TO ASSESS THE BALANCE CONTROL OF ELDERLY WITH SYMPTOMATIC KNEE OSTEOARTHRITIS IN A SELECTED COMMUNITY AT KANYAKUMARI DISTRICT

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ABSTRACT

Osteoarthritis (OA) is one of the most prevalent musculoskeletal impairments worldwide, affecting 30 - 40% of the population by the age of 65 years. It is a major cause of impairments and disability among the elderly and poses a significant economic burden on the community. Individuals with knee OA suffer progressive loss of function displaying increasing dependency in walking, stair climbing and other lower extremity task. The problem under the study was to assess the balance control of elderly with symptomatic knee osteoarthritis from selected community area at Kanyakumari district. The objectives of the study were to assess the balance control of elderly with symptomatic knee osteoarthritis, and to find out the association of balance control and selected demographic variables. The descriptive research design was adopted for this study. The population selected for the study comprised of elderly with symptomatic knee osteoarthritis from selected community area at Kanyakumari district. 60 elderly were selected by non-probability purposive sampling technique. The Berg Balance Scale was used to assess the balance control. Frequency, percentage, chi square test was used to analyse the study. The result of the study revealed that 59 (98.33%) of the elderly suffered with moderate level of balance control. The findings revealed that statistically significant association was found between age and history of doing exercise and balance control of the elderly at $p=0.05$. No association was found between functional ability and other demographic variables.

Key words: Osteoarthritis (OA), musculoskeletal impairments, Kanya kumari.

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INTRODUCTION

Osteoarthritis (OA) is a major cause of disability among elderly worldwide. According to WHO worldwide 9.6% of men and 18.0% of women aged over 60 years has symptomatic OA. The prevalence of symptomatic knee OA is estimated as 12% of the US adults older than 65 years of age. The prevalence of OA in India is 22% – 39%. It is reported more among women than men (Arthritis Foundation of India). Among adults 60 years of age or older the prevalence of symptomatic knee OA is approximately 10% in men and 13% in women. The number of people affected with symptomatic OA is likely to increase due to the aging of the population and the obesity epidemic.

Balance is a complex function that requires the integration of sensory information of the position of the body and the ability to make proper motor responses to body movement³. Balance is essential for maintaining postural stability while performing daily activities⁴, and loss of balance is a common cause of falls in older people. Balance function is the ability to maintain the center of mass at the base of support. It is the interaction among sensory inputs from proprioception, visual and vestibular systems, motor systems (such as muscle strength and muscle activity), and cognitive components (Kim et al., 2011; Sturnieks et al., 2008). Balancing prevents falls and is required for many functional activities (Sibley et al., 2013). Reduced balance function is associated with an increased risk of falling, which is one of the leading causes of hospital admissions of elderly people, and could lead to other consequences such as fracture, joint dislocation, soft-tissue injury, loss of independence, and mortality (Pandya et al., 2007).

Patients with knee OA typically have impairment of proprioception within the joint or weakness in the quadriceps muscles as compared with those without knee OA. These impairments associated with the disease may explain the poorer balances within these patients. More than 50% of all OA patients and 64% of female OA patients report falling within one year^{5, 7-9}. Approximately 60% to 80% of patients with knee OA report joint instability. Poor balance control, especially during standing or movement, is one risk factor for falls that could be addressed in the knee OA population. Better standing balance has been associated with increased quadriceps muscle strength, more advanced radiographic disease severity, less varus alignment, less pain, and better proprioception (Hunt et al., 2010). Impaired balance control has been suggested to be one of the most important risk factors of falls in arthritis patients. Reduced proprioceptive acuity of the involved joints and increased postural sway in standing have been identified in patients with lower limb OA.(Williams et al.,) The purpose of this study is to evaluate the balance control of elderly with symptomatic knee osteoarthritis. Studying balance control is required to support patient independence and it has rising as key to evaluate the health status of the elderly.

PROBLEM STATEMENT

A descriptive study to assess the balance control of elderly with symptomatic knee osteoarthritis in a selected community area at Kanyakumari District.

OBJECTIVES

- To assess the balance control of elderly with symptomatic knee osteoarthritis.
- To find out the association of balance control of elderly with symptomatic Knee Osteoarthritis and selected demographic variable

MATERIALS AND METHOD

Research approach: The quantitative research approach

Research design: Descriptive research design was adopted for this study

Setting of the study: Study was conducted in selected community area

Population: elderly who were living in selected community area with symptomatic Knee Osteoarthritis

Sample size: Total sample size for this study was 60 elderly with symptomatic knee OA.

