Original Article

Health – Related Quality of Life of Knee Osteoarthritis Patients

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Abstract

Background: Osteoarthritis (OA) is by far the most common form of arthritis and is a major cause of pain and disability in older people. Knee OA as a disabling disease affecting all aspects of patients' life.

Health – related quality of life (HRQOL) is increasingly being acknowledged as a valid health indicator in many diseases especially chronic processes. **Objective:** To assess the impact of Knee OA on HRQOL of Knee OA patients. **Materials and Methods:** A cross sectional descriptive study assessed HRQOL of 100 knee OA patients without significant comorbidity, were interviewed at Rheumatology consultant clinic of Baghdad Teaching Hospital by using 14 questions of CDC Health Related Quality of Life Questionnaire between September, 2020 to March 2021. **Results:** From 100 participants (21% male, 79% female), 96% of them said that knee pain made usual things hard to do with mean of 19 days according to the last 30 days before the interview. 89% of them said that they were limited in any way in any activities because of knee OA. **Conclusion:** The overall results of this study reflect the negative impact of Knee OA on HRQOL of the patients and, we found that the higher BMI (body mass index), age, disease duration and bilateral involvement, the lower the quality of life.

Keywords: BMI, health – related quality of life, knee osteoarthritis

Introduction

Health-related quality of life (HRQOL) is increasingly being acknowledged as a valid health indicator in many diseases especially chronic processes. It encompasses emotional, physical, social, and subjective feelings of well-being that reflect an individual's subjective evaluation and reaction to his/ her illness.[1]

Analysis of HRQOL surveillance data can identify subgroups with relatively poor perceived health and help to guide interventions to improve their situations and avert more serious consequences. Interpretation and publication of these data can help identify needs for health policies and legislation, help to allocate resources based on unmet needs, guide the development of strategic plans, and monitor the effectiveness of broad community interventions.

In brief, HRQOL refers to an individual's satisfaction or happiness with aspects of life, as they affect or are affected by their health.[2]

Osteoarthritis (OA) is the most common type of arthritis found worldwide especially in the elderly. It is a major cause of disability in both the developed and developing world.[3]

Osteoarthritis is the third most common diagnosis made by general practitioners in older patients and OA is the most common arthropathy to affect the knee.[4]

According to the American College of Rheumatology this disease is considered a heterogeneous group of conditions involving a broad range of symptoms and joint signs, which in combination with defective articular cartilage integrity and structural changes in the subchondral bone and in the joint margins, account for the key clinical–anatomopathological characteristics of the disease.[5]

The pathogenesis of OA is poorly understood. Repetitive trauma to articular cartilage may lead to damage and

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Submission: 30-May-2022 **Accepted:** 15-Jun-2022 **Published:** 29-Sep-2022

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How to cite this article: Abbas SJ. Health – Related quality of life of knee osteoarthritis patients. Med J Babylon 2022;19:463-70.

Access this article online

Quick Response Code:

Website: www.medjbabylon.org

DOI: 10.4103/MJBL.MJBL_82_22

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subsequent activation of the innate immune system. This tends to occur in joints that bear excessive loads such as lower extremity joints or in joints are used repetitively like hand joints.[6]

Risk factors for developing OA include age, joint location, obesity, genetic predisposition, joint malalignment, trauma and gender (Female: Male 3:1).

It is usually primary (generalized) but may be secondary to joint disease or other conditions (e.g. haemochromatosis, obesity, occupational)

OA mainly affects weight bearing joints such as knees and hips, which are the most frequently affected areas. Knee osteoarthritis is more disabling than any other orthopedic and musculoskeletal disorder.[7]

As OA and other rheumatic conditions seldom cause death but have a substantial impact on health, HRQOL measures are better indicators of their impact than related mortality rates.[8]

The impact of arthritic conditions is expected to grow while the population both increases ages in the coming decades.[9]

Knee OA is characterized by insidious onset of knee pain with gelling and limited range of motion. People with knee OA often describe pain and limitation with walking, transferring (as from seated to standing) and specially ascending or descending stairs. These reports of pain and limitation are often associated with sensation of instability or "giving out" at the knee. Pain may be elicited by palpation of the medial or lateral joint line or both.[10]

Early and accurate diagnosis of osteoarthritis is necessary so that appropriate treatment option can be considered. History, physical examination aided with radiological imaging remain the tools for diagnosis of osteoarthritis.

