

## Pattern of Physical Activity Level, Pain Intensity, Range of Motion and Physical Function among Older Patients with Knee Osteoarthritis

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### Abstract

**Introduction:** Osteoarthritis is a chronic degenerative joint disease which is common among middle aged and elderly persons, it is a common chronic condition resulting in pain, fatigue and functional limitation, and it is the leading cause of disability affecting population older than 60 years. Despite available therapies to patients with osteoarthritis, persistent pain and joint stiffness remains a daily experience. The purpose of this study was to assess the pattern of physical activity level, pain intensity, range of motion and physical function among older patients with knee osteoarthritis in Ibadan.

**Materials and method:** The physical activity level was assessed using the International Physical Activity Questionnaire-Short Form (IPAQ) short form questionnaire, the active range of motion was assessed using a universal goniometer, pain intensity was assessed using the numerical pain rating scale, while the physical function level was determined using the timed up and go test.

**Result:** A total number of 88 elderly participants with age ranging from 60 to 91 years, participated in this study, 21 (23.9%) were males, while 67 (76.1%) were females. The mean age  $69 \pm 7.05$  years; the mean pain level was  $4.03 \pm 1.36$ ; mean ROM was  $91.730 \pm 1.930$ . Out of the 88 participants, 2 (2.30%) were physically active, 13 (14.80%) were minimally active, and 73 (82.95%) were inactive. The mean physical function level was  $13.01 \pm 3.07$  secs.

**Conclusion:** The outcome of this study suggested that physical activity level in the elderly with knee osteoarthritis is low and most of them present with pain of moderate intensity, it also suggested that elderly with knee osteoarthritis have limited range of motion, and that they have a good mobility for their physical function level. It was then concluded that there was no effect of physical activity level on the physical function of the elderly, but pain intensity affected the physical function level. It was also concluded that physical activity level has a negative influence on physical function level in elderly with knee osteoarthritis.

**Keywords:** Knee osteoarthritis; Common chronic; Physical inactivity

### Introduction

Osteoarthritis (OA) is a common chronic condition resulting in pain, fatigue, functional limitations, increased healthcare utilization and high economic costs to society [1]. Knee osteoarthritis is estimated to be the most common cause of disability, and may be affecting various aspects of patients' quality of life, with overweight and pain being factors that could be a cause of these problems [2]. It is the leading cause of disability, affecting 60%-70% of the population older than 60 years. The worldwide prevalence estimate for symptomatic osteoarthritis is 9.6% among men and 18% among women [3]. Patients in order to relieve pain had to minimize physical activity and have sedentary life [4].

The American Geriatric Society Panel on Exercise and Osteoarthritis stated that symptomatic osteoarthritis causes joint pain and tenderness, limiting one's ability, which may cause the need for assistance with activities of daily living. However, recent reports of Centres for Disease Control and Prevention, the American College of

Sports Medicine, the American Surgeon Society and the American Heart Association suggests that having an active lifestyle and mobility, has many health benefits. Physical inactivity is a health problem in patients with osteoarthritis. Various studies have confirmed the fact that there is improvement on the quality of life with increasing physical activity and maintaining efficiency, reducing disability and musculoskeletal disorders [5,6]. Despite available therapies to patients with osteoarthritis, persistent pain and stiffness remains a daily experience [7]. It has been reported that knee pain and disability are two primary concerns in patients with osteoarthritis [8].

According to the World Health Organization, physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure, while according to Cooper et al. [9] physical function is an individual's capacity to undertake every day's tasks. Emerging evidence shows that regular physical activity may play a preventive and or restorative role in delaying declines in muscle strength and physical function and reducing osteoarthritis symptoms [10]. Evidence from Randomized Controlled Trials (RCTs) has demonstrated general benefits and disease-specific benefits of physical activity. Among persons with knee OA, RCTs have shown that physical

activity programs are effective for reducing pain, improving physical performance, and preventing or delaying disability. Participation in a low impact exercise program (such as walking) can improve functional performance without adverse effects on arthritis-related symptoms [11]. Studies of patients with knee osteoarthritis found that exercise is feasible and efficacious, leading to increased strength, reduced knee pain, enhanced functional performance, and improved balance [12]. This study looked into the pattern of physical activity level, pain intensity, range of motion, and physical function among older patients with knee osteoarthritis.

