ORIGINAL ARTICLE

FREQUENCY AND CONSEQUENCES OF FUNCTIONAL LIMITATIONS IN KNEE OSTEOARTHRITIS PATIENTS BELOW 50 YEARS OF AGE

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ABSTRACT

Objective: Measure and quantify the extent of functional limitations in knee osteoarthritis patients under 50. This could include a range of motion, mobility, and activities of daily living (ADLs).

Method: This observational study was conducted at the Baqai Institute of Diabetology and Endocrinology (BIDE) in its specialized foot clinic from 2015 to 2016. Data were collected from 80 participants of all genders who were under the age of 50. Individuals with a history of road traffic accidents (RTA), osteomyelitis, tuberculosis of joints, tumors, or those who had undergone ligament surgery were excluded from the study. The collected data were subjected to descriptive analysis using statistical package for social sciences to determine the frequency of various parameters.

Result: Participants were 80 (male + female) with an average age of 45.1 years and a standard deviation of 4.2. Regarding pain, the mean score was 6.5 with a standard deviation of 1.2. In terms of pain frequency, 56.3% reported constant pain. About mobility, 70% could walk normally. Of the participants, 25% had a limping gait. For descending stairs, 35% could do so without difficulty. Moreover, nearly all 98.8% experienced discomfort when squatting. Regarding muscle range of motion, active motion was associated with pain in flexion 35%, extension 7.5%, and both flexion and extension 47.5%. These unexpected results suggest a higher level of impairment than anticipated.

Conclusion: Our study revealed no statistically significant difference in the intensity of stiffness. However, there was a gender difference in the pain and physical function limitations.

Keywords: Functional limitation, Rehabilitation, Knee Osteoarthritis, Degeneration.

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INTRODUCTION

Osteoarthritis (OA) is a non-inflammatory condition affecting the synovial joints. The hallmark features of this condition are the loss of hyaline cartilage and the resulting bone remodeling [1]. Knee osteoarthritis, one of the most debilitating illnesses, is typically accompanied by pain and functional impairment. Knee OA negatively affects the quality of life and is characterized by articular cartilage deterioration and subchondral bone sclerosis for biomechanical and metabolic causes [2]. In the world, (OA) is a common problem, 2693 females are affected in every 100,000 and 1770 males are affected in every 100,000 [3]. Mostly OA occurs in older people and most commonly knee osteoarthritis develops in women after menopause, as revealed by some studies [4].

Knee OA symptoms include discomfort, locking or buckling, joint stiffness, crepitus, edema, muscular

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dysfunction, and loss of joint motion. Through atrophy, neuromuscular inhibition, and muscle weakening, it impairs muscle function. Functional restrictions exist, and they are thought to have a significant effect. For example, 30% of adults with knee OA have trouble getting out of a chair, 45% struggle to walk a quarter-mile, and 47% struggle to climb 10 steps [5]. Physiotherapy involvement in knee pain is concentrated in reducing pain and enhancing mobility, muscle strength, balance, and functional mobility [3].

The regular exercise therapy is the beneficial effect on increasing muscle strength and endurance, reducing joint stiffness, enhancing proprioceptive efficiency, improving balance, and the quality of life. Exercise therapy shows an important role in improving symptoms and physical function in knee osteoarthritis [6]. Treatments include pharmaceutical support, weight loss if overweight or obese, and education and exercise interventions. Joint replacement surgery is currently advised for end-stage management. Along with knowledge and education about osteoarthritis, exercise should be seen as a fundamental part of non-pharmacological therapy [7].

Exercise therapy, whether used alone or in conjunction with other modalities is effective in easing physical activity and limited functional activity. Several pieces of evidence also show that regular exercise therapy improves balance, proprioceptive efficiency, muscle strength and endurance, and patient quality of life. According to existing research, physical modalities combined with exercise can help patients with knee OA achieve better clinical results [8].

METHODOLOGY

This observational study was conducted at the Baqai Institute of Diabetology and Endocrinology (BIDE), Baqai Medical University (BMU) with a specialized foot clinic from 2015 to 2016. Data were collected from 80 participants of all genders below the age of 50. Exclusions comprised individuals with a history of road traffic accidents (RTA), osteomyelitis, tuberculosis of joints, tumors, or those who had undergone ligament surgery. The study systematically assessed various aspects related to mobility and joint function. Participants were asked to self-report their experiences and capabilities in specific activities related to walking and movement.

The evaluation included an inquiry into normal walking patterns, with participants indicating whether they experienced any difficulties or discomfort during this activity. Subsequently, the researcher inquired about the presence of a limping or antalgic gait, as well as any challenges individuals faced while descending stairs. This information provided valuable insights into the functional aspects of lower limb movements.

Furthermore, participants were asked to share their experiences regarding daily activities such as shopping, praying, and squatting. These inquiries aimed to gauge the impact of potential musculoskeletal issues on routine tasks and activities that require varied ranges of motion.