The knee is the most clinically significant site affected by osteoarthritis.[11] The age and sex standardized incidence of knee osteoarthritis is put at 240/100000 persons per year.[12]

The prevalence of OA is increasing and will continue to do so as population age and life expectancy increases.

According to American College of Rheumatology (ACR), knee OA can be diagnosed using the clinico-radiological criteria:.[13]

1. Knee pain for most days of prior month
2. Osteophytes at joint margins
3. Synovial fluid typical of osteoarthritis
4. Age equal or more than 40 years
5. Morning stiffness lasting equal or less than 30 min
6. Crepitus with active joint motion

Diagnosis requires 1 + 2, or 1 + 3+5 + 6, or 1 + 4+5 + 6

Bilateral knee OA is very common with time as the majority of sufferers will eventually develop radiographic disease in both knees. Clinicians need to be aware of the (joint at risk) and researchers need to remember to account for both knees when assessing the relationship between physical function, pain and structural disease. The other knee should not be used for comparison, even if it appears to be normal at baseline.[14]

Bilateral knee pain was an independent risk factor for poor physical function in a multicenter knee OA study.[15]

The management of OA can be divided into nonpharmacological interventions, pharmacologic (acetaminophen, oral NSAIDs, topical NSAIDs, intraarticular corticosteroids injection, duloxetine with depressive symptoms or widespread pain, opioids as needed) and surgical options according to severity of pain and limitation in activity functions.[16]

Patients with mild or intermittent pain are likely to need only non-pharmacologic treatment whereas those with more severe symptoms will probably require both non pharmacologic an pharmacologic treatment

The core treatments for all patients are exercise, weight loss, self-management and education.

Late-stage joint replacement is the preferred option for effective treatment to relieve pain and improve quality of life in advanced cases.[17]

Despite the clear goal of treatment mentioned, quality of life is the least considered or often neglected aspect in the overall management of patients with knee osteoarthritis.

Aim of Study was to assess the impact of Knee OA on HRQOL of Knee OA patients.

Materials and Methods

Study design and settings

A cross sectional study that Knee OA patients visited rheumatology consultant clinic at Baghdad Teaching Hospital during period of data collection were interviewed using a CDC HRQOL questionnaire to assess their health - related quality of life.

Period of study, inclusion and exclusion criteria

Interviews were conducted for period from September, 2020 to March 2021.

The patients involved fulfilled the ACR clinico – radiological criteria for diagnosis of knee OA,[13] and had previous documented diagnosis from a consultant rheumatologist at Baghdad Teaching Hospital.

Patients were excluded if they had secondary knee OA, post-traumatic knee OA, patients has severe psychiatric

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or physical illness that made it difficult to complete the questionnaire, patients had undergone surgery of the knee joint, and had disabling comorbidities such as heart disease, liver disease, and renal failure as well as Knee OA patient who refuse to participate.

Tools of data collection

The data of this study obtained through direct interview with patients using CDC structured questionnaire for assessing HRQOL which consist of 14 questions in three modules: Healthy Days Core module (4 questions), Activity Limitation Module (5 questions) and Healthy Days Symptoms Module (5 questions), each question had multiple options to answer and the patient must choose one option and the answer should be according to past 30 days(before the interview) time period, the patient asked to tell us how many days in which he/she felt "healthy" or "unhealthy" according to the question of each module from the last 30 days.

