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CORRELATION OF SELF-EFFICACY AND PHYSICAL PERFORMANCE IN PATIENTS WITH CHRONIC NON-SPECIFIC LOW BACK PAIN

Physiotherapy

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ABSTRACT

Introduction- Low back pain (LBP) is the most common musculoskeletal problem globally affecting the activities of daily living. Evidence suggests that CNSLBP affects the self-efficacy and physical performance measures but there is lack of evidence showing correlation of self-efficacy and physical performance test. This study aims to assess the Correlation of Self Efficacy and Physical performance with one minute sit to stand test and timed up and go test in patients with chronic non-specific low back pain. **Materials & Methods-** This cross-sectional analytical study assess the correlation of self-efficacy with one minute sit to stand and timed up and go test as physical performance test in 50 patients with chronic non-specific low back pain among the age group of 20-40 years. **Results-** the mean age of the patients was 31±5.4 year, mean value of pain self-efficacy score was 36±5.6, mean value of one minute sit to stand test was 19±2.8 repetitions in one minute, and, the mean value of timed up and go test was 10±1.9 Seconds. The Pearsons correlation showed significant weak positive correlation of pain self-efficacy questionnaire with one minute sit to stand (r=0.44) and no correlation was found between timed up and go test with pain self-efficacy questionnaire(r=0.22). **Conclusion-** Pain self-efficacy questionnaire showed significant weak positive correlation with one minute sit to stand test and no correlation was found with timed up and go test.

KEYWORDS

Chronic Non-Specific Low Back Pain (CNSLBP), one minute sit to stand, Physical performance, Self-efficacy, timed up and go test.

INTRODUCTION

Low back pain (LBP) is the most common musculoskeletal problem globally. Aimin Wu et al conducted the study on Global low back pain prevalence and years lived with disability from 1990 to 2017 over the estimates from the Global Burden of Disease Study 2017 and found that the region with the highest number of years lived with disabilities was South Asia which also includes India (10.8 million), followed by East Asia. (7.7 million)(Wu et al., 2020). According to systematic review and meta-analysis by Gautam M Shetty et al., the lifetime prevalence of low back pain in India 66% (95% CI 56-75%). The lifetime prevalence rate of LBP in the Indian population is higher compared to global and other ethnic populations affecting a large proportion of the population, especially among women, rural population and in elementary workers.(Shetty et al., 2022)

According to diagnostic triage of LBP, non-specific LBP is the largest group representing approximately 90–95% of LBP patients compared to the others, namely radicular LBP and specific LBP.(Bardin et al., 2017) The majority of acute low back pain cases resolve in two to six weeks. However, delayed diagnosis and inadequate treatment leads to recurrent, episodic of LBP (sub-acute LBP), a small percentage of which eventually progresses to chronic LBP.(Balagué et al., 2012) certain individuals with low back pain have the symptoms for the longer period than the usual time for recovery with respect to tissue healing, level of pain experienced, functional limitation and disability which remains disproportionate to the structural impairments leading to chronic non-specific low back pain from acute and subacute stage of back pain.(Feuerstein & Beattie, 1995)

The majority of the literature that describes the role of physiotherapy in management of chronic non-specific low back pain (CNSLBP) is based on identifying and correcting physical impairments. This approach is based on classic biomedical model of disease which infers a direct positive correlation with pain, impairment, functional limitation and disability. Whereas, the Biobehavioral factors can be described as set of psychological, environmental, and psychophysiological processes which exacerbate the discrepancy among pathology, pain, impairment, functional limitations and disability.(Feuerstein & Beattie, 1995) The perception of ability to function appears to be better predictor of reduced performance than the actual impairment level in patients with CNSLBP. Evidence shows that CNSLBP affects activities of daily life and work ability. Self-efficacy is hypothesized to affect CNSLBP disability and pain by influencing how situations such as performing physical activities that are associated with pain are managed in an attempt to alleviate painful experiences.(Edmond et al., 2022)

