

Habitual Physical Exercise and Osteoarthritis of the Knee in Female

Emran M^{1*}, Hasan MI², Ahmed SM³, Newaz F⁴, Atiquzzaman M², Rahman HH²

¹Department of Physical Medicine and Rehabilitation, Khwaja Yunus Ali Medical College and Hospital, Sirajganj, Bangladesh; ²Department of Physical Medicine and Rehabilitation, Kurmitola General Hospital, Dhaka, Bangladesh; ³Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ⁴Department of Physical Medicine and Rehabilitation, Kumudini Women's Medical College and Hospital, Tangail, Bangladesh

Abstract

Background: The exercise is a widely promoted way to improve and maintain health, and osteoarthritis (OA) is a major health problem also. The study was conducted to examine the impact of different types of leisure-time physical activity on the OA of the knee.

Objective: The study was aimed to evaluate the association of recreational (habitual) physical activities with the osteoarthritis of the knee in the female.

Methods: The case-control study was carried out on 174 female selected purposively with the age range of 40 – 70 years and above, from September 2016 to August 2017. Among them 87 were the cases with OA of the knee, and the same number of healthy females of the same age group were included as the control. Physical activity was assessed by self-reported regular exercise patterns. A structured interviewer-administered questionnaire was used to collect data.

Results: Age, educational status, occupational status and BMI were not statistically significant ($p > 0.05$) between the two groups. High level of physical activities (walking, running or jogging 20 or more miles per week) were associated with osteoarthritis of the knee, while low level of physical activities (<10 miles/per week) and moderate level of physical activities (10-20 miles/per week) had no significant association with the osteoarthritis of the knee.

Conclusion: Based on the findings, the study suggests not to continue a high level of physical activities rather than to continue with moderate and low level of physical activity in accordance to subject's physical propensity, and endorse this note for the general health promotion.

Keywords: Osteoarthritis, Habitual physical exercise, Physical propensity, High level physical activity.

Introduction

The bio-mechanical influence of anthropometric changes and habitual physical activity levels are important linked contributory factors which may play a role in the prevalence and symptomatology of osteoarthritis in aging women.¹

The beneficial health effects of physical activity are well known, include increased longevity and decreased incidence of cardiovascular disease, diabetes, obesity, and hypertension.²⁻³ One of the potentially hazardous effects of physical activity is osteoarthritis.⁴

Female gender, age, obesity, previous joint injury, occupational activities are known risk factors for both hip and knee osteoarthritis.⁵

There is an increased risk of developing hip and knee OA with specific strenuous exercise and longterm physical activity were detected among general population, here wear and tear theory of joint degeneration related to repetitive joint loading.⁶⁻⁸

The moderate and vigorous physical activities including recreational running do not significantly increase the risk of OA.⁹⁻¹⁰

While many kinds of physical activity require repetitive joint use that may cause cartilage attrition, physical activity can help in preventing OA in different ways like strengthening the muscular support around joints and thereby reduces the risk of joint injury, improve and maintains joint mobility by preventing the

*Correspondence: Mohammed Emran, Department of Physical Medicine and Rehabilitation, Khwaja Yunus Ali Medical College and Hospital, Sirajganj, Bangladesh; e-mail: emran.pmr@gmail.com;
ORCID: 0000-0002-6744-0225

joints from 'freezing up' and physical activity helps to avoid obesity, a risk factor for some forms of OA. Finally, mature cartilage cells receive nourishment only from the diffusion of substances through the cartilage matrix from the joint fluid as because cartilage has no blood vessels or nerves, and physical activity enhances this process.¹¹

A widely promoted way to improve and maintain health is leisure-time physical activity. The potential effect of physical activity on OA is important to understand.

Previous studies on the effect of physical activity on the knee joint have reported conflicting findings. Moreover, a few studies have been carried out on this fact in Bangladesh.

Therefore, this study was aimed to explore the interaction between physical activities with the osteoarthritis of the knee in the female.

Materials and Methods

This case-control study was conducted on 174 female participants. Data were collected using a structured interviewer-administered questionnaire, enquiring about demographic data and details of the physical activities. All procedures of this study including ethical aspects were reviewed and approved by the Institutional Review Board of the Bangabandhu Sheikh Mujib Medical University, (BSMMU) and performed following the declaration of Helsinki principles. Informed consents were obtained from all patients after explaining the nature and purpose of the study. Each patient enjoyed every right to participate or refuse or even withdraw from the study at any point in time. The study was conducted at the Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from September 2016 to August 2017.

The total 174 female participants were selected by purposive sampling, and were divided into the two groups where 87 patients with osteoarthritis of the knee as the case and 87 without osteoarthritis of the knee were in the control group.

Inclusion criteria for the study included (1) female, (2) age range 40 to 70 years and above,

(2) fulfill the American College of Rheumatology (ACR) clinical and radiological criteria for diagnosis of osteoarthritis, (3) doing any level of the habitual physical activity.