Table 1: Characteristics of studied patients

Variable/Question	Responses	N	%
BMI (Kg/m^2); Mean± SD, Min-Max	29.2±5.6, 21.1-44.2		
Age (y); Mean± SD, Min-Max	59.0±8.9, 40-81		
Age Group	40-49 y	11	11.0%
	50-59 y	43	43.0%
	60-69 y	33	33.0%
	≥ 70 y	13	13.0%
BMI Category	Normal weight	30	30.0%
	Overweight	27	27.0%
	Obesity I	20	20.0%
	Obesity II	20	20.0%
	Morbid obesity	3	3.0%
Sex	Male	21	21.0%
	Female	79	79.0%
Occupation	Freelance	5	5.0%
	Housewife	49	49.0%
	Employed	26	26.0%
	Unemployed	0	0.0%
	Retired	20	20.0%
	Student	0	0.0%
Monthly income (1000 ID)	> 500	40	40.0%
	250-500	27	27.0%
	< 250	33	33.0%
Residence	Owned	75	75.0%
	Rent	20	20.0%
	Others	5	5.0%
Education level	Primary	39	39.0%
	Secondary	16	16.0%
	> Secondary	33	33.0%
	Not educated	12	12.0%
Marital Status	Single	2	2.0%
	Married	95	95.0%
	Others	3	3.0%
Knee Joints Involvement	Unilateral	45	45.0%
	Bilateral	55	55.0%
Disease Duration (y); Mean±SD, Min-Max	5.5±3.1, 1-15		

Table 2: Response to questions related to healthy days core module

Variable/Question	Responses	N	%
Generally, Health is	• Excellent	0	0.0%
	• Very good	3	3.0%
	• Good	35	35.0%
	• Fair	28	28.0%
	• Poor	34	34.0%
	• Don't know	0	0.0%
	• Refused	0	0.0%
Physical health is not good	• Yes	40	40.0%
	Days; Mean±SD	16.7±5.2	
	Min-Max	7-30	
	• No	3	3.0%
	• Don't know	52	52.0%
	• Refused	5	5.0%
Mental health is not good	• Yes	44	44.0%
	Days; Mean±SD	16.7±5.5	
	Min-Max	7-30	
	• No	2	2.0%
	• Don't know	54	54.0%
	• Refused	0	0.0%
Inability to do usual activities due to physical or mental unfitness	• Yes	51	51.0%
	Days; Mean±SD	18.7±7.6	
	Min-Max	7-30	
	• Non	4	4.0%
	• Don't know	45	45.0%
	• Refused	0	0.0%

Table 3: Response to questions related to activity limitations module

Variable/Question	Responses	N	%
Activity limitation due to disease	• Yes	89	89.0%
	• No	10	10.0%
	• Don't know	1	1.0%
	• Refused	0	0.0%
Major cause of activity limitation	• Walking problem	58	58.0%
	• Back/neck problem	42	42.0%
Duration of this activity limitation	• Days	15	15.0%
	• Weeks	31	31.0%
	• Months	25	25.0%
	• Years	25	25.0%
	• Don't know	3	3.0%
	• Refused	1	1.0%
Needed others for personal care	• Yes	28	28.0%
	• No	69	69.0%
	• Don't know	3	3.0%
	• Refused	0	0.0%
Needed help for routine needs	• Yes	69	69.0%
	• No	30	30.0%
	• Don't know	1	1.0%

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Personal information about Knee OA patient included gender, age, BMI, education level, marital status, occupation, type of residence, date of Knee OA diagnosis, involvement of both or one Knee joint at interview time and their estimated monthly income.

According to CDC BMI in kg /m2 classified as follow:

18.5 – Less than 25 normal

25 – Less than 30 overweight

30 – Less than 35 class 1 obesity

35 – Less than 40 class11 obesity

40 or higher morbid obesity

Statistical analysis

Statistical package for social sciences version 24 (SPSS v24) used to analyze data. Continuous variables presented as means with standard deviation and discrete variables presented as numbers and percentages.

