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The Impact of Knee Pain on the Quality of Life and Physical Activity in Middle Age Women

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Abstract: Background: Approximately 25% of individuals over the age of 50 experience knee pain, with over 50% of these individuals reporting moderate to severe pain consistently. The World Health Organization defines quality of life as a "state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity."

Objective: To examine the impact of knee pain in middle age women on daily physical activity and their quality of life.

Materials and methods: A total of 70 women aged between 45 and 65 years participated in the study. Synovial fluid was collected from 40 of the participants and cultured to detect bacterial growth, tested for presence of crystals and white blood cell count. All participants completed a questionnaire specifically designed for this study. Physical performance was tested using the Health-ABC battery. The quality of life was assessed using the EQ-5D, developed by the European Quality of Life Group.

Results: The leading cause of knee pain was osteoarthritis, affecting 65.7% of participants. Rheumatoid arthritis and gout arthritis were less common. All the synovial fluid cultures showed no growth of bacteria. While 30% of the synovial fluid showed presence of monosodium urate crystals. The white blood cell count was higher in patients with rheumatoid arthritis (Median=7100 cell/mm3) in compare to the patients with osteoarthritis and gout arthritis. The findings of the present study revealed that the severity of arthritis pain varies in its intensity from moderate to severe and more than half of studied women had a severe pain intensity. Patients scored very low on the quality of life subscale.

Conclusion: The intensity of pain is greatest during activities that require standing, walking, crouching, or joint flexion.

Keywords: Middle age women, Synovial Fluid, Physical Activity, Quality of Life.

Introduction

Approximately 25% of individuals over the age of 50 experience knee pain, with over 50% of these individuals reporting moderate to severe pain consistently (1). It is a diverse disorder with various underlying causes. Various types of arthritis have been examined and classified into two categories: inflammatory arthritis, which is induced by autoimmune mechanisms such as rheumatoid arthritis (RA), crystal deposition (gout) and infections (Staphylococcus aureus, Neisseria gonorrhea, Lyme disease complications, Parvovirus, Enterovirus), and non-

inflammatory arthritis (osteoarthritis) (2). Osteoarthritis (OA) is a prevalent joint disorder considered potentially detrimental due to its capacity to induce structural abnormalities throughout the joint. Approximately 240 million individuals globally struggle with osteoarthritis, and with the aging population and increasing obesity rates, its prevalence will continue to grow. Typical joint manifestations of osteoarthritis encompass pain, rigidity, and restricted functionality. These symptoms affect quality of life (QoL) and induce incapacity, resulting in a substantial financial burden on individuals (3).

Gout is induced by hyperuricemia, an excess of uric acid in the body, regulated by genetic, metabolic and environmental variables. The process of uric acid saturation transpires locally in certain regions of the body typically the joints, resulting in the precipitation of monosodium urate crystals and the subsequent onset of gout. Gout, which causes acute arthritic symptoms, is marked by recurring bouts (4). Rheumatic diseases are autoimmune, systemic inflammatory, and degenerative conditions that predominantly impact connective tissues, marked by significant chronic inflammation and deterioration of these tissues (5).

Synovial fluid is characterized as the accumulation of fluid contained within a joint cavity. Synovial fluid is physiological, serving as a lubricant for articular cartilage within the joint space and providing nutrients via diffusion to adjacent structures such as cartilage, meniscus, and labrum. In cases where patients exhibit intensely painful joints with potential infection, inflammation, or non-inflammatory effusion, synovial fluid aspiration and analysis are essential for diagnosis and treatment direction (6). Knee pain is associated with diminished physical function and performance, both of which adversely affect quality of life (QoL). In 1947, the World Health Organization (WHO) defined QoL as a “state of complete physical mental, and social well-being, and not merely the absence of disease and infirmity.”. In 1995, the WHO definition was refined to state: “Individuals’ perceptions of their status in life within the cultural and value frameworks they inhabit, in relation to their aspirations, expectations, comparisons, and apprehensions.” The idea includes a wide array of factors, intricately integrating an individual's physical health, psychological condition, degree of autonomy, social connections, personal views, and their interactions with significant environmental elements (7). Discomfort and pain in the knee typically arise during movement or when bearing weight on the joint. It may range in intensity from moderate to extremely severe. As the disease advances and joint structural deterioration escalates, discomfort may manifest even at rest. Sleep problems that hinder bodily regeneration might exacerbate pain due to accompanying exhaustion and diminished well-being (8).