To quantify and qualify the range of motion and utilize a comprehensive assessment approach. Participants reported any discomfort or limitations during active range of motion (AROM) exercises, including flexion and extension of the affected joint. Passive range of motion (PROM) was also assessed, considering both painful sensations and decreased mobility during flexion and extension.

This multifaceted approach allowed researchers to gather comprehensive data on participants' functional abilities, joint mobility, and any discomfort or limitations experienced during various daily activities. These findings contribute to a more thorough understanding of the impact of musculoskeletal conditions on individuals' daily lives. The data collection was accomplished using a self-designed questionnaire focusing on attitudes and beliefs in clinical practice with the consent of participants. Efforts were made to engage physiotherapy departments, inviting their participation.

Descriptive analysis of the data using Statistical Package for Social Science (SPSS) version 16 was performed to determine the frequency of parameters. T-test was applied to see the mean different between two groups. Chi-square was applied for association between two categorical variables.

RESULTS

A total of 80 participants, comprising both males and females, were included in the study. The average age of the participants was 45.1 years with a standard deviation of 4.2. The mean intensity of pain reported by the participants was 6.5 with a standard deviation of 1.2, and the pain frequency was distributed as follows: 56.3% experienced constant pain, while 43.8% had intermittent pain. Table I displays the characteristics and clinical parameters of the participants under investigation.

Table 1: Baseline Characteristics of Study Participants

Variables	Male	Female	P-value	Overall
N	19	61	-	80
Age (years)	44.8 ± 3.9	45.2 ± 4.4	0.730	45.1 ± 4.2
Intensity of pain (Visual analog scale for pain-VAS pain)	6.4 ± 1.5	6.5 ± 1.1	0.663	6.5 ± 1.2
Frequency of pain				
Constant	10 (52.6%)	35 (57.4%)	0.458	45 (56.3%)
Intermittent	9 (47.4%)	26 (42.6%)		35 (43.8%)
Limp				
Yes	5 (26.3%)	15 (24.6%)	0.549	20 (25.0%)
No	14 (73.7%)	46 (75.4%)		60 (75.0%)
Support (Assisted Gait)				
Yes	2 (10.5%)	9 (14.8%)	0.486	11 (13.8%)
No	17 (89.5%)	52 (85.2%)		69 (86.3%)
Distant walking				
Yes	18 (94.7%)	60 (98.4%)	0.421	78 (97.5%)
No	1 (5.3%)	1 (1.6%)		2 (2.5%)
Swelling and its intensity				
None	5 (26.3%)	19 (31.1%)	0.874	24 (30.0%)
Mild	8 (42.1%)	26 (42.6%)		34 (42.5%)
Moderate	6 (31.6%)	15 (24.6%)		21 (26.3%)
Severe	0 (0%)	1 (1.6%)		1 (1.3%)
Joint stiffness				
Yes	19 (100%)	54 (88.5%)	0.137	73 (91.3%)
No	0 (0%)	7 (11.5%)		7 (8.8%)
Grading				
Normal	8 (42.1%)	21 (34.4%)	0.863	29 (36.3%)
Grade I	9 (47.4%)	30 (49.2%)		39 (48.8%)
Grade II	2 (10.5%)	9 (14.8%)		11 (13.8%)
Grade III	0 (0%)	1 (1.6%)		1 (1.3%)

Data presented as mean ± s.d or n (%)
P-value < 0.05 was considered statistically significant.

To assess muscle range of motion, active range of motion resulted in pain and decreased flexibility as follows: 35% experienced decreased flexion, 7.5% experienced decreased extension, and 47.5% experienced decreased flexion and extension. Passive range of motion showed similar effects, with 28.3% experiencing decreased flexion, 23.8% experiencing decreased extension, and 23.8% experiencing decreased flexion and extension (table 2).

Table 2: Range of Motions of Study Participants

Range of motion	Male	Female	P-value	Overall
N	19	61	-	80
Active Range Of Motion (AROM) painful decreased				
None	0 (0%)	8 (13.1%)	0.257	8 (10%)
Flexion	9 (47.4%)	19 (31.1%)		28 (35%)
Extension	2 (10.5%)	4 (6.6%)		6 (7.5%)
Flexion & extension	8 (42.1%)	30 (49.2%)		38 (47.5%)
Passive Range Of Motion (PROM) painful decreased				
None	2 (10.5%)	17 (27.9%)	0.196	19 (23.8%)
Flexion	8 (42.1%)	15 (24.6%)		23 (28.8%)
Extension	6 (31.6%)	13 (21.3%)		19 (23.8%)
Flexion & extension	3 (15.8%)	16 (26.2%)		19 (23.8%)

Data presented as n (%)

P-value < 0.05 was considered statistically significant

When evaluating the ability of patients to walk normally, 70% were able to do so, while 30% were unable. Additionally, 25% of patients exhibited a limping gait, while 75% did not. For descending stairs, 35% of patients were able to do so without difficulty, while 65% experienced difficulties. Squatting also posed challenges, with 98.8% of patients reporting difficulty and only 1.3% reporting no issues, as detailed in table 3. Furthermore, the statistical representations provided above clearly demonstrate that this debilitating condition significantly hampers daily activities, ultimately leading to a decline in the functional status of patients.