T test for two independent samples was used to test the significance of observed difference in mean. This test is shifted into ANOVA test if groups were more than two.

Table 4: Response to questions related to healthy days Symptoms module

Variable/Question	Responses	N	%
Knee pain made usual things hard to do	• Yes	96	96.0%
	Days; Mean±SD	19.4 ± 8.9	
	Min-Max	5-30	
	• Don't know	4	4.0%
Felt sad/blue/depressed	• Yes	69	69.0%
	Days; Mean±SD	20.2 ± 9.3	
	Min-Max	5-30	
	• No	12	12.0%
	• Don't know	14	14.0%
	• Refused	5	5.0%
Felt worried/tense/anxious	• Yes	62	62.0%
	Days; Mean±SD	14.2 ± 8.7	
	Min-Max	5-30	
	• No	3	3.0%
	• Don't know	34	34.0%
	• Refused	1	1.0%
No enough sleep/rest	• Yes	69	69.0%
	Days; Mean±SD	20.0 ± 9.0	
	Min-Max	7-30	
	• No	16	16.0%
	• Don't know	10	10.0%
	• Refused	5	5.0%
Felt very healthy/full of energy	• Yes	17	17.0%
	Days; Mean±SD	18.2 ± 3.9	
	Min-Max	10-20	
	• No	42	42.0%
	• Don't know	28	28.0%
	• Refused	13	13.0%

Chi-square test for independence was used as appropriate to test the significance of association between discrete variables.

Pearson's correlation coefficient was used to test the significance and magnitude of the relation between continuous variables.

Level of significance was set at P value <0.05.

Ethical considerations

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki.

It was carried out with patients' verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee.

Table 5: Mean days of absence of physical wellbeing according to studied variables

Variable	Category	Days during the past 30 days physical health not good			P value
		N	Mean	SD	
BMI Category	Normal weight	17	14.9	4.1	0.014
	Overweight	10	15.7	2.4	
	Obesity I	5	23.0	6.7	
	Obesity II	8	17.8	6.6	
	Morbid obesity	0	.	.	
Knee Joints Involvement	Unilateral	27	15.4	5.0	0.023
	Bilateral	13	19.4	4.9	
Age Group	40-49 y	3	16.7	2.9	0.635
	50-59 y	21	15.8	3.9	
	60-69 y	14	17.6	7.3	
	≥70 y	2	20.0	0.0	
Sex	Male	10	15.4	4.1	0.372
	Female	30	17.1	5.6	
Occupation	Freelance	0	.	.	0.116
	Housewife	17	18.6	5.1	
	Employed	14	14.7	1.8	
	Unemployed	0	.	.	
	Retired	9	16.2	7.9	
	Student	0	.	.	
Monthly income (1000 ID)	> 500	22	15.1	5.0	0.092
	250-500	16	18.8	5.1	
	< 250	2	17.5	3.5	
Residence	Owned	29	16.1	4.8	0.182
	Rent	8	19.6	6.9	
	Others	3	14.3	.6	
Education level	Primary	8	19.4	5.0	0.015
	Secondary	10	19.2	5.7	
	> Secondary	22	14.6	4.3	
	Not educated	0	.	.	
Marital Status	Single	2	15.0	0.0	0.748
	Married	37	16.7	5.4	
	Others	1	20.0	.	

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Results

One hundred patients were interviewed according to study inclusion and exclusion criteria. 21% was males and 79% females. This can be attributed to the high prevalence of knee OA among women and the high adherence of women to follow-up visits. The mean age of studied patient's was 59.0 ± 8.9 years old. Results are shown in Tables 1-10, in detail, according to Modules questions.

Discussion

Knee osteoarthritis is a disabling disease affecting all aspects of patients' life. HRQOL has been receiving greater attention as a result of increasing income levels and life expectancy, which has been brought about by advances in medical technology.

