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CORRELATION OF PAIN, BALANCE AND FUNCTION IN SUBJECTS WITH OSTEOARTHRITIS KNEE

Orthopaedics

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ABSTRACT

Background: Knee osteoarthritis (OA) is a joint disease which results from breakdown of joint cartilage and underlying bone. Its most common symptoms are joint pain, stiffness, decreased range of motion, decreased muscle power. OA may cause problems in function and activities of daily living (ADL) in the affected patients. The objective of this study was to find the correlation between pain, balance and function in patients with knee OA.

Methodology: An observational study was conducted in physiotherapy outpatient department on patients having OA of knee joint diagnosed by the orthopaedic department. Thirty subjects, both males and females, diagnosed with OA knee, above age of 40 years were included in the study by convenience sampling. Outcome measures assessed were NPRS both on activity and at rest, knee ROM, knee MMT, TUG test, BMI and WOMAC score.

Result: Pearson's correlation was used to find correlation between parameters as data was normally distributed. Correlation of pain and function was found to be r= 0.511, p=0.004. Correlation of balance and function was found to be r= 0.549, p=0.002. Correlation of BMI and function was found to be r=0.023, p=0.905. Thus moderate correlation was found between pain and balance with function which was statistically significant. The mean knee ROM on left was 119.43+13.94 and on right was 122.33+14.03 degrees. The median of MMT of knee flexors and extensors on left was 4.5 and on right was 4.

Conclusion: Pain and balance affection may lead to functional impairments in subjects with osteoarthritis of knee.

KEYWORDS

Pain, Balance, Function, Osteoarthritis

INTRODUCTION:

Osteoarthritis (OA) is the most common degenerative joint disorder and a major public health problem throughout the world. It can affect any joint containing hyaline cartilage1,2 and the knees are the most commonly affected joints3. Prevalence of OA increases with age and aging is associated with decreasing physiological functions, thus leading to major health problems. Osteoarthritis is a disease of the entire joint, involving not only the joint lining but also cartilage, ligaments, and bone. It is characterized by breakdown of the cartilage, bony changes of the joints, deterioration of tendons and ligaments, and various degrees of inflammation of the synovium4. Disability is a major consequence of lower limb OA. Since knee OA is very common, the impact of such disability on the community in terms of health care utilization is high. A study by Creamer et al has shown that function in symptomatic knee OA is determined more by pain and obesity than by structural change, at least as seen on plain X-ray. Same study describes additional factors associated with disability in persons with knee OA which include increase in age, decrease in educational status, obesity, female gender, co morbidity and quadriceps muscle weakness5. Knee OA also results in balance affection and studies have shown that individuals with knee OA display some impairment in postural control, mostly under dynamic testing conditions[6].

The older population in India is gradually increasing with the better medical facilities now available. Knee osteoarthritis is a major cause of disability and may cause impairment in function and in activities of daily living. For proper and more comprehensive rehabilitation of the patient of OA, it is important to understand the relation between the impairments and the functional limitations present in the patients. So the aim of this study is to determine the correlation of pain, balance and function in subjects with osteoarthritis knee.

METHODOLOGY:

A cross sectional survey study was conducted at the outpatient physiotherapy department in a general hospital. Thirty subjects were selected by convenience sampling. Patients above 40 years of age diagnosed with bilateral or unilateral OA knee by the orthopaedic department were included. Both male and female patients were included in the study. Subjects with known neurological, cardiac, traumatic conditions and other co-morbidities were excluded from the study. Subjects were explained the study and consent was taken. Subjects were asked to fill a questionnaire which included demographic data and outcome measures. Detailed physical examination including assessment of outcome measures like Numeric Pain Rating Scale on activity and at rest, Range of motion, Body Mass Index, muscle power; balance and function was performed.

Pain was assessed using the Numeric Pain Rating Scale (NPRS) on activity and at rest. The validity and reliability of NPRS is excellent8. Range of motion (ROM) was assessed for knee flexion and extension according to the method described by Norkin et al.9. Bilateral ROM for flexion and extension were measured. Body Mass Index (BMI) was calculated by measuring the height and weight of the subject10. Muscle power of knee flexors and extensors was assessed by MMT (Manual Muscle Testing) done bilaterally according to the method described by Daniel11. TUG (Timed Up And Go) test was used to assess balance[12].

Disability and Functional Status-

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used as an indicator of pain, mobility and self-reported disability13. Subjects rated the degree of difficulty experienced in the preceding 48 hours for each of the 17 activities using a 5-level numeric verbal descriptor scale with a total subscore ranging from 0 to 68 to describe their level of physical function. The activities included in the WOMAC physical function section occur commonly on a daily basis and have faced validity for lower limb function. It also assessed the severity of pain and mobility. Higher scores indicate greater levels of difficulty.

Findings were then correlated. Statistical package for the social science (SPSS), version 16.5 was used for data analysis. Level of significance was kept at 5%. Pearson's test was applied between BMI and WOMAC, TUG and WOMAC and NPRS (on activity) and WOMAC.