Material and methods

Study design and population

This cross-sectional study was conducted in Kirkuk City between March and July 2025. A total of 70 women aged between 45 and 65 years participated in the study. These participants were recruited from the Orthopedic and Rheumatologic Department of Azadi Teaching Hospital. Synovial fluid was collected from 40 of the participants. All participants completed a questionnaire specifically designed for this study, which collected key sociodemographic data including age, place of residence, duration of illness, weight, and height (used to calculate body mass index [BMI]). The inclusion criteria were women in middle age with knee pain.

Sample collection and processing

Physical performance was tested using the Health-ABC battery, as reported in (9). The EQ-5D, created by the European Quality of Life Group (EuroQol Group), is presently among the most extensively utilized questionnaires in quality of life research. The initial iteration of the EQ-5D was launched in 1990 and comprises five dimensions: Mobility, Self-Care, Usual Activities, Pain/Discomfort, and Anxiety/Depression. Each dimension encompassed five levels of severity: non, slight, moderate, large, extreme (10). Synovial fluid was drawn following standard procedure. It delivered to the microbiology lab in less than half hour after collection. The

synovial fluid was cultured on Blood and MacConkey agar media and incubated aerobically at 37°C for 18–24 hours to detect bacterial growth. Synovial fluid was tested for presence of crystals and white blood cell count as in (11).

Statistical Analysis

The statistical calculations were performed using SPSS version 27 for Windows. Descriptive statistics and Kruskal Wallis test was employed to compare the continuous variables between the cases. A P-value less than 0.05 was deemed to be statistically significant.

Ethical Approval

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. The procedure was performed with the patient's explicit and informed consent, both verbally and in writing, before collecting the sample. The study protocol, subject information, and consent form were evaluated and approved by a local ethics committee.

Results and discussion

Table 1 show that larger proportion of participants 58.6% were in the 45-55 age range, while 41.4% were in the 56-65 age range. The majority 80% of participants resided in urban areas, while 20% lived in rural areas. The BMI of the participant showed that most women were either overweight 42.8% or obese 34.3%, only 22.9% had a normal BMI; Thes results were in agrrement with (12). The leading cause of knee pain was osteoarthritis, affecting 65.7% of participants. rheumatoid arthritis and gout arthritis were less common, affecting 17.1% and 17.2%, respectively. The duration of disease in the majourity of women was less than one year in rate 77.1 % while 22.9% had been suffering from knee pain for more than a year. 62.9% of participants experienced pain in only one knee, while 37.1% experienced pain in both knees. High BMI is recognized as a risk factor for knee osteoarthritis and associated discomfort. Excess weight amplifies the mechanical stress placed on the knee joint. Moreover, systemic and metabolic variables linked to excess weight may influence the inflammatory processes initiated by the generation of inflammatory cytokines by adipocytes. The mechanical and biochemical impacts of elevated BMI on knee osteoarthritis and knee pain are significant clinical concerns that can be managed (13).

Table 1: Sociodemographic characteristics of middle age women with knee pain (n=70).

Item	Percentage
Age	
45-55	58.6 %
56-65	41.4 %
place of residence	
Urban	80 %
Rural	20 %
BMI	
Normal	22.9 %
Over weight	42.8 %
Obese	34.3 %
Cause of knee pain	
Osteoarthritis	65.7 %
Rheumatoid arthritis	17.1 %
Gout arthritis	17.2 %
Duration of disease	
1 month – 1 year	77.1 %
More than 1 year	22.9 %
Pain in	
One knee	62.9 %
Both knee	37.1 %