Table 6: Mean days of absence of mental wellbeing according to studied variables

Variable	Category	Days during the past 30 days mental health not good			P value
		Count	Mean	SD	
BMI Category	Normal weight	19	16.1	5.2	**0.047**
	Overweight	12	14.5	2.2	
	Obesity I	5	23.0	6.7	
	Obesity II	7	17.4	7.0	
	Morbid obesity	1	20.0	0.0	
Knee Joints Involvement	Unilateral	28	15.1	4.8	**0.010**
	Bilateral	16	19.5	5.7	
Age Group	40-49 y	5	19.0	6.5	0.333
	50-59 y	21	15.2	4.0	
	60-69 y	16	17.6	6.9	
	≥70 y	2	20.0	0.0	
Sex	Male	10	15.2	4.0	0.324
	Female	34	17.2	5.8	
Occupation	Freelance	0	.	.	0.105
	Housewife	20	18.6	5.7	
	Employed	14	14.6	1.6	
	Unemployed	0	.	.	
	Retired	10	16.1	7.5	
	Student	0	.	.	
Monthly income (1000 ID)	> 500	23	15.2	5.0	0.131
	250-500	17	18.0	5.5	
	< 250	4	20.0	7.1	
Residence	Owned	31	16.5	5.3	0.725
	Rent	9	18.0	7.3	
	Others	4	15.8	2.9	
Education level	Primary	11	19.5	5.7	**0.013**
	Secondary	10	19.2	5.7	
	> Secondary	22	14.5	4.3	
	Not educated	1	10.0	0.0	
Marital Status	Single	2	15.0	0.0	0.768
	Married	41	16.7	5.7	
	Others	1	20.0	0.0	

CDC HRQOL questionnaire is a simple and short tool and it is suitable to assess HRQOL of our patients. It is practical for repeated use in clinical trials or routine clinical practice than other tools using for assessment of quality of life as WHOQOL -100 questionnaire and (SF-36) questionnaire and OAKHQOL questionnaire. .

The disease specific instruments, such as the Western Ontario and McMasterUniversities index scale. It is disease-specific, self-administered, health status measure. It is designed to measure functional disability in the context of knee replacement surgery rather than HRQoL.[18]

The overall results of this study reflect the negative impact of Knee OA

Table 7: Mean days of inability to do usual activities according to studied variables

Variable	Category	Days during the past 30 days mental health not good			P value
		Count	Mean	SD	
BMI Category	Normal weight	19	16.1	5.2	**0.047**
	Overweight	12	14.5	2.2	
	Obesity I	5	23.0	6.7	
	Obesity II	7	17.4	7.0	
	Morbid obesity	1	20.0	0.0	
Knee Joints Involvement	Unilateral	28	15.1	4.8	**0.010**
	Bilateral	16	19.5	5.7	
Age Group	40-49 y	5	19.0	6.5	0.333
	50-59 y	21	15.2	4.0	
	60-69 y	16	17.6	6.9	
	≥70 y	2	20.0	0.0	
Sex	Male	10	15.2	4.0	0.324
	Female	34	17.2	5.8	
Occupation	Freelance	0	.	.	0.105
	Housewife	20	18.6	5.7	
	Employed	14	14.6	1.6	
	Unemployed	0	.	.	
	Retired	10	16.1	7.5	
	Student	0	.	.	
Monthly income (1000 ID)	> 500	23	15.2	5.0	0.131
	250-500	17	18.0	5.5	
	< 250	4	20.0	7.1	
Residence	Owned	31	16.5	5.3	0.725
	Rent	9	18.0	7.3	
	Others	4	15.8	2.9	
Education level	Primary	11	19.5	5.7	**0.013**
	Secondary	10	19.2	5.7	
	> Secondary	22	14.5	4.3	
	Not educated	1	10.0	0.0	
Marital Status	Single	2	15.0	0.0	0.768
	Married	41	16.7	5.7	
	Others	1	20.0	0.0	