### Methodology

A total number of 88 questionnaires were administered to participants with osteoarthritis who have been receiving physiotherapy treatment in the selected hospitals, and measurements were taken. Ethical approval was sought and obtained from the university of Ibadan/University College Hospital (UI/UCH) Research Committee. The approval of authorities of the various hospitals to be used was as well obtained. A cover letter was distributed with all copies of the questionnaire. These letters contained information about the purpose of the study and a consent form, followed by The International Physical Activity Questionnaire-Short Form (IPAQ-SF) which was administered to assess the physical activity level.

The Universal goniometer was used to measure the range of motion, the participant was told to lie prone on a plinth, the fulcrum of the goniometer was placed on the lateral epicondyle of the affected knee, with the movable arm of the goniometer aligned to the lateral malleolus and the immovable arm aligned to the greater trochanter, the goniometer was calibrated to zero degree before measurement was taken. The patient was then asked to bend the knee and measurement was taken by moving the movable arm of the goniometer to the new position of the leg.

The Numerical Pain Rating Scale was administered to the participants to measure pain intensity. The timed up and Go Test (TUG) was used to assess physical function with the participants starting in the sitting position. The participants stood up upon therapist’s command and walked 3 meters, turned around, walked back to the chair and sat down. The time was stopped when the participants were seated. Descriptive statistics such as frequency counts, percentages, mean ± SD was used to summarize and present the results. Inferential statistics of spearman rank difference correlation was used to investigate the relationship between the physical activity and physical function. Chi-Square test was used to determine whether the association between pain, active range of motion and physical function is statistically significant at  $p < 0.05$ .

### Results

A total number of 88 questionnaires were administered to patients with osteoarthritis who have been receiving physiotherapy treatment in the three selected hospitals, and measurements were taken from the patients. Out of all the 88 participants, 21 (23.9%) were males while 67 (76.1%) were females. (Figure 1).The mean age was  $69 \pm 7.05$  years; mean pain level was  $4.03 \pm 1.36$ ; mean ROM was  $91.730 \pm 1.930$  and mean physical function using time up and go test was  $13.01 \pm 3.07$  seconds (Table 1). Among the participants, 21 (23.90%) had normal physical function, 62 (72.70%) had good mobility, and 3 (3.40%) required walking aid (Figure 2). Among the males, 6 had normal physical function, 15 had good mobility while none ambulates with a

walking aid. Based on Numerical Pain Rate Scale, 38 (43.2%) of participants had mild pain, 43 (48.9%) had moderate pain, 7 (7.9%) had severe pain (Table 2) (Figure 3). 2 (2.30%) were physically active, 13 (14.80%) were minimally active, and 73 (82.95%) were inactive (Figure 4). The mean physical function level was  $13.01 \pm 3.07$  secs (Table 2). Other distributions are presented in Table 2.

Variable	Minimum	Maximum	Mean	± SD
Age (in years)	60	91	69.61	7.05
Pain level	2	8	4.03	1.36
Knee AROM (in degrees)	84	95	91.73	1.93
Physical function	8	29	13.1	3.07

Key-AROM: Active Range of Motion

**Table 1:** Demographic characteristics of participants.

	Frequency (n)	Percentage (%)
<b>Pain level</b>		
Mild Pain	38	43.2
Moderate Pain	43	48.9
Severe Pain	7	7.9
Total	88	100
<b>Gender</b>		
Male	21	23.9
Female	67	76.1
Total	88	100
<b>Physical function</b>		
Normal	21	23.9
Good Mobility	64	72.7
Gait Aid	3	3.4
Total	88	100
<b>Pal</b>		
Inactive	73	82.95
Minimally active	13	14.8
Active	2	2.3
Total	88	100
<b>Knee arom</b>		
Limited	88	100
Full	0	0
Total	88	100

