

## Original Research Article

# A cross-sectional analytical survey on ACL depressive syndrome at a tertiary care hospital

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## ABSTRACT

**Background:** One of the most prevalent and incapacitating injuries affecting active people is an anterior cruciate ligament (ACL) injury. There is evidence of the physical effects of ACL injuries, but there is now growing evidence of the psychological toll, which is referred to as ACL depressive syndrome. The purpose was to evaluate the relationship between pain functional activities (WOMAC) and depression and overall health in individuals with ACL injuries.

**Methods:** 50 Patients diagnosed with ACL injury, aged 15-45, were screened who fulfilled the inclusion criteria and were enrolled in the study after giving consent to the Department of Orthopaedics. The patients were asked questions related to their activities of daily life and mental health, including depression.

**Results:** The study found a statistically significant moderate positive correlation between WOMAC scores and the Pain subdomain of the SF-36 ( $R=0.30$ ,  $p=0.034$ ). All other correlations, including WOMAC with PHQ-9 and other SF-36 dimensions, were weak and not statistically significant.

**Conclusions:** The study indicates substantial differences in emotional ( $p=0.03$ ) and general health ( $p=0.00$ ) as critical emphasis areas, whereas other indicators had a minor effect on quality of life.

**Keywords:** ACL, Anxiety, Depression, WOMAC

## INTRODUCTION

ACL (Anterior Cruciate ligament) injury is the most common injury of knee joint.<sup>1</sup> Anterior cruciate ligament injuries also negatively affect joint proprioception.<sup>2</sup> Recent research suggests that clinical depression is one of the most incapacitating psychological issues. For patients receiving ACLR, it has been discovered that preoperative depressive symptomatology is linked to a significantly worse self-reported functional result at one year postoperatively.<sup>4</sup> Additionally, up to two out of every five ACLR candidates may have noticeable depressive symptomatology before surgery, which is a rate that is four times greater than the average.<sup>5-7</sup> ACL injury has been associated with anxiety and pain response, mood disturbance, depression and feelings of decreased athletic identity.<sup>8-15</sup> In addition, subjective feelings of function and symptoms were highly associated with patient satisfaction

after ACL reconstruction.<sup>16</sup> The PHQ-9 is the 9-item depression module from the full PHQ. Major depression is diagnosed when 5 or more of the 9 depressive symptom criteria are present for "more than half the days" in the previous two weeks, with one of the symptoms being depressed mood or anhedonia. Other depression is diagnosed when two, three or four depressive symptoms appear at least "more than half the days" in the previous two weeks, with one of the symptoms being depressed mood or anhedonia. One of the nine symptom requirements ("thoughts that you would be better off dead or hurting yourself in some way") is counted if present at all, regardless of length.<sup>17</sup> The aim was to evaluate the prevalence of depression in patients with ACL injury and the Objective was to assess the correlation of pain functional activities using WOMAC (modified CRD pune version) with depression and general health in the patients with ACL injury using the Patient Health Questionnaire

(PHQ-9) and short form health survey (SF-36) questionnaire.

## METHODS

### Study design

The cross-sectional study was started after ethical approval from the IEC (AIIMS/IEC/23/64) AIIMS Rishikesh between March 2023 and September 2023 in the Department of Orthopaedics.

### Patient selection

A total of 50 male and female patients aged 15-45 with acute ACL injuries who fulfilled the inclusion criteria and, after obtaining consent, were included in the study. A standardized questionnaire collected demographics: age, height, weight, gender, education, occupation and comorbidities.

### Inclusion criteria

Both men and women aged 15-45 were included in the study. Limited knee ROM/swelling/effusion was observed during the physical examination. Diagnosed with acute ACL injury by MRI.

### Exclusion criteria

Previous H/O of knee septic OA. Dislocation of patella. Any previous surgery of the knee. Any inflammatory arthritis affecting the knee. Any spine deformity/LCS/ or associated radiculopathy due to back-ache may interfere with ADL. Osteoarthritis knee.

### Statistical analysis

Age and body mass index (BMI) followed the normal distribution, while the rest of the variables did not follow normal distribution.

Descriptive statistics included frequency tables. The mean and standard deviation were used; the median and interquartile range were used for data that was not normally distributed. When comparing means between two sets of normally distributed data, the t-test was used and the Chi-square test was used for continuous variables. All questionnaire scores were presented as mean (SD), followed by a 95% confidence interval. Data were analyzed with IBM SPSS software version 19.0 and significant p values of 0.05 were considered.

## RESULTS

The study found statistically significant differences in the SF-36 categories of emotional problem (p value 0.03) and general health (p value 0.00), indicating disparities in emotional well-being and perceived general health between groups. Other variables, such as age and BMI, WOMAC scores (pain, stiffness, ADL and total) and PHQ9 scores (depression severity), showed no statistically significant differences (p value>0.05). Similarly, there were no significant differences in most of the SF-36 characteristics, including physical function, physical health, energy/fatigue, social functioning, pain and health changes Table 1.