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Table 8: Mean days of routine things cannot be done due to knee pain according to studied variables

Variable	Category	Days that knee pain made routine things hard to do			P value
		N	Mean	SD	
BMI Category	Normal weight	29	16.6	8.8	0.003
	Overweight	26	16.3	8.1	
	Obesity I	18	23.8	8.7	
	Obesity II	20	22.5	7.7	
	Morbid obesity	3	26.7	5.8	
Knee Joints Involvement	Unilateral	42	13.2	6.3	<0.001
	Bilateral	54	24.2	7.5	
Age Group	40-49 y	11	17.2	6.5	0.006
	50-59 y	42	16.5	8.2	
	60-69 y	32	22.7	9.1	
	≥70 y	11	23.4	8.6	
Sex	Male	20	14.1	9.4	0.002
	Female	76	20.8	8.2	
Occupation	Freelance	5	20.0	7.1	<0.001
	Housewife	48	23.9	6.9	
	Employed	25	11.6	5.6	
	Unemployed	0	.	.	
	Retired	18	18.2	10.2	
	Student	0	.	.	
Monthly income (1000 ID)	> 500	37	13.6	7.6	<0.001
	250-500	26	20.9	7.5	
	< 250	33	24.8	7.3	
Residence	Owned	72	19.1	9.3	0.368
	Rent	19	21.5	7.4	
	Others	5	15.6	5.6	
Education level	Primary	38	22.4	7.6	<0.001
	Secondary	13	22.2	9.1	
	> Secondary	33	12.4	6.5	
	Not educated	12	26.2	5.9	
Marital Status	Single	2	12.5	3.5	0.061
	Married	91	19.2	8.8	
	Others	3	30.0	0.0	

Table 9: Mean days of poor sleep/rest according to studied variables

Variable	Category	Days of no enough sleep/ rest			P value
		N	Mean	SD	
BMI Category	Normal weight	19	17.3	8.3	0.215
	Overweight	16	17.6	8.6	
	Obesity I	16	22.4	9.2	
	Obesity II	15	22.8	9.0	
	Morbid obesity	3	23.3	11.5	
Knee Joints Involvement	Unilateral	25	14.0	6.5	<0.001
	Bilateral	44	23.5	8.4	
Age Group	40-49 y	10	15.7	7.7	0.114
	50-59 y	20	18.1	9.0	
	60-69 y	30	21.5	8.8	
	≥70 y	9	24.1	9.5	
Sex	Male	12	13.4	7.3	0.004
	Female	57	21.4	8.7	
Occupation	Freelance	3	16.7	11.5	<0.001
	Housewife	37	24.1	7.6	
	Employed	12	14.0	8.2	
	Unemployed	0	.	.	
	Retired	17	16.0	8.1	
	Student	0	.	.	
Monthly income (1000 ID)	> 500	24	14.3	7.9	<0.001
	250-500	15	18.2	8.7	
	< 250	30	25.5	6.7	
Residence	Owned	55	19.2	9.2	0.294
	Rent	11	23.9	7.3	
	Others	3	20.0	10.0	
Education level	Primary	30	22.1	8.9	<0.001
	Secondary	12	16.6	6.2	
	> Secondary	17	14.1	8.2	
	Not educated	10	28.0	4.2	
Marital Status	Single	2	15.0	7.1	0.213
	Married	65	19.9	9.0	
	Others	2	30.0	0.0	

on HRQOL of the patients and, we found that the higher BMI, age, disease duration and bilateral knee involvement, the lower the quality of life.