All the synovial fluid cultures showed no growth of bacteria. While 12 (30%) of the synovial fluid showed presence of monosodium urate crystals which remains the gold standard method for diagnosis of gout; this result was agrement with (13). Gout is induced by the buildup of uric acid in the body, resulting in hyperuricemia. Genetic, metabolic, and environmental variables may affect this syndrome. Excessive accumulation of uric acid leads to the development of monosodium urate crystals, which deposit in particular regions of the body, notably the joints, resulting in gout symptoms (14). Table 2 show significant corelation between synovial white blood cell count and rheumatoid arthritis (P-value <0.001); the white blood cell count was higher in patients with rheumatoid arthritis (Median=7100 cell/mm^3) in compare to the patients with osteoarthritis and gout arthritis; this result was in agrement with (15) . The quantification of white blood cells in synovial fluid is commonly employed in clinical rheumatology to diagnose inflammatory arthritis, despite their non-specificity as indications of heightened inflammation inside the joint area. In rheumatoid arthritis and infectious arthritis, white blood cells can swiftly damage cartilage through the release of different metalloproteinases (16).

Table 2: The corelation between cause of knee pain in middle age women and synovial fluid white blood cell count (n=40).

Cause of knee pain	Median (IQR) of white blood cell count (Cell/mm^3)	Mean Rank of white blood cell count in synovial fluid	P- value
Rheumatoid arthritis	7100 (3655)	32.50	<0.001*
Osteoarthritis	257 (800)	11.10	
Gout arthritis	5200 (7000)	28.17	

IQR:Interquartile Range

Table 3 presents the relationship between different types of physical activities and the degree of knee pain experienced during those activities in middle-aged women. The degree of pain is categorized as lak of pain, slight pain, moderate pain, sever pain and extremely sever pain. For walking 51.5% of participants reported severe pain while walking, and 20% reported extremely severe pain; this suggests that walking is one of the activities that causes significant discomfort for most women. 40% of women reported severe pain while standing and 14.3% reported extremely severe pain.This may suggest that the static nature of standing for extended periods places strain on the knee joint, leading to more pain. Getting up from sitting position reported 28.6% severe pain and 22.9% experienced extremely severe pain. This action induces discomfort in a considerable number of women. The transition from sitting to standing may be especially difficult due to knee stiffness or weakness (17). During night rest the pain levels were somewhat moderate, with 28.6% reporting slight pain, 17.1% reporting lack of pain. However, 25.7% still experienced severe pain. Several studies have shown that patients with better sleep quality were more likely to have less knee pain and restless sleep was associated with worse knee pain (18).

Morning discomfort reported 22.9% lack of pain but 22.9% experienced extremely severe pain. The cause of prolonged morning stiffness remains ambiguous; however, it is postulated to indicate inflammation and is believed to stem from the circadian cycle of proinflammatory cytokines (19). Forty eight percent of participants reported severe pain when going up or down stairs and 18% reported extremely severe pain. For going shopping, 25.7% reported severe pain and 11.4% experienced extremely severe pain. This activity entails walking, but may also involve standing and walking while carrying additional weight (such as bags), potentially exacerbating knee pain for certain women (20). Interestingly, 42.8% reported moderate pain while lying in bed. However, 22.9% also reported lack of pain, suggesting that while rest may not fully eliminate pain, some women do not experience significant discomfort while lying down. 28.6% of women reported extremely severe pain when getting out of bed and 22.9%

reported slight pain. This again emphasizes the difficulty of transitioning from lying to standing positions, especially in the morning when stiffness is at its peak.

Getting up/sitting down on the toilet 45.7% of participant experienced severe pain and 14.3% reported extremely severe pain when performing this action. The act of bending and rising from a seated posture certainly exerts significant stress on the knee joint, rendering this action uncomfortable for numerous women (21). For heavy housework 37.1% of women reported severe pain and 31.4% reported extremely severe pain; while light housework 31.4% reported moderate pain and 11.4% experiencing severe pain. However, this activity seems to be less painful compared to heavy housework. 28.4% reported slight pain and 40% reported moderate pain during showering. For getting in/out of the car 34.3% had extremely severe pain and 22.9% slight pain. The act of bending the knee to get in or out of the car appears to be quite difficult for some women, causing significant discomfort.

