

ORIGINAL ARTICLE

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RELATIONSHIP BETWEEN BALANCE AND PHYSICAL FUNCTION IN OLDER ADULTS WITH OSTEOARTHRITIS OF KNEE JOINT

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ABSTRACT:

BACKGROUND: OA knee is one of the commonest cause of disability in Elderly individuals which can cause functional decline and balance impairment which leads to difficulty in Activities of daily living hence this study was conducted to evaluate the balance and physical function in OA knee patients using simple clinical test so that the patients from the rural area can also be evaluated where advanced measures are not available. **METHOD:** In this cross-sectional observational study, the participants were elderly in community and patients coming to OPD included in convenient sampling both male and female patients with OA knee joint. 60 participants were assessed for Balance and Physical function using Mini-BEST and FTSTST respectively and co-relation between Balance and Physical function. **RESULT:** The results show that the balance and physical function was affected by the OA and the impact was greater according to the severity and also co-relation shows that as the balance impairment was more the ability to perform the physical function was reduced in OA knee patients

KEY WORDS: Osteoarthritis, Balance, Physical Function, Mini-BEST, five times-sit-to-stand test.

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INTRODUCTION

The degenerative joint disease occurs in 85 percent of persons older than 70 years of age and is a major cause of disability. It affects both the peripheral and axial skeleton and is characterized by degeneration of cartilage, subchondral bone thickening and eburnation, and remodelling of bone with the formation of marginal spurs and subarticular bone cysts. Osteoarthritis refers to a clinical syndrome of joint pain accompanied by varying degrees of functional limitation and reduced quality of life. And it is the most common problem made in older people and the commonest cause of disability at older ages¹. The knee joint has a rich sensory innervation and has mechanoreceptors in the anterior and posterior cruciate ligaments, collateral ligaments, and menisci²⁻³. Osteoarthritis (OA) may result in changes that not only intra-capsular tissues but also periarticular tissues, such as ligaments, capsule, tendons, and muscle. Subjects with knee OA are known to have impaired proprioception compared with age matched controls⁴⁻⁵.

The ability to balance can be compromised by disease, medications, and the process of aging. Age-related changes in balance and functional task performance are well-established. When the concern is centred on the functional performance of an older adult, the ability of the individual to respond appropriately while performing everyday activities and skills may provide meaningful information. There are some outcome measures to test physical performance, The FTSSST measures the ability to perform a functional transitional movement, consideration should be given to performing the FTSSST when examining people with suspected balance disorders⁶⁻⁷. Limited research has evaluated the impact of knee OA on balance and physical function using a clinical available and easy to administer tests so in this study a clinical tests Mini-BEST and FTSTST used for evaluation of balance and physical function.

MATERIALS AND METHODOLOGY

Outcome Measures:

Mini-Balance Evaluation Systems Test (Mini-BEST)—

The Mini-BEST is a newly developed 14-item balance test. The instrument examines several postural control systems through performance of dynamic balance tasks.

FTSTS Test:

Sitting in an armless chair that was 0.43 meters from the

ground. Each participant was instructed to cross his arms over his chest and sit with his back against the upright back rest of the chair. The correct technique demonstrated for performance of the test, Timing began with word “go” and stopped when the participant’s buttocks reached the seat following the fifth stand.

Present study is a Cross-sectional study with convenient sampling conducted for one year with Sample size 60. Hypothesized frequency percentage: - 24%, confidence limit 5%, confidence level 80% was set for calculating sample size based on mean SD of one study.

Inclusion criteria 1) Older adults (Both men and women of Age 60-80 years). 2) Diagnosed Osteoarthritis of Knee joint. Exclusion criteria -1) History of recent B/L or U/L knee replacement. 2) Had any medical conditions that would compromise physical function. 3) Required another person or an assistive device to walk.

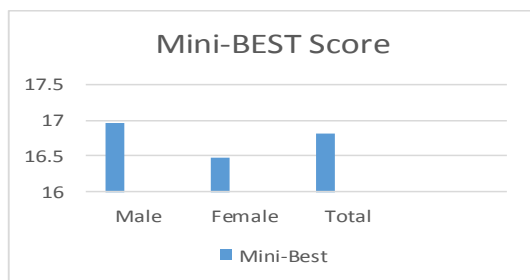
This study was conducted in the Department of Community Physiotherapy OPD and in community through camp and visit to Old Age Home, the study protocol was approved by the Institutional Ethical Committee of College Physiotherapy. Assessment was done for OA knee and Patients with osteoarthritis of knee joint were enrolled in the study. Written informed consent was obtained from all participants after explanation of the details of this study and its benefits and risk in their own language or a language the patient able to understand. After approval of Ethical committee, the recruitment initiated. Subjects were selected based on Inclusion and Exclusion criteria by convenient sampling technique. The demographic data was obtained from assessment form, then patients was Asses for chair rise functional performance measure test by FTSTS Test, and Balance Assessment using Mini-BEST. Then the data was noted on the data collection sheets for further calculation, after completion of the data collection analysis done using appropriate static tests.

RESULTS:

Results showing the scores of Mini-BEST and Five Times Sit-to-Stand test time tabular and graphical presentation of the study population.

Table No.1 : Mean Values of Mini-BEST in Older adults with OA knee.