Taher E. *et al.* study which published in 2016 used KHOAQOL questionnaire also concluded that the perception of QoL is affected negatively by the duration of the disease. However in contrast to our study Age, sex, BMI and site of OA showed no statistically significant difference in their KHOAQOL score. This study found a significant positive correlation of BMI of patients and their physical activity parameter of KHOAQOL.[19]

In fact, OA is defined as a common complex disorder with multiple risk factors. These risk factors can broadly be divided into genetic factors and constitutional factors (as: age, sex, BMI)[20]

Zamri *et al.* study which published in 2020 was another study used KHOAQOL questionnaire and showed as our study Age was positively associated with social functioning (P = 0.005). Meanwhile, disease duration was positively associated with physical domain (P = 0.043). BMI was positively associated with physical domain (P = 0.040).[21]

Zakaria *et al.* study which published in 2009 used the Short Form-36 (SF-36) questionnaire results showed that Patients with higher body mass index (BMI) and existence co-morbidities scored lower in most of the QOL domains.

The physical health status showed lower score as compared to mental health component in this study.

As our study the domain concerning mental health components showed positive correlation with age. There

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Table 10: Correlations between BMI, age, disease duration, unhealthy days and healthy days

		Physical unhealth	Mental unhealth	Usual activities not done	Routine activities not done	sad/blue/ depressed	worried/ tense/anxious	No enough sleep/rest	very healthy/full of energy
BMI	r	0.360	0.279	0.445	0.372	0.268	0.384	0.290	-0.132
	P	0.023	0.066	0.001	<0.001	0.026	0.002	0.015	0.614
	N	40	44	51	96	69	62	69	17
Age	r	0.278	0.163	0.421	0.322	0.334	0.160	0.327	-0.189
	P	0.083	0.290	0.002	0.001	0.005	0.214	0.006	0.468
	N	40	44	51	96	69	62	69	17
Disease duration	r	0.275	0.175	0.522	0.369	0.418	0.275	0.470	-0.519
	P	0.086	0.256	<0.001	<0.001	<0.001	0.031	<0.001	0.033
	N	40	44	51	96	69	62	69	17
Days physical health not good	r		0.984	0.949	0.774	0.820	0.795	0.735	0.723
	P		<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
	N		39	35	38	16	30	18	15
Days mental health not good	r	0.984		0.945	0.685	0.585	0.798	0.697	0.723
	P	<0.001		<0.001	<0.001	0.005	<0.001	<0.001	0.002
	N	39		37	42	21	33	22	15
Days inability to do usual activities	r	0.949	0.945		0.754	0.709	0.658	0.821	0.723
	P	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	0.002
	N	35	37		50	30	31	30	15
Days routine things hard to do	r	0.774	0.685	0.754		0.933	0.881	0.853	0.130
	P	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	0.620
	N	38	42	50		69	62	68	17
Days felt sad/blue/depressed	r	0.820	0.585	0.709	0.933		10.000	0.859	-0.633
	P	<0.001	0.005	<0.001	<0.001		<0.001	<0.001	0.127
	N	16	21	30	69		45	61	7
Days felt worried/tense/anxious	r	0.795	0.798	0.658	0.881	10.000		0.837	-0.762
	P	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	N	30	33	31	62	45		42	17
Days of no enough sleep/rest	r	0.735	0.697	0.821	0.853	0.859	0.837		-0.633
	P	0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.127
	N	18	22	30	68	61	42		7
Days very healthy/full of energy	r	0.723	0.723	0.723	0.130	-0.633	-0.762	-0.633	
	P	0.002	0.002	0.002	0.620	0.127	<0.001	0.127	
	N	15	15	15	17	7	17	7	

r: Pearson's correlation coefficient, P: P value, N: number.

was a significant negative correlation between age and physical functioning ($P < 0.0005$) which indicated the deterioration of this domain as patients became older.[22]

Compared with healthy controls Salaffi *et al.* study which published in 2005 concluded that older adults with OA of the lower extremities undergo a significant impact on multiple dimensions of HRQOL.[23]

Conclusion

The overall results of this study reflect the negative impact of Knee OA on HRQOL of the patients and, we found that the higher BMI, age, disease duration and bilateral involvement, the lower the quality of life.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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