately 260 million people worldwide suffered from anxiety disorders in 2017.<sup>9</sup> Major depression is currently the fourth leading cause of disease burden worldwide, and it is expected to rank first in disease burden in high-income countries by 2030.<sup>10</sup> While both anxiety and depression have been linked to the experience of chronic pain.

Blozak et al conducted a study that included a neck pain and disability scale and hospital anxiety and depression scale and concluded the greater the level of neck pain, the greater the importance of psychosocial distress as a connected burden.<sup>11</sup> More research is needed to identify the cause and direction of the relationship between psychological distress and neck pain & disability. Previous research has shown that anxiety and depression play an important role in chronic pain and disability in computer workers, Cervical radiculopathy and in whiplash injuries.<sup>12-14</sup> Also, the influence of anxiety and depression is studied in chronic back pain and chronic non-specific low back pain.<sup>15-17</sup> But the relationship between neck disability due to chronic neck pain, anxiety, and depression in nonspecific neck pain has not been thoroughly investigated. Hence, as there is paucity in the literature, this study was planned to investigate the relationship between neck disability, anxiety, and depression in non-specific neck pain.

## METHODS

### *Study type, location and duration*

This is an observational cross-sectional study conducted in the physiotherapy out-patient department of a KEM hospital which is a tertiary care hospital in Mumbai, India. This study was carried out from January 2020 to January 2022.

### *Inclusion criteria*

Patients diagnosed with nonspecific chronic neck pain in the age group from 18-45 years were included in this study. Nonspecific Chronic neck patients were identified as those with no specific cause of the onset of neck pain with patients experiencing symptoms of pain for at least 3 months in the preceding six months duration.

### *Exclusion criteria*

All patients with acute neck pain, known spine fractures/surgeries, metabolic bone disease/disorders, history of or suffering from secondary neck pain (rheumatic, infectious, neoplastic), and psychiatric disorders or usage of antipsychotic drugs were excluded from the study.

## *Baseline variables*

Sociodemographic information relating to patients' age, sex, pain duration, marital status, education level, and Neck disability was evaluated.

## *Questionnaires*

Disability was assessed using the neck disability index (NDI).<sup>18</sup> The NDI is the most used patient-rated outcome measure to assess the disability in patients with neck pain. The NDI has been shown to have excellent psychometric properties, demonstrating high internal consistency (Cronbach's  $\alpha=0.80$ ), and test-retest reliability (Pearson's  $r=0.89$ ,  $p$  less than or equal to 0.05).

Spitzer and colleagues developed the generalized anxiety disorder scale-7 (GAD-7) as a screening tool and severity indicator for generalized anxiety disorder.<sup>19,20</sup> The GAD-7 consists of the 7 items with the highest correlation with the total 13-item original GAD scale score ( $r=0.75-0.85$ ) of the initial item pool that consisted of 9 items that reflect all of the diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV) symptom criteria for GAD and 4 items based on a review of existing anxiety scales. The internal consistency of the GAD-7 is excellent (Cronbach  $\alpha=0.92$ ). Test-retest reliability is also good (intraclass correlation= $0.83$ ). With a sensitivity of 89% and specificity of 82%.

Patient health questionnaire-9 (PHQ-9) is a depression module of the patient health questionnaire (PHQ) which is a self-administered version of the primary care evaluation of mental disorders diagnostic instrument for common mental disorders.<sup>21</sup> It scores each of the 9 DSM-IV criteria as "0" (not at all) "3" (nearly every day) "0-27". The internal reliability of the PHQ-9 was excellent, with a Cronbach's  $\alpha$  of 0.89 in the PHQ Primary Care Study and 0.86 in the PHQ Ob-Gyn Study. Test-retest reliability of the PHQ-9 is 0.84. Criterion validity was assessed against an independent structured mental health professional (MHP) interview in a sample of 580 patients. Using the MHP re-interview as the criterion standard, a PHQ-9 score  $\geq 10$  had a sensitivity of 88% and a specificity of 88% for major depression.

## RESULTS

Statistical analysis was done using the SPSS software with version 24 Shapiro-wilk test applied to find out the normality in the variable. The normality test yielded  $p$  values to be less than 5% for depression; hence the Pearson correlation coefficient was run for these, and Spearman's was run for anxiety. This study included a total of 87 subjects. 60 subjects were female, accounting for 68.96% of the total, with the remaining 27 males accounting for 31.04 percent. The mean age of the subjects was 33.04 years ( $SD\pm 8.78$ ), mean BMI was 21.93  $kg/m^2$  ( $\pm SD=2.87$ ). Demographic details are presented in (Table 1).

