

Association between Self Report Low Back Pain and Lower Limb Function in Middle Aged Person with Mechanical Low Back Pain

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I. Introduction

Low back pain can be classified into nonspecific and mechanical. mechanical low back pain arises from the spine, inter vertebral disks or surrounding soft tissues ¹. It involves radiculopathy, osteoporotic and other vertebral fractures, degenerative conditions including degenerative lumbar scoliosis, bone tumors and cancers, spinal infections, cauda equine syndrome etc². Back Pain lasting for at least 3 months is referred as chronic back pain.³

Radiculopathy is one of the most common sign of low back pain, which is due to the compression of nerve roots or spinal meninges by degenerated spinal structures. According to the level of compression the clinical picture varies. It can give neurogenic claudication characterized by numbness and heaviness of legs after prolonged walking. Osteoporotic vertebral fractures are more common in post-menopausal women, approximately 25% of post-menopausal women suffer from vertebral compression fracture, the most common mechanism is flexion movement or trauma that leads to anterior wedging⁴. Degenerative conditions and the scoliosis associated with will give disabling lower back pain due to the asymmetrical bio mechanical load on the concave part of the vertebrae, however there is no association reported between low back pain and cobs angle. It can cause bone marrow oedema as well. The location of bone marrow oedema is frequent on the concave side of the curve. One percentage of the population suffer from back pain due to spinal tumors. Majority are metastatic tumors, only a few are primary spinal tumors. Seniors are more unlikely to get primary tumors. Typically, the pain is localized, progressive, un remitting or radiating and aggravates with movement, worse at night and cannot get decreased by rest. Vertebral osteomyelitis is another life-threatening infectious disease which will give lower back pain. Staphylococcus Aureus is the most common organism secondary to tuberculous vertebral osteomyelitis. Cauda equina syndrome is another common cause of low back pain which is due to the compression of multiple lumbar and sacral nerve roots in the spinal canal that leads to bowel and bladder and sexual dysfunction.⁵

Low back pain leads to the reduction in muscle power of lower limb significantly. The hip muscles are linked with lumbar paraspinal muscles via thoracic lumbar fascia, which allows the load transfer from lumbar spine to the lower extremities, so that low back pain and hip function are related and vice versa.⁶

Previous studies are mostly about nonspecific low back pain and they don't specify the reason for the pain. So, this study specifically considers mechanical causes of lower back pain. The purpose of this study is to determine the association between mechanical low back pain and level of lower limb function. Because LBP is one of the leading causes of pain and disability in adults, it is important to find pragmatic treatments that not only treat the pain, but also decrease disability⁶

II. Methodology

A single blind, Observational study design is used in this study. The study was performed from October 2020 to February 2021 in Mangalore. The study protocol was approved by Institutional Ethical Committee (AJEC/REV/114/2021).

PARTICIPANTS

Study participants were recruited from October 2020 through February 2021. Patients with Mechanical low back pain diagnosed from an orthopedic OPD, patients with quadrant test positive, age group of 30 to 50 years & patients who are able to understand Nordic musculoskeletal questionnaire, Oswestry disability index and lower limb function scale are included in the study. The participants were excluded, if they are taking any pain killer medications and if they have any other injuries, fractures or infections of any of the lower extremities and the persons with a previous lower extremity surgery. Convenient sampling technique is used to collect the sample for the study. On the basis of the study conducted by Kahraman T, Assuming the correlation between low back pain and lower limb function with 0.5 significance, assuming 95% of confidence interval and 80% of power the sampling size estimated for the study was 23.

$$n = \frac{[Z_{1-\alpha/2} + Z_{r-\beta}]^2 [1-r^2]}{r^2}$$

EVALUATION

The researcher recruited the participants according to inclusion criteria. The participants were asked about their site of pain using Nordic musculoskeletal questionnaire which is valid and reliable. X ray, MRI and other radiographic images are used to confirm diagnosis.

PROCEDURE

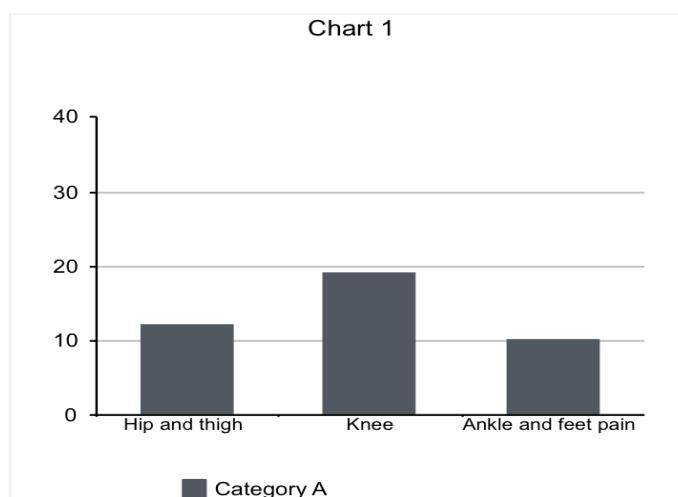
Participants were selected according to the inclusion and exclusion criteria. Participants were asked to fill nordic musculoskeletal questionnaire, lower limb function scale and Oswestry disability index. Total of 23 participants were selected for the study and the data taken was analyzed by using Karl Pearson's coefficient.