The exclusion criteria included (1) male, (2) secondary osteoarthritis, (3) morning stiffness more than 1 hour, (4) malignancy, (4) tuberculosis.

Physical activity was assessed by self-reported regular exercise patterns. Among those who reported any regular exercise, three levels of activity were defined: high (those who had physical activity more than 20 miles per week); moderate (those who had physical activity between 10 and 20 miles per week); low (those who had physical activity up to 10 miles per week). The chosen basis for the physical activity index was walking, running, jogging here because they were the most common activity for this population.

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0. The quantitative observations were indicated by frequencies and percentages. Chi-Squared test was used to analyse the categorical variables, showed with cross tabulation. The univariate logistic regression analysis was used to the regular physical activity and the results were expressed as odds ratios with 95% confidence intervals. The p -value of <0.05 was considered statistically significant. Here significant, denoted of having the association.

Results

Demographic data were obtained from all the respondents. The mean age was 57 years. Age, educational status, occupation and BMI were not statistically significant ($p>0.05$) between the two groups. (table I)

Among the 87 patients, 55 were doing a high level of physical activities, the value was 41 in the control group and the p value was significant (<0.05). The low level of physical activities and a moderate level of physical activities were not statistically significant ($p>0.05$) between the two groups. (table II)

Table I: Demographic characteristics of the respondents

	Case (n=87)		Control (n=87)		p value
	n	%	n	%	
Age (year)					
40-50	31	35.6	29	33.3	0.717 ^{ns}
51-60	30	34.5	25	28.7	
61-70	18	20.7	23	26.4	
>70	8	9.2	10	11.5	
Educational status					
Illiterate	5	5.7	8	9.2	0.387 ^{ns}
Literate	82	94.3	79	90.8	
Occupational status					
Teacher	31	35.6	28	32.2	0.961 ^{ns}
Banker	27	31.0	23	26.4	
Doctor	9	10.3	11	12.6	
House wife	8	9.2	9	10.3	
Business	6	6.9	7	8.0	
Garment worker	5	5.7	7	8.0	
Household worker	1	1.1	2	2.3	
BMI (kg/m ²)					
<18.5	2	2.3	3	3.4	0.472 ^{ns}
18.5-24.9	44	50.6	53	60.9	
25.0-29.9	25	28.7	20	23.0	
≥30.0	16	18.4	11	12.6	

ns = not significant

Table II: Regular physical activity of the respondents

Regular physical activity (miles/per week)	Case (n=87)	Control (n=87)	OR (95% CI)	p value
Low (<10)	7	14	2.19 (0.77-6.40)	0.103 ^{ns}
Moderate (10-20)	25	32	0.69 (0.35-1.37)	0.258 ^{ns}
High (>20)	55	41	1.93 (1.01-3.70)	0.032 ^s

s= significant, ns= not significant

Discussion

This case-control study on women provides additional knowledge about the relation of physical activity to osteoarthritis of the knee.

This study proves Marti et al where they said that premature OA could happen in high-intensity exercise over a long period of time.¹²

Another study found an association with a two to three fold increased risk of radiologic OA of the knees and hips in women who were involved in weight-bearing sports (running, jogging, etc.) activity which is in favour of this study.¹³

Some studies investigated the effect of physical activity on the knee joint and reported conflicting findings. Although some of them reported that physical activity is associated with risk for knee OA.^{6, 13-14}

A study showed female gender as a significant risk factor along with the other risk factors for Knee OA among walkers and runners.¹⁵

Selected types of physical activity may initiate and/or exacerbate cartilage degeneration by transmitting repetitive impact and torsional loads to the large weight-bearing joints such as the hip and knee.¹⁶ Here the high level of physical activity was the significant one.

In this study, the moderate and low level of physical activity was not associated with the osteoarthritis of the knee and that was seen in other studies. All suggested, without significant joint injury, moderate types of physical activity do not increase the risk of OA.^{1, 7, 17-23}

It was identified in a study that there was no increased risk for radiographic knee OA in middle-aged and elderly persons who participated in the recreational exercise.²⁴

Other studies observed that physical activity might have no effect or may even protect the knee joint from degenerative changes.^{8, 24-26}

The similarity of this study with others is that there is no association of the moderate level of physical activities with osteoarthritis of the knee, while it differs from that high level of physical activities, have an association.

The recommendation is to continue low level and moderate level of physical activity, and public health guideline can be followed.²⁷⁻²⁸ This could be an important message for health promotion in general and for the prevention of the knee osteoarthritis in particular.

Conclusion

This study accords a proposition about the alliance of physical activity and OA knee and encourage not to continue high level of physical activity rather than to continue with moderate and low level of physical activity in accordance to subject's physical propensity. The study also endorses this note for the general health advancement and explicitly to impede the OA of the knee.

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