Sampling technique: Subjects of the sample will be selected by non-probability purposive sampling technique

CRITERIA FOR SAMPLE SELECTION

Inclusion criteria:

Elderly with symptomatic OA

- Age above 60 years.
- Knee pain in unilateral or bilateral
- Willing to participate in the study
- Available during data collection period

Exclusion criteria

- Unresolved neurological disorder
- History of major knee trauma
- underwent hip or knee replacement

DEVELOPMENT OF TOOL

Section A includes demographic data of the geriatrics such as age, gender, education, occupation, religion and marital status.

Section B includes clinical data such as BMI, duration of knee pain, which knee is affected, and history of doing exercise.

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Section B includes clinical data such as BMI, duration of knee pain, which knee is affected, and history of doing exercise.

Section C consisted of Berg Balance Scale (BBS) to assess the balance control of elderly. Balancing ability is currently evaluated in the clinic using composite measures such as the Berg Balance Scale. The berg balance scale consists of 14 items which includes static tasks such as sitting, standing, and movement such as turning and bending. Tasks were scored on a scale of zero (unable to perform or need assistance) to 4 (able to perform independently). Lower scores were given if participants were unable to meet time or distance requirement. Completion of the BBS required two chairs, a ruler, a step or low stool and stop watch. The BBS addressed basic balancing ability in multiple tasks. A high score indicates higher levels of balance control while the low score shows lower levels of balance control.

Total score was interpreted as follows.

0-20 – High fall risk

21-40 – Medium fall risk

41-56 - Low fall risk

ANALYSIS:**Table 1**

Frequency and percentage distribution of the sample with demographic characteristics (N=60)

Demographic Variables	No.	%
Age		
66 – 65 years	9	15.0
66 – 70 years	14	23.3
71 – 75 years	31	51.7
76 – 80 years	6	10.0
Gender		
Male	20	33.3
Female	40	66.7
Education		
Illiterate	12	20.0
Primary school	48	80.0
Higher secondary	-	-
Graduate	-	-
Previous occupation		
Sedentary workers	7	11.7
Moderately sedentary	24	40.0
Heavy workers	29	48.3
Religion		
Christian	25	41.7
Hindu	35	58.3
Muslim	-	-
Others	-	-

Table no 2

Frequency and percentage of sample with clinical data

(N=60)

Demographic Variables	No.	%
BMI		
Underweight (<18.5)	-	-
Normal (18.5 – 24.9)	22	36.7
Overweight (25 – 29.9)	38	63.3
Obese(30 – 39.9)	-	-
Duration of knee pain		
Less than 3 years	-	-
3 – 6 years	4	6.7
7 – 10 years	20	33.3
More than 10 years	36	60.0
Which knee is affected		
One knee	16	26.7
Both knees	44	73.3
Are you under any medication for knee pain		
Yes	31	51.7
No	29	48.3
Are you following any exercise		
Yes	8	13.3
No	52	86.7
If yes,		
Walking	8	13.3
Cycling	-	-
Jogging	-	-
Others	-	-

Figure 1 Balance control of samples in percentage

Table no 3: Assessment of balance control among elderly with symptomatic knee osteoarthritis.

N = 60

Balance Control	Score
Minimum Score	26.0
Maximum Score	41.0
Mean	33.45
Standard Deviation (S.D)	3.49

Table 4: Association of level of balance control of elderly with symptomatic knee osteoarthritis with their selected demographic variables.

N = 60

Demographic Variables	High fall risk		Medium fall risk		Low fall risk		Chi-Square Value
	No.	%	No.	%	No.	%	
Age							$\chi^2=9.153$ d.f=3 p = 0.027 S*
66 – 65 years	-	-	9	15.0	0	0	
66 – 70 years	-	-	14	23.3	0	0	
71 – 75 years	-	-	31	51.7	0	0	
76 – 80 years	-	-	5	8.3	1	1.7	
Gender							$\chi^2=2.034$ d.f=1 p = 0.154 N.S
Male	-	-	19	31.7	1	1.7	
Female	-	-	40	66.7	0	0	
Education							$\chi^2=0.254$ d.f=1 p = 0.614 N.S
Illiterate	-	-	12	20.0	0	0	
Primary school	-	-	47	78.3	1	1.7	
Higher secondary	-	-	-	-	-	-	
Graduate	-	-	-	-	-	-	
Previous occupation							$\chi^2=1.087$ d.f=2 p = 0.581 N.S
Sedentary workers	-	-	7	11.7	0	0	
Moderately sedentary	-	-	24	40.0	0	0	
Heavy workers	-	-	28	46.7	1	1.7	
Religion							$\chi^2=1.424$ d.f=1 p = 0.233 N.S
Christian	-	-	24	40.0	1	1.7	
Hindu	-	-	35	58.3	0	0	
Muslim	-	-	-	-	-	-	
Others	-	-	-	-	-	-	

