

## Most Association between lifelong daily activities and knee and hip osteoarthritis in a group of people attending Rizgary Teaching Hospital in Erbil city

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### Abstract

**Background and objective:** Wear and tear of joint cartilage is regarded as one of the main causes of osteoarthritis hence recurrent minor traumas due to some of lifelong daily activities can correlate with the development of osteoarthritis especially in weight bearing large joints. This study was designed to evaluate the association between 10 specified lifelong daily activities with knee and hip osteoarthritis.

**Methods:** A cross-sectional study was carried out in the outpatient clinic of Rizgary Teaching Hospital over a period of six months starting from November 2009. The study sample constituted 101 subjects with knee and/or hip osteoarthritis and 100 subjects of normal joints. Subjects fulfilling the inclusion criteria underwent clinical evaluation and radiology of their knee and hip joints. Differences between comparable subdivisions of the studied subjects in relation to the duration of each of the 10 specified lifelong daily activities was tested by the Chi-square test concerning the association of each daily activity with knee and hip osteoarthritis.

**Results:** Five of the 10 specified lifelong daily activities showed association with knee osteoarthritis, and these were; squatting, sitting on the floor, knee bending and crossed leg sitting postures, cycling, and less time sitting on chair or sofa. The same applied for osteoarthritis of hip except for cycling.

**Conclusion:** Lifestyle has an important role in the pathogenesis of knee and hip osteoarthritis.

**Keywords:** Daily Activities, Hip, Knee, OA.

### Introduction

Osteoarthritis (OA) predominantly involves the weight-bearing joints, including the knees, hips, cervical and lumbosacral spine, and feet.<sup>1</sup> It accounts for more dependency in walking, stair climbing, and other lower extremity tasks than any other disease, especially in the elderly.<sup>2</sup> While there are many unavoidable risk factors such as age and gender for the development of OA of the knee and hip joints, lifelong daily activities like sitting on the floor, lotus, squatting, and cycling are activities that people can avoid, and in doing so, lower their risk for developing arthritis later in life. Many studies have found that frequent squatting or lotus for periods of time ( $\geq 1$  hours/day) can have

a deleterious effect on the knee and hip joints as people age.<sup>3</sup> Squatting or ascent from the squatted position, accounted for roughly half of the meniscus tears that occurred during "everyday living" activities. Damage to the meniscus has been shown to lead to OA later in life.<sup>4</sup> Malpositions like lotus, knee bending and squatting demand a greater range of motion than that typically required.<sup>5,6</sup> Since the measurement of daily activities has not always been complete, exposure has been surmised indirectly from the subject's job and leisure-time activities description. The aim of this study was to to evaluate the association between 10 specified lifelong daily activities with knee and hip OA.

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## Methods

A cross-sectional study was carried out in the outpatient clinic of Rizgary Teaching Hospital over a period of six months starting from November 2009. A convenience method of sampling was used to collect 201 Kurdish patients attending the department of rheumatology in the outpatient clinic of Rizgary Teaching Hospital. Inclusion criteria were male 35-50 years old with a normal body mass index (BMI), i.e. less than 25 kg/m<sup>2</sup>. BMI is calculated according to Thomas E. Andreoli<sup>7</sup>. Exclusion criteria were any subject with BMI of more than 25 kg/m<sup>2</sup>. All causes of secondary OA; known previous or ongoing infective, inflammatory, or metabolic joint disease, having developmental deformities, previous major trauma to the knee or hip joints, ESR more than 40mm/hr, positive CRP or positive RF or raised serum uric acid and knee/hip joint related harmful occupations like farmers, constructive workers and professional athletics. Thorough examination of both knee and hip joints were done for each subject in addition to plain X-ray in antero-posterior and lateral views of both knee joints and hip joints. In the knee joints we searched for the evidence of tibiofemoral narrowing, patellofemoral narrowing, presence of osteophyte and cyst formation. In the hip joints we searched for the evidence of joint space narrowing (superior or inferior), presence of osteophyte and cyst formation. Diagnosis of OA was according to American Collage of Rheumatology classification criteria of OA clinically and radiologically of both hip and knee joints.<sup>8</sup> Subjects were subdivided into two groups: those who have evidence of knee and/or hip OA according to the American College of Rheumatology (ACR) criteria's.<sup>9,10</sup> The second group comprised of subjects who have no evidence for knee or hip OA. These two groups were further subdivided according to age factor into three categories.