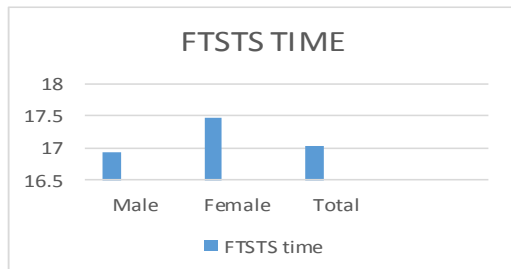
Scale	Male Mean ±SD	Female Mean ±SD	Total Mean ± SD
Mini-BEST	16.97±4.4	16.47±4.4	16.81±4.44



Graph No.1 : Bar diagram showing the mean values of Mini-BEST scale score in both male and female older adults with OA knee.

Table No.2: Shows the mean values of FTSTST score in older adults with OA knee

Scale	Male Mean ±SD	Female Mean ±SD	Total Mean ± SD
FTSTST	16.94±6.13	17.48±4.5	17.04±5.66



Graph No.2: Bar diagram showing the mean values of FTSTST scale score in both male and female older adults with OA knee.

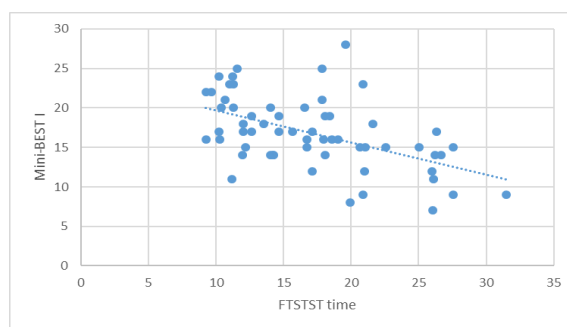
Table No.3: Shows the mean values of score OA severity wise

	Mean-SD (Mild)	Mean-SD (Mod)	Mean-SD (severe)	H-statistic	p value
Mini-BEST	20.05±2.7	16.62±3.8	11.6±3.06	Kw = 24.54.	<0.0001 **
FTSTST	11.70±2.3	17.13±3.5	26.39±2.5	Kw = 38.960.	<0.0001 **

Co-relation of FTSTST Time & Mini-BEST score

The Pearson Correlation Coefficient Test was used to find Association Balance and Physical function i.e. Association between Mini-BEST & FTSTST in older adults with OA. Correlation coefficient (r): -0.5171. 95% confidence interval: -0.6816 to -0.3029. Coefficient of determination (r

squared) = 0.2674. The Value of R is -0.5179.



Graph No.3: Co-relation of FTSTST Time & Mini-BEST score.

This is a Moderate Negative Co-relation which means there is a tendency for high FTSTST time to go with Low Mini-BEST scores & (vice versa).

DISCUSSION:

To our knowledge very few studies done before to find out the association between balance and physical function in OA knee patients According to severity of OA knee using simple clinical test also Limited research has evaluated the impact of knee OA on balance and physical function using a clinical available and easy to administer tests so in this study a clinical tests Mini-BEST and FTSTST used for evaluation of balance and physical function. In this study our aim was firstly evaluated the balance in OA knee patients using Mini-BEST and Physical function using FTSTST time. And comparison done between male and female for Mini-BEST score and FTSTST Then we co-related Balance and Physical function. The sit-to-stand motion is a frequently executed activity that is affected by weakness in the quadriceps-femoris muscle and knee joint pain in patients with knee OA. five times sit-to-stand test sensitive measure of functional compensations typical of knee OA pathology⁸. Bohannon R.W 2000, Meta-analysis results “demonstrated that individuals with times for 5 repetitions of this test exceeding the following can be considered to have worse than average performance” o 60-69 y/o 11.4 sec o 70-79 y/o 12.6 sec o 80-89 y/o 14.8 sec. has given age wise normative values for sit-to-stand time. In our study average age was 65.56±5.44 and mean and SD for sit-to-stand test time is 17.04±5.66 suggestive of the time required for participants in our study required more time to complete the test hence exceeding the range suggested by bohannon study.

Findings in our study suggest that the time for the FTSTST was greater in females when compared to male and also the patients with severe OA required more time to complete the test when compared to mild and moderate OA. also we have compared the time required for completion of Five times sit-to-stand test among the participants diagnosed with Mild, Moderate & sever OA knee which was 11.70 ± 2.3 , 17.13 ± 3.5 & 26.39 ± 2.5 respectively it shows that time required to complete sit-to-stand test was greater for the severe OA knee group when compared to mild and moderate group. Marco Godi, Franco Franchignoni, et al 2013, found the high reliability levels of the Mini-BESTest, confirmed those of the BBS, and proved the validity of both scales for measuring balance function and its change over time⁹. A study done by Rumpa Boonsinsukh et al, 2016, demonstrated that the MiniBEST was the accurate tool for identifying older adults with risk of falls or balance deficit, this study suggest cut-off score for the Mini-BEST test is 16/28, this cut-off score is similar range in another study which reported 17.5/28 as cut-off for predicting history of fall or balance impairment in stoke patients. Findings in our study with Mean and SD for Mini-BEST is 16.81 ± 4.44 is in the same range showing the balance impairment in OA knee patient. Also we compared the scores of Mini-Best as per severity of OA as mild, moderate, & sever and values are 20.05 ± 2.7 16.62 ± 3.8 11.6 ± 3.06 respectively showing that The score for Mini-BEST was higher in patients who diagnosed with Mild OA when compared to moderate or severe OA knee. Our study concluded that Balance for the patients with OA knee was decreased and also analysed that balance was decreased according to the severity of OA knee. Similarly, the performance of Physical function of same subject was decreased.

Clinical Implication The outcome measures used in our study shows the Balance and Physical function in OA knee which are simple clinical test and can be performed at rural setup where advanced measures of balance and Physical function are not available.

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CONFLICTS OF INTEREST: None

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