The American Psychological Association defines self-efficacy as an individual's confidence in the ability to exert control over one's own motivation, behavior, and social environment.(Self-Efficacy Teaching Tip Sheet, n.d.) In relation to patients with CNSLBP, the definition of self-efficacy is refined to indicate a patient's overall confidence in the ability to cope and self-manage symptoms, stresses or limitations associated with a chronic non-specific low back pain.(Anderson et al., 1995) It is the current topic in chronic pain management. self-efficacy scale assesses different components of ADL and patients' perception of activities considering low back pain. Despite greater research emphasis on fear avoidance beliefs, there is lack of evidence to suggest that pain self-efficacy is a more important cognitive perceptual factor and psychological mediator in the relationship between pain and disability in patients with CNSLBP. However, the impact of pain-self efficacy on physical performance measures such as muscle strength, coordination, balance, power and agility is currently unknown.

In the literatures most of the researchers have used patient-reported outcome measures (PROMs) to assess the level of functioning and disability and physical performance in patients with CNSLBP, whereas physical performance tests are designed to assess what patients actually can do rather than what they think they can do, and can therefore capture important information about functioning that patient-reported outcome measures (PROMs) often do not.

As per the model for interrelated multidomain maladaptation associated with meaningful outcomes for individual with CNSLBP(Farragher et al., 2021), psychological and behavioral mal-adaptations i.e., fear-avoidance beliefs and low self-efficacy are associated with poorer patient outcomes, whereas there is uncertainty regarding the impact of mal-adaptations in the neuromuscular system in terms of physical performance on important clinical outcomes. The evidences are more supportive of association between CNSLBP and negative muscular adaptation, avoidance of physical activity, adopting maladaptive postures and movements and fear avoidance belief.

The evidence is somewhat supportive of association low self-confidence in physical capabilities and guarded functional movements and with functional capacity, disability and quality of life. Whereas, evidence suggest minimal to no association between impaired coordination and motor control i.e. physical performance with guarded functional movements. Also, there is minimal to no association between impaired motor control with disability and functional capacity.

Physical performance domains are areas that define different aspects of an individual's physical capabilities and skills. These domains include various abilities, including endurance, strength, flexibility, power,

speed, agility, and coordination. Physical performance tests used in patients with CNSLBP can assess these abilities like impaired coordination and motor control.(Vachalathiti et al., 2020) Previous studies suggests that one-minute sit to stand test can assess the strength of lumbopelvic hip complex and endurance whereas timed up and go test can assess the balance, reaction, and agility or speed of movement in patients with CNSLBP.

The studies reported in literature were conducted on correlation between behavioral outcomes like quality-of-life questionnaires and physical capabilities. Separate studies were also conducted on the assessment of physical performance tests and self-efficacy in patients with CNSLBP. However, there is paucity of literature regarding the correlation of self-efficacy and physical performance test in patients with CNSLBP. Furthermore, there is absence of recommendations pertaining to behavioral and physical performance assessments for the people with CNSLBP.

Therefore, this study aims to assess the Correlation of Self Efficacy and Physical performance with one minute sit to stand test and timed up and go test in patients with chronic non-specific low back pain.

Methodology

Study design

An Observational cross-sectional analytical study investigated the correlation between pain self-efficacy with one minute sit to stand and timed up and go test. 50 participants with CNSLBP were recruited by convenience sampling method.

Study Participants

Inclusion Criteria:

- Age between 20– 40years.
- A reported minimum score of 5 and <5 out of 10 on NPRS.
- Location of pain: Below the costal margin and above the gluteal folds
- With or without somatic referred (Dull aching) pain in the leg.
- NSLBP referred by an orthopedic surgeon for physiotherapy.
- Both male and females.

Exclusion Criteria

- Radicular Pain -sharp shooting in dermatomal pattern.

History Of-

- spinal surgery,
- ankylosing spondylitis or rheumatoid arthritis,
- spondylolisthesis or spondylolysis,
- spinal or pelvic fracture,
- spinal inflammation or tumor,
- osteoporosis,
- Continuous use of pain medications
- stroke,
- respiratory disease or heart disease, or
- Pregnancy.