STATISTICAL ANALYSIS

Karl Pearson's coefficient is used to correlate lower limb function with disability due to mechanical low back pain

III. Results

Frequency of lower extremity pain in persons with mechanical low back pain

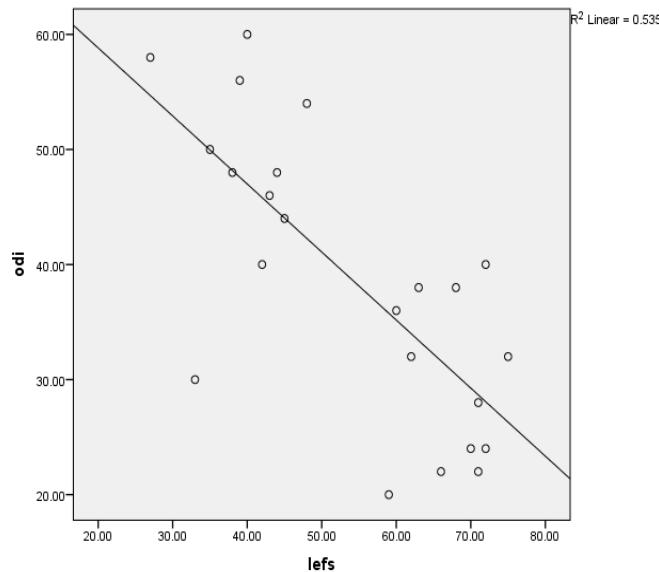


The study found that the persons with mechanical low back pain had 43 % of hip and thigh pain, 82% of knee pain and 52 % of ankle and feet pain.

Correlation between lower back pain and lower limb function

Correlations		
	LEFS	ODI
Pearson Correlation	1	-.731**
Sig. (2-tailed)		0.000
N	23	23

**Correlation is significant at the 0.01 level (2-tailed).



The study showed negative correlation of lower extremity function to the lower limb disability with 0.01 negative correlation. Hence decline in lower limb function and disability occurs together in middle aged patients with mechanical low back pain.

IV. Discussion

Low back pain usually defined as pain, muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain. One of the main problems with low back pain is disability.¹⁹ Disability means restricted function, limitation of activities and restriction of participation in life situations. Disability always accompany low back pain, varies in extend often temporary or essentially permanent and the extend of disability is slightly greater in males, and extend of disability increase with age²⁰. Low back pain will be associated with almost all instrumental activities of daily living²¹. It affects the physical, psychological, emotional, financial and social aspects of a person's life. Back pain has increased the attention in the community because of diminished abilities to perform day to day activities. According to the cause of pain low back pain is classified as mechanical and nonmechanical. The most back pains in general practice are from dysfunctions in the elements of mobile segments that is the two apophyseal joints, inter vertebral joints (with its disk) and the ligaments and its muscular attachments. This problem, often referred to as mechanical low back pain. And the pain can be radicular or non-radicular. Radicular pain is due to the nerve root compression and non-radicular pain will be localized to an area and does not involve neurologic elements and occurs usually sudden after any twisting event.²³

Mechanical back pain is also associated with neurological signs of atrophy of leg muscles, inability to walk on heels or toes, weakness of dorsiflexors, heaviness of lower limb, etc. which will affect the lower limb function.²² Chronic low back pain leads to progressive atrophy of lower limb and back muscles, and if person immobilize the limb it can lead to peri muscular and inter muscular fibrosis that will only be resolved once the patient gets back to normal activity.²⁴ The people with lower back pain demonstrates more lower limb complaints as compared to normal population, and studies shows that they are reporting more disability.

The purpose of the study is to find the association between lower back pain and the lower limb function in middle aged population with mechanical low back pain.

The study by Wien Klin Wochenschr also found that the mechanical low back pain is associated with activity limitations and they found that the lower limb function reduced significantly by 45 %.²⁵

Pradeep Suri did a study and found persons with low back pain complaints of knee pain more as compared to persons without lower back pain with a p value of 0.0001 and r value 1.0 which is similar to the present study.²⁶

The reason for the association of low back pain and lower limb function is that the lower limb movements create force on the spine and they can affect lumbopelvic region. The patients with low back pain often present malalignment of pelvis and posture issues and the patients with LBP usually had tight hamstring, psoas muscles and quadratus lumborum and weak gluteus and abdominals and restricted hip motion

V. Limitations

The population was not appropriate for the scales, we used and the educational standards of the patients were not considered in this study. The sample size was so small and the genders are not individualized in the present study.

VI. Conclusion

The study concluded that there is a strong negative relationship between lower limb function and disability in the middle-aged persons with mechanical low back pain. As the lower limb function reduces, the disability increases.

CONFLICT OF INTEREST

There is no potential conflict of interest relevant to this article was reported.

Acknowledgement

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