RESULTS:

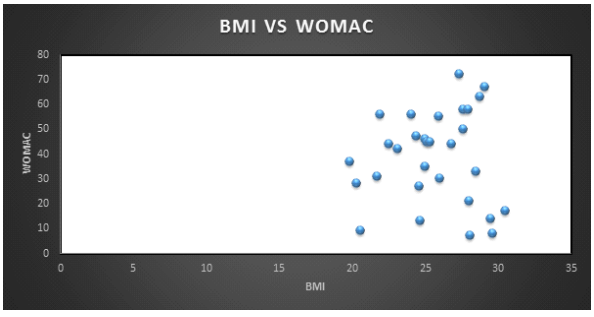
Thirty subjects were included in the study. Demographic data is shown in table 1. There were 12 males and 18 females with a mean age of 57.13+12.71 years. Eight subjects had left OA, four had right OA and 18 had bilateral knee affection. Table 2 shows the Mean/Median of the outcome measures. Graphs 1-3 show the correlation between the outcomes.

Table 1: Demographic data

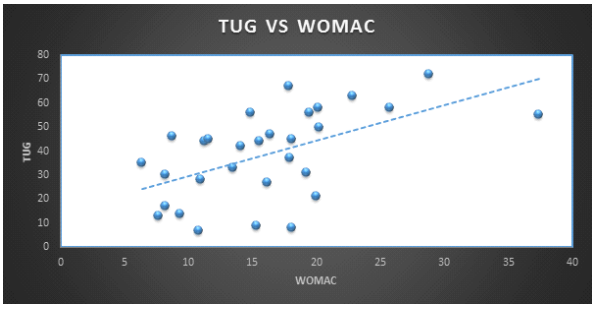
Mean Age	Years	57.13
Gender	Male/Female	12/18
Side of affection	Left/Right Bilateral	8/4 18

Table 2: Mean of outcome measures

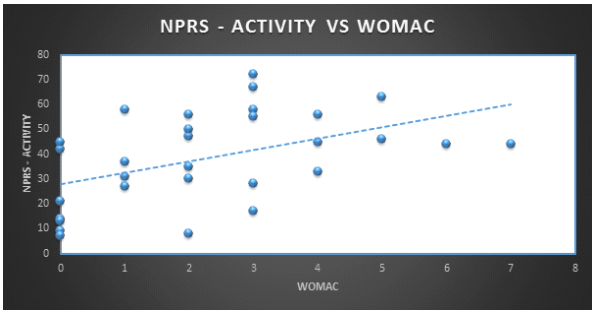
NO.	Outcome measures	Mean/Median	Standard deviation
1	NPRS On activity: At rest:	 5.63 2.3	 1.85 1.91
2	BMI (kg/m^2)	25.63	2.96
3	Knee ROM left side Flexion: Knee ROM right side Flexion:	119.43 122.33	13.93 14.03
4	MMT left side Flexors: Extensors: MMT right side Flexors: Extensors:	 4.5 4.5 4 4	
5	TUG	25.62	2.96
6	WOMAC Score	38.60	18.40



GRAPH 1: Correlation of obesity (BMI) and function (WOMAC)



GRAPH 2: Correlation of balance (TUG) and function (WOMAC)



GRAPH 3: Correlation of pain (NPRS-Activity) and (WOMAC)

DISCUSSION:

In this cross-sectional study correlation between pain, balance and function in patients with knee OA was assessed. Correlation of pain and function was found to be moderate with r= 0.511, p=0.004. Pain is the main complaint among patients with knee OA, a leading cause of physical disability14. The risk of disability increases with the presence of knee pain in the community15. Thus it is important to understand the factors which contribute to disability in patients with knee OA. There are some studies which report the relationship between pain and physical functions in patients with knee OA2 . McAlindon et al. 16 demonstrated that knee pain and age are more important determinants of functional impairments in elderly subjects than the severity of knee OA as assessed by radiographic features. Similar to present study, Cubukcu et al found disability scores were significantly associated with pain and stiffness scores as measured by WOMAC7. Secondary changes occurring in the joint with increasing age cause OA to be one of the major health problems in the elderly7. A number of cross-sectional community studies15,17 found a relationship between radiographic disease severity and physical function. Radiographic status at baseline has also been shown to predict future disability in longitudinal studies18. However, knee pain is a better predictor of disability than radiographic change15,18 and, in multiple models, the association between disability and structural change may disappear altogether when pain is included17. Correlation of age and function was not done in present study.

Moderate correlation of balance and function was found in present study r= 0.549, p=0.002. A study by Hinman et al found that both subjects with OA knee and control group displayed similar postural sway on most variables measured. Significantly greater sway was noted in the OA group on a firm surface in both lateral (eyes open) and AP directions (eyes closed), as well as total sway (eyes closed). Poorer dynamic standing balance was observed in the OA group as evidenced by the step test. However, the clinical relevance of the small deficits identified remains unknown and warrants further investigation[3].