The correlation analysis found no statistically significant connections between WOMAC scores and the PHQ9 or SF36 dimensions. Although a moderate positive connection existed between WOMAC and the SF36 pain component ( $R=0.30$ , p value 0.34), it did not achieve statistical significance. The other relationships between WOMAC and SF36 dimensions were minor ( $R$  values ranged from -0.07 to 0.18, p value >0.05). These findings indicate considerable disparities in emotional and general health, but functional status, depression and quality of life have limited associations in these individuals Table 2.

**Table 1: Demographics variables.**

Variables	Mean±SD	P value
<b>Age (years)</b>	61.60±8.9	0.32
<b>BMI</b>	26.5±4.2	0.51
<b>WOMAC</b>		
Pain	5.61±3.50	0.33
Stiffness	2.77±1.40	0.06
ADL	24±9.24	0.11
Total	32.3±13.16	0.11
PHQ9	9.10±3.51	0.30
<b>SF36</b>		
Physical function	26±11.21	0.87
Physical health	28.5±12.5	0.27
Energy/fatigue	29.46±13.72	0.42
Emotional problem	28.24±8.69	0.03
Social functioning	31.14±12.6	0.11

Continued.

Variables	Mean±SD	P value
Pain	29.32±9.10	0.44
General health	29.32±13.08	0.00
Health changes	27.79±8.85	0.62

**Table 2: Correlation of WOMAC with PHQ and SF-36.**

Variables	WOMAC
<b>PHQ9</b>	
R	-0.22
P value	0.12
<b>SF-36</b>	
<b>Physical function</b>	
R	0.05
P value	0.73
<b>Physical health</b>	
R	0.10
P value	0.48
<b>Energy/ fatigue</b>	
R	-0.05
P value	0.73
<b>Emotional problem</b>	
R	0.18
P value	0.21
<b>Social functioning</b>	
R	-0.07
P value	0.62
<b>Pain</b>	
R	0.30
P value	0.34
<b>General health</b>	
R	0.08
P value	0.58
<b>Health changes</b>	
R	0.17
P value	0.23

## DISCUSSION

The study's findings reveal essential insights into the association between emotional well-being, perceived general health, functional status, depression severity and quality of life in people with ACL injuries. Statistically significant differences were seen in the SF-36 emotional issues (p value 0.03) and general health (p value 0.00), indicating that ACL injuries disproportionately affect emotional well-being and perceived health status. These inequalities highlight the importance of a comprehensive biopsychosocial approach in healing ACL injuries, as emotional and general health are key components of recovery.

The strong impacts on emotional difficulties and general health are consistent with previous research showing the psychological burden of ACL damage. In the study by Ardern et al, 2013 it was found that individuals suffering

from ACL injuries frequently express emotional distress, such as anxiety and depression. The increased emphasis on physical therapy may unintentionally ignore these psychological barriers, thereby delaying recovery and influencing long-term outcomes.<sup>18</sup> In contrast to the observed differences in emotional well-being and overall health, there were no significant differences in age, BMI, WOMAC scores or PHQ9 depression severity scores. This lack of correlation implies that, while emotional well-being is harmed, functional impairments and depression severity may not differ considerably between groups. These findings are consistent with prior research by Czuppon et al, who found diverse psychological responses to ACL injuries that are not always directly connected to physical capability.<sup>19</sup>

The correlation analysis indicated no statistically significant relationship between WOMAC scores and the PHQ9 or SF-36 components. Although not statistically

significant, the moderate positive connection between WOMAC and the SF-36 pain component ( $R=0.30$ ,  $p=0.34$ ) implies a potential interaction between pain and subjective quality of life. This result is consistent with previous research done by Filbay et al which suggests that chronic pain reduces quality of life but does not always result in severe functional or psychological impairments.<sup>20</sup> The findings of this investigation have significant clinical consequences. The observed discrepancies in emotional well-being and overall health highlight the importance of psychological assistance as an essential component of ACL damage therapy. Incorporating mental health tests, such as the PHQ9, alongside physical measures like the WOMAC may allow for a more comprehensive healing process. Furthermore, interventions aiming at improving perceived general health, such as patient education and counselling, have the potential to improve outcomes significantly.

The study's findings should be understood in light of its limitations, particularly the cross-sectional technique, which limits causal inferences. Future longitudinal studies could investigate how emotional well-being and overall health change during healing. Furthermore, a greater sample size may improve the ability to detect minor correlations and provide a more detailed knowledge of the interactions between psychological and functional characteristics.

## CONCLUSION

This study found significant differences in emotional well-being and perceived overall health among those with ACL injuries, with no correlation between functional status, depression severity and quality of life. These findings highlight the necessity of addressing emotional and psychological elements in addition to physical rehabilitation to achieve the best recovery outcomes.

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