Recruitment Process And Ethical Consideration

The written informed consent was obtained from the subject after explaining about the study in their own language the subject can understand. Subjects were asked to score Pain self-efficacy questionnaire and score was recorded. Each subject then performed one minute sit to stand test in which number of repetitions were recorded and after the rest period of 2 minutes subjects were asked to perform timed up and go test of which the time in seconds was recorded to complete the test.

Data Analysis And Results

This study analyzed the correlation of Pain self-efficacy with physical performance by using one minute sit to stand and timed up and go test. Descriptive statistics and Spearmon's correlation was done by using Graph-pad prism software.

Basic Characteristics Of Participants

The demographic characteristics of the study population are given in Table 1.

Table 1- The Demographic Characteristics Of Study Population.

Characteristics	Mean±S.D.
Age in year	31±5.4
Gender	
Male	52%
Female	48%

Descriptive Statistics

Table 2 represent the descriptive statistics for the outcome measures Pain self-efficacy, one minute sit to stand and timed up and go test.

Table 2- Descriptive Statistics For Outcome Measures.

Outcome variables	Mean	Std. Deviation	Std. Error of mean
Pain Self efficacy score	36	5.6	0.8
One minute sit to stand (No. of repetitions)	19	2.8	0.41
Timed up and go test (in Sec.)	10	1.9	0.8

Correlation Analysis

Pearson's correlation determined the correlation of pain self-efficacy with one minute sit to stand and timed up and go test. The Pearsons correlation showed significant weak positive correlation of pain self-efficacy questionnaire with one minute sit to stand ($r=0.44$, $p=0.001$) and no correlation was found between timed up and go test with pain self-efficacy questionnaire ($r=0.22$, $p=0.127$).

Table 3- Correlation Of Pain Self-efficacy With Physical Performance Tests-

Pain Self-efficacy Score Vs	R-value	p-value	Significance
One Minute Sit to Stand	0.44	0.001	Yes
Timed up and go test	0.22	0.127	No

DISCUSSION

This study explored the correlation of Pain self-efficacy with physical performance test. One minute sit to stand and timed up and go test were used to assess the physical performance.

The mean score of pain self-efficacy questionnaire was $36\pm_{5.6}$ which was closer to the higher score i.e. 40. However, the 32.65%, subjects in this study reported PSEQ score of 40-60, 55.1% reported 30-39.99 and 12.24% reported score of less than 30.

Correlation Of Pain Self-efficacy With One Minute Sit To Stand Test-

The results of the study showed weak but positive significant correlation between pain self-efficacy and one minute sit to stand test ($r=0.44$, $p=0.001$). This indicates that if the pain self-efficacy score is better there are increased number of repetitions with one minute sit to stand test. Literature reports that one minute sit to stand reflects the functional integration of neuromuscular coordination and dynamic balance which assesses lower limb strength and endurance.(Crook et al., 2017; Yanagawa et al., 2016). According to a study conducted by Vilarinho et al, the median repetitions of one minute sit to stand in young adults (from 20-24 years) can range from 41-57 for men and 39-55 for women, while in older adults (75-79 years), it can range from 25-37 for men and 22-30 for women.(Vilarinho et al., 2024). However, there is currently no normative reference value for individuals aged 20 to 40 who suffer from chronic non-specific low back pain (CNSLBP), in this study we found 19±2.8 mean repetitions of one minute sit to stand test. Also, to the best of our knowledge there are no studies examining the relationship between Pain Self-Efficacy Questionnaire (PSEQ) score and one-minute sit-to-stand test.