Table 5: Association of level of balance control of elderly with symptomatic knee osteoarthritis with their selected clinical variables.

N = 60

Demographic Variables	High fall risk		Medium fall risk		Low fall risk		Chi-Square Value
	No.	%	No.	%	No.	%	
BMI							$\chi^2=0.589$ d.f=1 p = 0.443 N.S
Underweight (<18.5)	-	-	-	-	-	-	
Normal (18.5 – 24.9)	-	-	22	36.6	0	0	
Overweight (25 – 29.9)	-	-	37	61.7	1	1.7	
Obese(30 – 39.9)	-	-	-	-	-	-	
Duration of knee pain							$\chi^2=0.678$ d.f=2 p = 0.712 N.S
Less than 3 years	-	-	-	-	-	-	
3 – 6 years	-	-	4	6.7	0	0	
7 – 10 years	-	-	20	33.3	0	0	
More than 10 years	-	-	35	58.3	1	1.7	
Which knee is affected?							$\chi^2=0.370$ d.f=1 p = 0.543 N.S
One knee	-	-	16	26.7	0	0	
Both knees	-	-	43	71.7	1	1.7	
Are you under any medication for knee pain							$\chi^2=0.951$ d.f=1 p = 0.329 N.S
Yes	-	-	30	50.0	1	1.7	
No	-	-	29	48.3	0	0	
Are you following any exercise							$\chi^2=6.610$ d.f=1 p = 0.010 S*
Yes	-	-	7	11.7	1	1.7	
No	-	-	52	86.7	0	0	
If yes,							-
Walking	-	-	7	87.5	1	12.5	
Cycling	-	-	-	-	-	-	
Jogging	-	-	-	-	-	-	
Others	-	-	-	-	-	-	

*p<0.05, S – Significant, N.S – Not Significant

Table no 4 and 5 reveals that the association between balance control and duration of knee pain. The finding shows that there was a significant association between balance control and age and history of doing exercise.

DISCUSSION:

The present study result indicated that 31 (51.7%) of the elderly between the age group of 71 to 75 years, 66.7% of the elderly were male, 48 (80%) were completed primary education, 48.3% of the elderly were heavy workers, 63.3% of the elderly were overweight 36 (60%) of the elderly had knee pain 7 to 10 years. 44 (73.3%) of the elderly had knee OA affected in both knees, 31 (51.7%) of the elderly taking medication for pain, only 8 (13.3%) of the elderly are doing walking exercise and 52 (86.7%) of the elderly not doing any exercise. Berg Balance Scale was used to assess the balance control of elderly. The finding showed that majority of the elderly 98.33% had moderate level of balance control. It is affecting their activity of daily living. This was also supported by a study conducted by RS Hinman et, al., on balance impairment in individual with symptomatic knee OA. 33 people above 50 years with OA and 33 controls were participated. WOMAC OA index was used to evaluate knee pain and disability in the OA group. The result of the study demonstrated that individual with knee OA display some impairment in postural control.

CONCLUSION:

Knee OA is a most common disease which causes a major burden of physical disability. It is incurable which currently available therapeutic measures. The only way for reduction of burden of the disorder is prevention. There is need to take necessary step to increase awareness about the prevention of risk factors. Proper position of knee joint, importance of daily exercise. Regular treatment and exercise could make patients to manage the pain, maintain mobility and maintain physical function.