## STATISTICAL ANALYSIS

The data have been processed by the use of the statistical package for the social sciences (version 18).<sup>11</sup> Chi-square test of association was used to compare between proportions among the two study groups. A *P* value ≤0.05 was considered statistically significant.<sup>12</sup>

## Results

No significant association was detected between hip and knee OA with carrying loads, climbing stairs, walking up-down hill, walking on flat ground and standing. A significant association was found for sitting on the floor for duration of ≥3hr/day for both knee and hip OA. The frequency of knee OA in association with sitting on chair/Sofa, for the duration categories of (1-2hr/day) was shown to be potentially protective against knee and hip OA while a significant association was found for the category (≥3hr/d) for both knee and hip OA. A significant difference was found in people who reported prolonged squatting for duration of >30 minute/day especially those using oriental toilette with knee OA and hip OA. Association of prolonged knee bending in crossed leg posture (lotus) with knee and hip OA for the duration category of >30minutes/day, was of statistically significant for both knee and hip OA. Cycling for duration of >30minutes/day for at least six months was a statistically significant risk factor for knee OA, but not for hip OA. Tables 1 and 2 show the association of lifelong daily activities with knee and hip OA.

**Table 1:** Association of Lifelong Daily Activities with Knee OA

Daily activity	Case% n=97	Control% n=100	P value
1. Sitting on the floor			
<1hr/d	20.6 n=20	62% n=62	< 0.001
1-2hr/d	6.2% n=6	28% n=28	
≥3hr/d	73.2% n=71	10% n=10	
2. Carrying load			
<2kg/d	55.6% n= 54	58% n=58	0.314
2-4kg/day	34.1% n= 33	26% n=26	
>4kg/day	10.3% n= 10	16% n=16	
3. Climbing stairs			
<3stories/day (reference)	67% n=65	69% n=69	0.387
3-5stories/day	28.9% n=28	23% n=23	
>10 stories/day	4.1% n=4	8% n=8	
4. Sitting on chair/sofa			
<1hr/d	25.9% n=25	1% n=1	<0.001
1-2hr/d	35% n=34	22% n=22	
≥3hr/d	39.1% n=38	77% n=77	
5. Squatting			
<30min/day	13.4% n=13	85% n=85	< 0.001
>30min/day	86.6% n=84	15% n=15	
6. Cross legged posture(lotus)			
<30min/day(reference)	32% n=31	79% n=79	< 0.001
>30min/day	68% n=66	21% n=21	
7. Cycling			
<30min/day	69% n=67	89% n=89	< 0.001
>30min/day	31% n=30	11% n=11	
8. Walking up-downhill			
<30min/day	89.69% n=87	83% n=83	0.172
>30min/day	10.31% n=10	17% n=17	
9. Walking on flat ground			
<1hr/d (reference)	49.5% n=48	42% n=42	0.631
1-2hr/d	42.3% n=41	52% n=52	
≥3hr/d	8.2% n=8	6% n=6	
10. Standing			
<1hr/d (reference)	46.4% n=45	61% n=61	0.875
1-2hr/d	30.9% n= 30	27% n=27	
≥3hr/d	22.7% n=22	12% n=12	