**Table 1: Demographic data.**

Variable	N	%
<b>Gender</b>		
Male	27	31
Female	60	69
<b>Marital status</b>		
Married	51	58.6
Single	35	40.2
Divorced	1	1
<b>Education</b>		
Elementary	5	5.7
Middle School	9	10.3
Junior /Senior High School	18	20.7
UG	45	51.7
PG	10	11.5
<b>Employment</b>		
Employed	39	44.8
Unemployed	26	29.9
Student	22	25.3
<b>Exercise</b>		
Yes	39	55.2
No	48	44.8
<b>Comorbidity</b>		
Hypertension	6	6.9
Diabetes mellitus	3	3.4
Endocrine	11	12.6
Respiratory	4	4.6
HT+DM	3	3.4
None	60	69.0
<b>Addictions</b>		
Yes	11	12.6
No	76	87.4
<b>Spectacles</b>		
Yes	50	57.5
No	37	42.5

**Table 2: The score of outcome measures.**

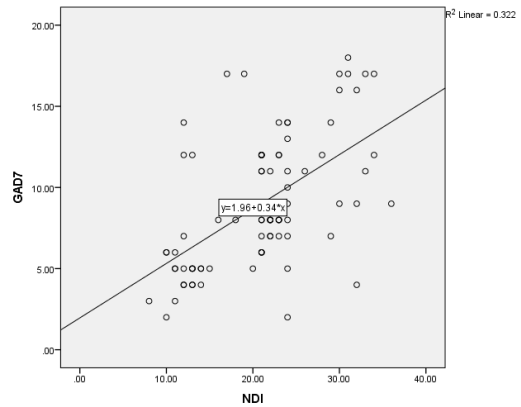
Outcome measures	Mean	±SD
NDI	20.94	6.85
GAD 7	8.98	4.04
PHQ 9	8.97	3.22

**Table 3: Correlation of NDI with GAD 7 and PHQ 9.**

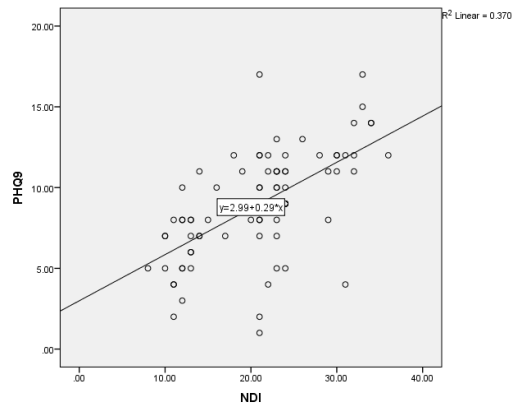
Parameters	correlation coefficient (r)	P value
NDI vs. PHQ-9	0.63	0.000
NDI vs. GAD-7	0.55	0.000

The mean NDI score was 20.90 (±SD=6.78) indicating moderate disability, the mean GAD score was 8.98 (±SD=4.04) indicating mild anxiety disorder, and the mean PHQ score was 8.97 (±SD=3.22) indicating mild depression level (Table 2). The NDI score was positively and moderately correlated with GAD 7 (r=0.55; p= 0.001)

(Figure 1) and PHQ 9 (r= 0.63; p= 0.000) (Figure 2, Table 3).



**Figure 1: Correlation of NDI with GAD 7.**



**Figure 2: Correlation of NDI with PHQ 9.**

**DISCUSSION**

The primary goal was to study the anxiety, and depression among non-specific neck pain patients and find the correlation of each with their perception of disability. Other studies have used the Hospital anxiety depression scale (HADS) to access anxiety and depression, but we have used the Generalized anxiety disorder -7 and patient health questionnaire-9 scales instead as their Marathi and Hindi translations were available. They were required to be used, as these are the main local languages of Indians, hence a varied population in terms of socio-cultural conditions could be studied which is important for the generalizability of results. In current study we found that both anxiety and depression were moderately correlated with disability in patients with chronic non-specific neck pain.