The outcomes of the current study indicated that the intensity of arthritis pain ranges from moderate to severe, with over half of the women examined experiencing severe pain intensity. Moreover, a report from the WHO underscores the significant correlations between painful musculoskeletal disorders and diminished physical activity, functional capacity, and overall well-being (22). These findings are in accordance with (23) who added that the majority of the studied women had a sever degree of pain.

Table 3: degree of knee pain during daily physical activities in middle-aged women (n=70)

Type of daily Physical activity	Degree of knee pain during performing daily activity				
	Lack	Slight	Moderate	Sever	Extremely sever
Walking	11.4 %	5.7 %	11.4 %	51.5 %	20 %
Standing	11.4 %	2.9 %	31.4 %	40 %	14.3 %
Getting up from sitting position	8.6 %	17.1 %	22.8 %	28.6 %	22.9 %
Night rest	17.1 %	28.6 %	20 %	25.7 %	8.6 %
Morning discomfort	22.9 %	14.3 %	28.5 %	20 %	14.3 %
Going up and down the stairs	0 %	17 %	17 %	48 %	18 %
Going for shopping	14.3 %	20 %	25.7 %	28.6 %	11.4 %
Lying in bed	22.9 %	20 %	42.8 %	14.3 %	0 %
Getting out of bed	28.6 %	22.9 %	37.1 %	11.4 %	0 %
Getting up/ sit down on toilet	2.9 %	14.3 %	22.8 %	45.7 %	14.3 %
Heavy house work	0 %	2.9 %	28.6 %	37.1 %	31.4 %
Light house work	14.3 %	42.9 %	31.4 %	11.4 %	0 %
Shower	28.4 %	23 %	40 %	8.6 %	0 %
Getting in / out of the care	34.3 %	22.9 %	31.4 %	11.4 %	0 %

Chronic diseases can adversely affect patient QoL due to pain, reduced mobility, less social engagement, and alterations in mood. Consequently, QoL assessments in individuals with chronic illness are valuable for evaluating overall disease impact. Numerous prior research have documented the adverse effects of knee pain on QoL (24). The results of this study in Table 4 show that all women's QoL was impacted by knee pain. Of these women, 8.6% were slightly impacted, 31.4% were moderately impacted, 37.1% were largely impacted and 22.9% were extremely impacted by knee pain. This result was inagrement with (25). Patients had markedly low scores on the QoL subscale. Almost all participants in this study indicated that they are aware of their knee condition on a daily or continuous basis, and the majority experience significant to extreme distress due to a lack of trust in their knee, coupled with severe to excessive overall difficulty related to it. Physical health is a crucial factor of QoL; hence, any adverse changes in health will substantially alter QoL. Initially, measures must be implemented to enhance patients' understanding of the primary factors influencing pain and to educate them about the many therapeutic approaches available to alleviate or reduce symptoms. Promoting

non-pharmacological interventions in osteoarthritis is particularly crucial, such as enhancing physical activity or facilitating weight reduction. Pharmacological treatment, while deemed beneficial, may induce side effects such as gastrointestinal issues and multi-organ failure over time (8).

Table 4: The impact of knee pain on the Quality of Life in middle age women (n=70)

The impact of knee pain on the quality of life	Number and Percentage of patient
Not impact	0
Slight impact	6 (8.6 %)
Moderate impact	22 (31.4 %)
Large impact	26 (37.1 %)
Extreme impact	16 (22.9 %)
Total	70 (100 %)

Conclusion

Knee osteoarthritis was the leading cause of knee pain in middle age women. White blood cell count in synovial fluid was significantly elevated in women with Rheumatoid arthritis. Knee pain significantly affects various daily activities in middle-aged women. The intensity of pain is greatest during activities that require standing, walking, or squatting, as well as when joint flexion is necessary (for instance, sitting down or rising). Activities necessitating knee flexion, such as ascending stairs, bending, and exiting a vehicle, appear to be especially difficult and result in heightened pain. Conversely, sitting or nighttime rest appears to exert a diminished influence, but discomfort persists for numerous women. This information can assist in determining which activities may require modification or avoidance to effectively manage knee discomfort. Patients scored very low on the quality of life subscale.

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