**Table 2:** Association of Lifelong Daily Activities with Hip OA

Daily activity	Case% n=97	Control% n=100	P value
<b>1. Sitting on the floor</b>			
<1hr/d (reference)	9.1% n=9	62% n=62	
1-2hr/d	18.2% n=18	28% n=28	0.0026
≥3hr/d	72.8% n=70	10% n=10	0.0001
<b>2. Carrying load</b>			
<2kg/d (reference)	45.5% n=44	58% n=58	
2-4kg/day	36.3% n=35	26% n=26	0.142
>4kg/day	18.2% n=18	16% n=16	0.112
<b>3. Climbing stairs</b>			
<3stories/day (reference)	54.54% n=53	69% n=69	
3-5stories/day	36.36% n=35	23% n=23	0.092
>10 stories/day	9.1% n=9	8% n=8	0.831
<b>4. Sitting on chair/sofa</b>			
<1hr/d (reference)	36.4% n=35	1% n=1	
1-2hr/d	54.4% n=53	22% n=22	0.001
≥3hr/d	9.2% n=9	77% n=77	0.0001
<b>5. Squatting</b>			
<30min/day (reference)	9.1% n=9	85% n=85	
>30min/day	90.9% n=88	15% n=15	0.0001
<b>6. Cross legged posture(lotus)</b>			
<30min/day(reference)	18.2% n=18	79% n=79	
>30min/day	81.8% n=79	21% n=21	0.0002
<b>7. Cycling</b>			
<30min/day(reference)	90.9% n=88	89% n=89	
>30min/day	9.1% n=9	11% n=11	0.104
<b>8. Walking up-downhill</b>			
<30min/day	72.7% n=71	83% n= 83	0.172
>30min/day	27.3% n=26	17% n=17	
<b>9. Walking on flat ground</b>			
<1hr/d	45.5% n=44	42% n=42	
1-2hr/d	36.3% n=35	52% n=52	0.378
≥3hr/d	18.2% n=18	6% n=6	
<b>10. Standing</b>			
<1hr/d	54.6% n=53	61% n=61	0.064
1-2hr/d	27.3% n=26	27% n=27	
≥3hr/d	18.1% n=18	12% n=12	0.184

## Discussion

Knee OA is a major worldwide public health problem. Mechanical factors generally are considered important in its pathogenesis.<sup>13,14</sup> Repetitive use may also play a role in causing hip OA.<sup>6</sup> The traditional way of sitting on the floor in our locality and the wide use of oriental toilette that requires squatting posture play a role in developing knee OA and to lesser extent hip OA. This study was conducted to evaluate those habitual daily activities as risk factors for knee and hip OA in Erbil city among a group of people who attended Rizgary Teaching Hospital. The data were collected randomly; the subjects include both urban and rural clusters in Erbil, and of different socioeconomic classes. The risk of age, gender and body weight as factors for developing OA have been restricted, by excluding subjects aging >50, female gender, and overweight. Thus, all the possible secondary causes of knee and hip OA were rolled out. The subjects groups were subdivided according to the duration of the 10 specified lifelong daily activities and habitual malpositions, into subgroups taking in consideration the shortest duration of each of these activities as a reference. The association of five of these lifelong daily activities showed to be not significantly including standing, walking on flat ground, walking up/down hill, carrying loads and climbing stairs. The results were in contrast to Coggon et al.<sup>15</sup> We demonstrated that squatting is significantly associated with knee OA.<sup>16-18</sup> Similar results were found by Tangtrakulwanich et al.<sup>19</sup> and Thambyah et al.<sup>20,21</sup> Our study showed a significant association between crossed legged posture (lotus) for duration of >30min/day with knee OA, which is similar to the results reported by both Coggon et al and Boonsin T. et al.<sup>16,19</sup> We found that the association between the duration of sitting on the chair or sofa and prevention of knee and hip OA, as the statistical investigation shows that sitting on the chair or sofa for duration of 1-3 hr/day have a protective effect for both hip and

knee OA. Sitting on the floor that is quite habitual daily activity among people in our locality was highly significant for the 1-2hr/day duration, reflecting that daily sitting on the floor for a duration  $\geq 1$  hr/day may play role as a risk factor for both knee and hip OA, which is similar to the study of Boonsin T. et al.<sup>19</sup> An extra risk of knee OA in people who cycled >30 minutes a day in analogous to S. Dahaghin et al who also confirmed this association.<sup>15</sup> The frequencies of hip OA among our case group were quite low since all the secondary risk factors were excluded.

## Conclusion

The study has confirmed the association between some of the habitual lifelong daily activities as risk factors and OA of knee and hip joints. Daily habitual mal-positions of squatting, sitting on the floor, sitting with knee bending and crossed legs (lotus) posture can have harmful effects on these joints. Cycling has confirmed to play a role in predisposing to OA of knee joint, while sitting on the chair or sofa for daily duration of 1-3hours, has a protective effect for both knee and hip OA. The associations presented are very close to reality and our findings support the theory that OA has an overuse component in its pathogenesis.

## Conflicts of interest

The authors report no conflicts of interest.

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