**Table 2:** Frequency and percentages of physical characteristics.

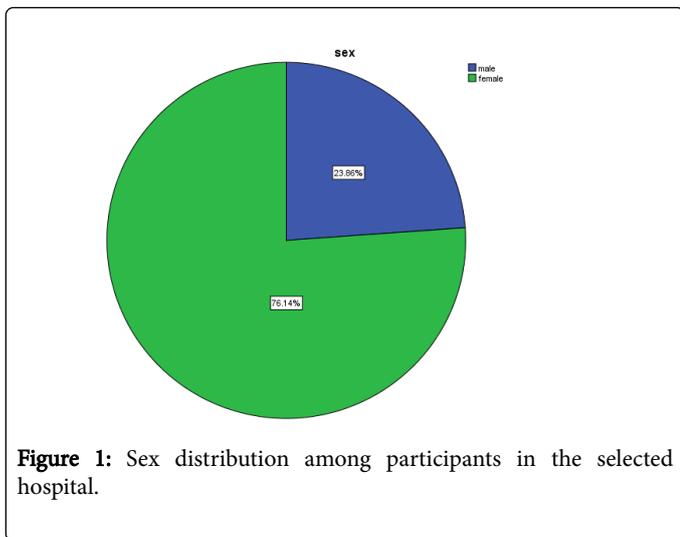


Figure 1: Sex distribution among participants in the selected hospital.

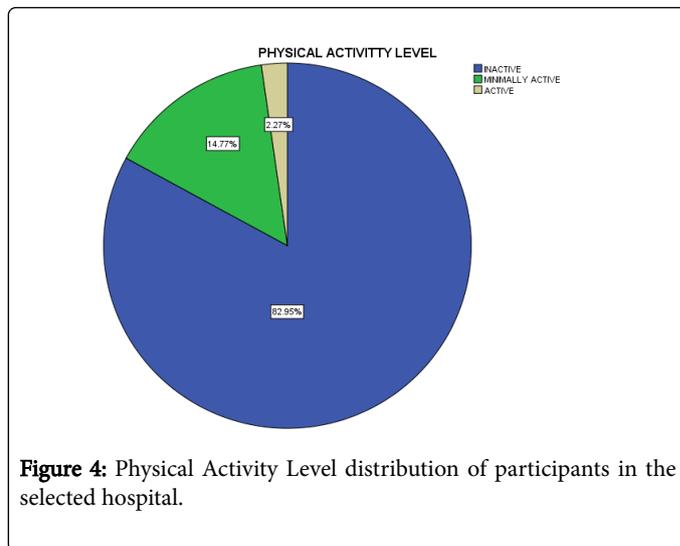


Figure 4: Physical Activity Level distribution of participants in the selected hospital.

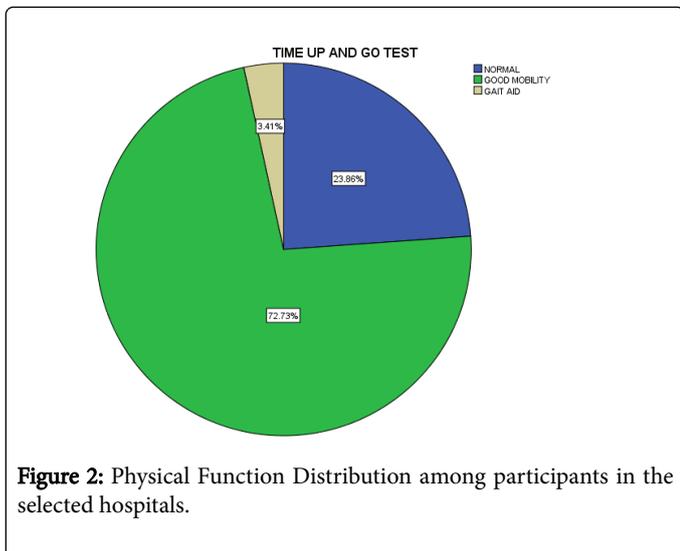


Figure 2: Physical Function Distribution among participants in the selected hospitals.