Poor correlation of BMI and function was found in the present study, r=0.023, p=0.905. Creamer et al. concluded that the function in knee OA is determined more by pain and obesity than by structural changes seen on plain radiograph5. Creamer et al concluded that self-reported disability in patients with symptomatic knee OA bears little relationship to radiographic severity, at least in subjects with over 5 yr disease duration. It is, however, strongly related to pain severity, BMI and anxiety, all of which are potentially treatable. A number of cross-sectional community studies15,17 found a relationship between radiographic disease severity and physical function. Radiographic status at baseline has also been shown to predict future disability in longitudinal studies18. However, knee pain is a better predictor of disability than radiographic change15,18 and, in multiple models, the association between disability and structural change may disappear altogether when pain is included17. Poor correlation with BMI could be seen here possibly because of a smaller sample size.

With respect to important risk factors for the development of functional limitations and disability among those with OA, the evidence provides strong support for the role of physical impairments along with other predisposing and intra-individual factors such as age; body mass index, obesity, lack of exercise, co morbid conditions, depression and depressive symptoms. Extra-individual factors included need for aids and assistance, and lack of access to public or private transportation. Interventions focused on weight and pain reduction, together with strategies designed to reduce helplessness and anxiety, are logical approaches to tackling the burden of disability associated with knee OA.

CONCLUSION:

Pain and balance affection may lead to functional impairments in subjects with osteoarthritis of knee.

REFERENCES:

1. D. T. Felson, A. Naimark, and J. Anderson, "The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study," Arthritis and Rheumatism, vol. 30, no. 8, pp. 914–918, 1987. View at Google Scholar · View at Scopus 2.
2. D. W. Puett and M. R. Griffin, "Published trials of nonmedicinal and noninvasive therapies for hip and knee osteoarthritis," Annals of Internal Medicine, vol. 121, no. 2, pp. 133–140, 1994. View at Google Scholar · View at Scopus.
3. M. A. Davis, "Epidemiology of osteoarthritis," Clinics in Geriatric Medicine, vol. 4, no. 2, pp. 241–255, 1988.
4. Alshami, Ali M. "Knee Osteoarthritis Related Pain: A Narrative Review of Diagnosis and Treatment." International Journal of Health Sciences 8.1 (2014): 85–104. Print.
5. P. Creamer, M. Lethbridge-Cejku, M.C. Hochberg; Factors associated with functional impairment in symptomatic knee Osteoarthritis, Rheumatology, Volume 39, Issue 5, 1 May 2000, Pages 490-496.
6. R.S. Hinman, K.L. Bennell, B.R. Metcalf, K.M. Crossley; Balance impairments in individuals with symptomatic knee Osteoarthritis: A comparison with matched controls using clinical test, Rheumatology, Volume 41, Issue 12, 1 December 2002, Pages 1388-1394.
7. Duygu Cubukcu, Ayse Sarsan, Hakan Alkan; Relationships between pain, function and radiological findings in Osteoarthritis of the knee: A Cross-Sectional Study, Arthritis, Volume 2012, 5 Pages.
8. Downie WW, Leatham PA et al. Studies with pain rating scales. Annals Rheum Dis 1978;37(4):378-81.
9. Norkin CC, White JC. Measurement of joint motion-A guide to Goniometery. Jaypee Publishers, Fourth Edition, Pages 243 to 249.
10. Peter J. Maud and Carl Foster. Physiological Assessment of Human Fitness. Publisher Human Kinetics. Second Edition, Anthropometry and Body Composition Measurement, Pages 185 and 186.
11. Hislop HJ, Montgomery. Daniels and Worthingham's Muscle Testing-Techniques of Manual Examination. Publisher WB Saunders Company. Pages 345 and 348.

12. Susan B. O'Sullivan and Thomas J. Schmitz. Physical Rehabilitation. Fifth Edition. FA Davis. Page 869.
13. N. Bellamy, W. W. Buchanan, C. H. Goldsmith, J. Campbell, and L. W. Stitt, Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee," Journal of Rheumatology, vol. 15, no. 12, pp. 1833–1840, 1988. View at Google Scholar · View at Scopus.
14. L. Torres, D. D. Dunlop, C. Peterfy et al., "The relationship between specific tissue lesions and pain severity in persons with knee osteoarthritis," Osteoarthritis and Cartilage, vol. 14, no. 10, pp. 1033–1040, 2006.
15. A. A. Guccione, D. T. Felson, and J. J. Anderson, "Defining arthritis and measuring functional status in elders: methodological issues in the study of disease and physical disability," American Journal of Public Health, vol. 80, no. 8, pp. 945–949, 1990.
16. T. E. McAlindon, C. Cooper, J. R. Kirwan, and P. A. Dieppe, "Determinants of disability in osteoarthritis of the knee," Annals of the Rheumatic Diseases, vol. 52, no. 4, pp. 258–262, 1993.
17. Jordan JM, Luta G, Renner J, Dragomir A, Hochberg M, Fryer J. Knee pain and knee osteoarthritis severity in self reported task specific disability: the Johnstone County Osteoarthritis Project. J Rheumatol 1997;24:1344–9.
18. Davis MA, Ettinger W, Neuhaus J, Mallon KP. Knee osteoarthritis and physical functioning: evidence from the NHANES I epidemiological follow up study. J Rheumatol 1991;18:591–8.