The result of present study is in line with the previous literature. Parekh et al and Zacharias et al have reported positive correlations of disability with anxiety and depression.<sup>22,23</sup> Parekh et al conducted a study on computer workers using the neck pain and neck disability index and hospital anxiety and depression scale (HADS)

in the 20 to 60 years old population where authors found a strong positive relationship between neck discomfort and anxiety, as well as between neck pain and depression.<sup>22</sup> Additionally Zacharias et al investigated the relationship between pain catastrophizing and disability inferred that anxiety, depression, and catastrophizing are connected with self-reported disability in individuals with chronic neck pain.<sup>23</sup> Sundseth et al correlated the neck disability index with mental health and quality of life and concluded that the neck disability index was found to be substantially associated with various quality of life and mental health parameter in individuals with single-level cervical disc disease and radiculopathy.<sup>24</sup>

The psychological states of patients with nonspecific chronic neck pain were more closely related to their disability than to the intensity of their pain. Similarly, Thompson et al found that the psychological states of patients with idiopathic chronic neck pain had stronger associations with disability than pain intensity.<sup>25</sup> This finding suggests that changes in the psychological states of patients suffering from idiopathic chronic neck pain may have a greater impact on their disability without significantly altering the intensity of their pain. This could imply that the psychological distress of patients with idiopathic chronic neck pain is to blame for a large part of the disability reported. This disability could be a result of a maladaptive strategy, which is largely attributed to patients' beliefs. Brenes et al found that after controlling for demographic and health characteristics, there was a link between anxiety, depression, and physical handicap.<sup>23</sup> After controlling for age, gender, income, self-rated health, number of medical conditions, and number of physician visits in the previous year, the results show that anxiety, depression, and comorbid anxiety and depression are related to higher degrees of disability.

As the literature recognizes anxiety and depression as an important psychological factor associated with pain and disability.<sup>27</sup> However, the pathophysiology of anxiety and depression leading to disability is different. Physiological explanations for the relationship between anxiety and pain experience and disability have been provided in the literature. Anxiety may alter reticular activity, increasing supraspinal transmission of nociceptive signals. Furthermore, anxiety is linked to an increase in adrenaline levels. Adrenaline release can stimulate 2-receptors, resulting in a pro-inflammatory cascade of events and an increase in pain perception. Furthermore, anxiety is thought to affect the autonomous nervous system, causing vasoconstriction in certain muscle areas and promoting muscle injury. Because of its association with their function, anxiety is also thought to affect vessels and muscles via the central nervous system. Anxiety appears to be a key psychological factor contributing to increased pain and disability in patients with chronic neck pain.<sup>28</sup> Depression is also regarded as a psychological state that increases pain perception by decreasing the activity of descending inhibitory

pathways. Furthermore, an increase in pain experience may occur in a manner similar to anxiety, as depression has been hypothesized to affect the autonomous nervous system, resulting in vasoconstriction and promoting muscle injury.<sup>28</sup> Based on the ICF, the NDI is noted to contain five items that are classified as impairments, three related to activity limitations, and two items indicative of participation restrictions. Neck pain is a common as well as frequently occurring disorder with a complicated clinical etiology that is primarily caused by people's poor lifestyle choices, such as long-term head bending posture especially during smartphone usage or occupation like Nursing or computer user.<sup>29-31</sup> Hence, pain and disability are easy to relapse and last for a long duration. Chronic neck pain is one of the most widely known neuromusculoskeletal pain problems that can lead to chronic disability in patients. Long-term chronic pain has a significant impact on patients' mental health, and they are more susceptible to negative emotions such as anxiety and depression, which have a negative impact on patient's quality of life. According to reports, the longer chronic pain persists, the more severe it becomes and the more anxious or depressed it becomes.<sup>32</sup> Anxiety and depression, on the other hand, can promote psychological responses to chronic pain. The current study's findings support previous studies that found a significant association between anxiety and depression with neck disability in nonspecific chronic neck pain in young adults.

### Limitations

Limitations of current study were other factors like economic status; occupation socioeconomic status, education, and addiction are not individually correlated with disability in Non-specific chronic neck pain.

### CONCLUSION

In adults with nonspecific chronic neck pain, psychological states (anxiety, depression) have a moderate positive correlation with disability. This indicates that in non-specific neck pain, the disability could be the result of these patients' psychological status.

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