The results reported by Asante et al and La Touche et al are similar to the findings of this study in subjects with Chronic low back pain. However, in their studies, lifting tasks were used as a physical performance test measure and functional self-efficacy was assessed. Asante et al reported that functional self-efficacy (confidence in performing specific tasks) predicts actual spinal function such as lifting more effectively than general pain control beliefs or anxiety.(Asante et al., 2007) La Touche et al. compared high vs. low self-efficacy groups among individuals with non-specific chronic low back pain. The results of low self-efficacy group exhibited reduced lumbar range of motion, worse postural stability, and higher pain during lifting tasks.(Touche et al., 2019)

Correlation Of Pain Self-efficacy With Timed Up And Go Test-

In this study no correlation was found between Pain Self-Efficacy Questionnaire (PSEQ) scores and Timed Up and Go (TUG) test performance. Champagne et al. (2012) also found similar results in there comparative study of older women with and without CLBP and found no significant correlation between falls-related self-efficacy and

mobility scores or TUG time. This suggests that confidence in balance might not directly influence TUG performance in this population, supporting the idea that general balance confidence may not directly impact the quicker-paced TUG test.(Champagne et al., 2012)

The mean time to complete TUG test in this study was 10±1.9 seconds, which is slightly greater than the normative reference time to complete TUG i.e. 8.56±1.3 in healthy young adults in the age group of 20-40.(Kear et al., 2017).

The study conducted by Adegoke, Babatunde, and Oyeyemi (2012) found significant negative correlations between pain self-efficacy and pain intensity, as well as between functional self-efficacy and TUG in OA knee patients. However, they noted that the correlations were low, suggesting that while there's a relationship, self-efficacy might not be the primary determinant of TUG performance, while the pain intensity playing a more significant role. (Adegoke et al., 2012) Currently, no studies have been reported on the association between the correlation of pain self-efficacy questionnaire score and TUG test in CNSLBP individuals.

Trinidad-Fernández et al. (2020) investigated chronic low back pain (CLBP) patients using an instrumented TUG test and found a strong association between patient perception disability scores (Roland-Morris Disability Questionnaire) and TUG test.(Trinidad-Fernández et al., 2020). Also, Hirano et al, observed that TUG performance is linked to pain levels, disability, and quality of life in individuals with low back pain.(Hirano et al., 2014) This suggests that TUG may be more closely related to pain and self-perception of disability than pain self-efficacy. Whereas in this study we have not assessed the patient's perception of functional disability.

The finding of no correlation between Pain Self-Efficacy Questionnaire (PSEQ) scores and Timed Up and Go (TUG) test performance in this study, particularly within a young adult population (20-40 years old), could be due to:

1. Near Normative TUG Values

The mean TUG scores obtained in this study were close to the established normative data (8.56±1.3) for young adults(Kear et al., 2017), indicating that the participants, despite potentially experiencing chronic low back pain (CNSLBP), maintained good functional mobility.

2. TUG Test Reflects Practiced Daily Activities

The TUG test simulates everyday functional movements, such as standing up from a chair, walking a short distance, turning around, and sitting down again.

These are actions regularly performed by individuals in their daily lives, including those with CNSLBP.

Frequent practice and familiarity with these tasks may lead to proficient performance, regardless of variations in pain self-efficacy. Research indicates that exercise and physical activity can improve pain severity, physical function, and quality of life.

3. Good Functional Mobility In Young Adults With CNSLBP

Chronic non-specific low back pain (CNSLBP) in young adults, while potentially affecting pain perception and self-efficacy, might not significantly impede basic functional mobility tasks like those assessed by the TUG test.

Younger individuals typically possess better inherent strength, balance, and coordination, which could enable them to perform the TUG test efficiently even with some degree of pain or lower pain self-efficacy.

CONCLUSIONS

This study revealed that the individuals with higher pain self-efficacy scores tend to demonstrate improved physical performance. Specifically, if the the pain self-efficacy score is better there are increased number of repetitions with one minute sit to stand test. However, no correlation was found between PSEQ scores and the Timed Up and Go (TUG) test. The TUG test is often considered a relatively easier form of mobility testing compared to the 1-minute sit-to-stand test (1-min STST), which requires more repetitive muscle exertion. The fact that the 1-minute STST showed a significant weak positive correlation with the PSEQ in this study suggests that more demanding functional tasks may be more sensitive to variations in pain self-efficacy. One minute sit to stand test can be safely used in clinical setup for routine assessment and treatment planning of patients with CNSLBP in order to assess physical performance, functional capacity, and for treatment monitoring response. However, there is need to explore the association of pain self-efficacy and TUG test with larger sample size of CNSLBP.

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