REFERENCES:

1. Van Saase, J. L., Van Romunde, L. K., Cats, A. R. N. O. L. D., Vandenbroucke, J. P., & Valkenburg, H. A. (1989). Epidemiology of osteoarthritis: Zoetermeer survey. Comparison of radiological osteoarthritis in a Dutch population with that in 10 other populations. *Annals of the rheumatic diseases*, 48(4), 271-280.
2. Liu, C., Wan, Q., Zhou, W., Feng, X., & Shang, S. (2017). Factors associated with balance function in patients with knee osteoarthritis: An integrative review. *International journal of nursing sciences*, 4(4), 402-409.
3. Guccione, A. A., Felson, D. T., Anderson, J. J., Anthony, J. M., Zhang, Y., Wilson, P. W., & Kannel, W. B. (1994). The effects of specific medical conditions on the functional limitations of elders in the Framingham Study. *American journal of public health*, 84(3), 351-358.
4. Moutzouri, M., Gleeson, N., Billis, E., Tsepis, E., Panoutsopoulou, I., & Gliatis, J. (2017). The effect of total knee arthroplasty on patients' balance and incidence of falls: a systematic review. *Knee Surgery, Sports Traumatology, Arthroscopy*, 25(11), 3439-3451.
5. Sibley, K. M., Beauchamp, M. K., Van Ooteghem, K., Straus, S. E., & Jaglal, S. B. (2015). Using the systems framework for postural control to analyze the components of balance evaluated in standardized balance measures: a scoping review. *Archives of physical medicine and rehabilitation*, 96(1), 122-132.
6. Levinger, P., Menz, H. B., Wee, E., Feller, J. A., Bartlett, J. R., & Bergman, N. R. (2011). Physiological risk factors for falls in people with knee osteoarthritis before and early after knee replacement surgery. *Knee surgery, sports traumatology, arthroscopy*, 19(7), 1082-1089.
7. Xing, D., Xu, Y., Liu, Q., Ke, Y., Wang, B., Li, Z., & Lin, J. (2016). Osteoarthritis and all-cause mortality in worldwide populations: grading the evidence from a meta-analysis. *Scientific reports*, 6(1), 1-7.
8. Fitzgerald, G. K., Piva, S. R., & Irrgang, J. J. (2004). Reports of joint instability in knee osteoarthritis: its prevalence and relationship to physical function. *Arthritis care & research*, 51(6), 941-946.
9. Kim, I., Kim, H. A., Seo, Y. I., Song, Y. W., Hunter, D. J., Jeong, J. Y., & Kim, D. H. (2010). Tibiofemoral osteoarthritis affects quality of life and function in elderly Koreans, with women more adversely affected than men. *BMC musculoskeletal disorders*, 11(1), 129.
10. Sturmeiks, D. L., St George, R., & Lord, S. R. (2008). Balance disorders in the elderly. *Neurophysiologie Clinique/Clinical Neurophysiology*, 38(6), 467-478.
11. Sibley, K. M., Straus, S. E., Inness, E. L., Salbach, N. M., & Jaglal, S. B. (2013). Clinical balance assessment: perceptions of commonly-used standardized measures and current practices among physiotherapists in Ontario, Canada. *Implementation Science*, 8(1), 33.
12. Hsieh, R. L., Lee, W. C., Lo, M. T., & Liao, W. C. (2013). Postural stability in patients with knee osteoarthritis: comparison with controls and evaluation of relationships between postural stability scores and international classification of functioning, disability and health components. *Archives of physical medicine and rehabilitation*, 94(2), 340-346.
13. Pandya, N. K., Piotrowski, G. A., Pottenger, L., & Draganich, L. F. (2007). Pain relief in knee osteoarthritis reduces the propensity to trip on an obstacle. *Gait & posture*, 25(1), 106-111.
14. Hunt, M. A., McManus, F. J., Hinman, R. S., & Bennell, K. L. (2010). Predictors of single-leg standing balance in individuals with medial knee osteoarthritis. *Arthritis care & research*, 62(4), 496-500.
15. Slemenda, C., Brandt, K. D., Heilman, D. K., Mazzuca, S., Braunstein, E. M., Katz, B. P., & Wolinsky, F. D. (1997). Quadriceps weakness and osteoarthritis of the knee. *Annals of internal medicine*, 127(2), 97-104.
16. Koralewicz, L. M., & Engh, G. A. (2000). Comparison of proprioception in arthritic and age-matched normal knees. *JBJS*, 82(11), 1582.
17. Brooks, P. M. (2006). The burden of musculoskeletal disease—a global perspective. *Clinical rheumatology*, 25(6), 778-781.
18. Williams, S. B., Brand, C. A., Hill, K. D., Hunt, S. B., & Moran, H. (2010). Feasibility and outcomes of a home-based exercise program on improving balance and gait stability in women with lower-limb osteoarthritis or rheumatoid arthritis: a pilot study. *Archives of physical medicine and rehabilitation*, 91(1), 106-114.