Table 3: Functional Status of Study Participants

Functional status	Male	Female	P-value	Overall
N	19	61	-	80
Normal walking				
Yes	13 (68.4%)	43 (70.5%)	0.537	56 (70%)
No	6 (31.6%)	18 (29.5%)		24 (30%)
Limping/antalgic Gait				
Yes	5 (26.3%)	15 (24.6%)	0.549	20 (25%)
No	14 (73.7%)	46 (75.4%)		60 (75%)
Difficulty going down stairs				
Yes	11 (57.9%)	41 (67.2%)	0.316	52 (65%)
No	8 (42.1%)	20 (32.8%)		28 (35%)
Difficulty in shopping				
Yes	19 (100%)	61 (100%)		80 (100%)
No	0 (0%)	0 (0%)		0 (0%)
Difficulty in praying				
Yes	19 (100%)	59 (96.7%)	0.579	78 (97.5%)
No	0 (0%)	2 (3.3%)		2 (2.5%)
Difficulty in squatting				
Yes	19 (100%)	60 (98.4%)	0.762	79 (98.8%)
No	0 (0%)	1 (1.6%)		1 (1.3%)

Data presented as n (%)

P-value < 0.05 was considered statistically significan

DISCUSSION

The primary objective of this study is to reduce discomfort and enhance stability and joint function. Improving functional capacity necessitates attention to several physical characteristics, including weight, lifestyle, and diet. The most prominent characteristics linked to functional limitations in individuals with knee joint issues encompass discomfort, strength, lifestyle, educational level, BMI, and social contacts. Obesity and osteoporosis are well-documented factors affecting physical activity. Additionally, the impact of pain and disability caused by arthritis is significantly influenced by several other factors, in addition to the association between functional impairment and arthritis. Notably, our study revealed a considerably higher prevalence of range of motion restrictions and joint stiffness among women in our study population compared to males, although the association was not statistically significant.

Previous studies have demonstrated that knee osteoarthritis (OA) patients experience significantly higher levels of fatigue than healthy controls [9,10]. Fatigue and disability often lead to feelings of depression among patients with knee OA. Furthermore, knee OA patients tend to exhibit lower postural stability compared to healthy controls [11]. Earlier research has suggested that physical activities can enhance muscle strength and coordination. However, the fear of falling, coupled with postural instability, can negatively impact physical activity levels [12].

Previous studies have also indicated that knee OA patients generally report lower health-related quality of life (QOL) compared to healthy controls [13]. Alleviating pain and reducing functional limitations can lead to an improvement in QOL [14]. Our study results indicated a positive association between aging and pain and physical functional limitations. Elderly adults with knee OA frequently report higher degrees of pain and physical functional limitations compared to younger individuals with the condition [15]. Given that the incidence of knee OA increases with age, this issue is of growing concern, particularly in developed countries with a rising number of elderly individuals.

Exercise is widely recognized for its therapeutic benefits in the management of OA. It is considered an effective non-pharmacological treatment for OA symptoms such as pain and stiffness [16]. Regular, moderate exercise has been suggested to enhance the composition of the cartilage matrix, facilitating cartilage healing and reducing the risk of knee damage [17]. Pain and functional limitation stand out as primary contributors to knee osteoarthritis (OA), a global health concern. Our study underscores the significance of these factors, aligning with existing research. Notably, we reaffirm the predictive value of self-efficacy, social support, and functional reliance, and their frequent presence in OA patients.

An intriguing revelation from our research is the substantial impact of body composition, particularly body mass index (BMI) or obesity, on disability among OA patients. This novel insight highlights the need for comprehensive intervention strategies targeting physical attributes such as obesity, lifestyle modifications, and dietary plans to enhance functional capacity. Moreover, our findings stress the importance of tailoring interventions to women, who are more vulnerable to these contributing factors. Preventive measures must be taken seriously to avert adverse consequences. In the context of our study's objectives, it is imperative to emphasize the need for future research aimed at developing customized interventions. This research should be focused on addressing the specific determinants identified in this study, thereby advancing the management and treatment of knee OA. Future recommendations should include a call for diverse and tailored intervention strategies, designed to directly address the concerns raised in our study.

Strengths and Limitations

Knee osteoarthritis is a common and debilitating condition, and studying its impact on patients under 50 can provide valuable insights for clinical practice and public health. Limitation of the title does not mention the geographic scope of the study. Osteoarthritis prevalence and management may vary

by region, so specifying the geographic context could provide additional relevance.

CONCLUSION

Our study revealed no statistically significant difference in the intensity of stiffness. However, there was a gender difference in the pain and physical function limitations.

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Authors' Contributions

FA: Concept, design, literature search, manuscript writing.
IA: Concept, design, edited and approval of the final manuscript.
MA: Literature search and manuscript writing.
FA, IA & MA: Accountable for the accuracy or integrity of the work, edited and approved the manuscript.

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