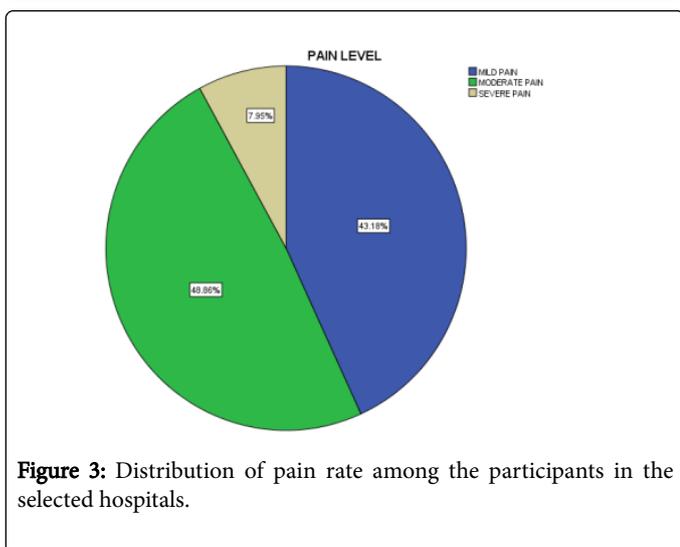


Figure 3: Distribution of pain rate among the participants in the selected hospitals.

## Discussion

A total number of 88 questionnaires were administered to patients with osteoarthritis who have been receiving physiotherapy treatment in all the three selected hospitals, and measurements were taken from the patients. Out of all the 88 participants, 21 (23.86%) were males while 67 (76.14%) were females; this supports studies that prevalence of osteoarthritis is higher in female than male [6]. Among the males, six had normal physical function, 15 had good mobility while none ambulates with a walking aid. The mean age was  $69 \pm 7.05$  years; mean pain level was  $4.03 \pm 1.36$ , showing that the average pain level of elderly patients with knee osteoarthritis is moderate, this support a previous study that shows averagely, the pain level of the elderly with knee osteoarthritis is moderate [13,14].

Also, mean knee Active ROM was  $91.730 \pm 1.930$ , indicating that averagely, knee Active ROM of elderly patients with osteoarthritis is limited, this agrees with the study carried out by Slemenda et al. [14] that the range of motion is limited in elderly that are diagnosed with osteoarthritis. The mean physical function using time up and go test which was  $13.01 \pm 3.07$  secs indicates that an average elderly patient with knee osteoarthritis has good mobility. This is also in line with a study by Josefina [15], it was found that the cut-off value for institutionalized elderly from community dwelling elderly was 12 seconds.

Physical Activity Level using International Physical Activity Questionnaire showed that only 2.3% of the total population is physically active while 14.80% were minimally active and 83% were inactive, this goes along with the study by Scott et al. [16], concluding that majority of the elderly with knee osteoarthritis are inactive.

It was shown that there was no significant association between sex and physical function. This is likely due to the fact that the reported activities of daily living of most elderly that participated in this study were the same. This is contrary to the study that shows that male having greater physical function level than the female [17]. This may be because, majority of the participants both male and female were reportedly living the same way of lifestyle, and most of them are retired and are not in active service.

However, there was a significant association between physical function and each of pain level and physical activity level. Pain and

physical activity level are closely related to physical function. This is because the elderly with increased pain intensity had difficulty in carrying out the physical function test. This agrees with the study by American Geriatric society panel on exercise and osteoarthritis which stated that symptomatic osteoarthritis causes joint pain and tenderness, limiting one's ability, which may cause the need for assistance with activities of daily living. Also, it agrees with a research by Ali et al. [18], which showed pain and joint stiffness are important factors that limits the ability to perform activities of daily living in patients with knee osteoarthritis.

In this study, there was a negative and significant relationship between physical function and physical activity level of elderly patients with knee osteoarthritis. This shows that as physical function increases, physical activity level decreases and vice versa for decrease in physical function. This is contrary to many studies which showed a direct relationship between physical function and physical activity level [19-21]. This is likely due to the fact that time up and go test, a measure physical function, only measures functional capacity and not functional ability. Therefore, in spite of the functional capacity of the participants, it is not translating to abilities to perform many of their activities of daily living. Also, IPAQ, a measure of physical activity does not give a perfect picture of their activities of daily living, as it involves recalling activities done in the past seven days only and the elderly have reduced ability to recall events accurately as a result of recall bias.

## Conclusion

Based on the findings of this study, the following conclusions were made:

1. Majority of the elderly with knee osteoarthritis are inactive.
2. Increased pain intensity and reduced physical activity has a negative effect on physical function in elderly.
3. The relationship between physical function and physical activity level was negative and significant. However, the relationship between physical function and each of pain level and physical activity level was not statistically significant.

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