

Original Research



The relationship between knee osteoarthritis and ischaemic heart disease among patients attending the National Hospital of Sri Lanka – A comparative study

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Abstract

Background & Aim: Osteoarthritis (OA) is a highly prevalent type of arthritis worldwide, and the knee is the most commonly affected joint of all. Ischaemic heart disease (IHD) is also a major contributor to disability, among other cardiovascular diseases. A growing amount of research suggests that OA may be considered a cardiovascular risk factor. This study aims to assess the relationship between knee OA and IHD among patients attending the National Hospital of Sri Lanka (NHSL).

Methods: A comparative study was conducted on 80 patients, aged between 50 and 75 years, at NHSL. Among them, 40 patients diagnosed with IHD from Cardiology Institute and medical clinics were selected as the study group, and 40 patients from medical clinics who were not diagnosed with IHD were selected as the control group. Two groups were matched for age and gender. Diagnosis of knee OA and IHD in the participants was established by a valid diagnosis made by a registered medical officer. An interviewer-administered questionnaire was administered to collect data. Descriptive statistics and the Chi-squared test were used for data analysis.

Results: The majority were older adults between 61 and 65 years ($n=12$, 30.0%), and females ($n=22$, 55.0%) in both study and control groups. The percentage of those with knee OA was significantly higher in study group ($n=15$, 37.5%) than in the control group ($n=6$, 15.0%) (OR=3.4; 95% CI=1.156-9.996; $p=0.022$).

Conclusions & Recommendations: Patients with knee OA are at a significantly higher risk of developing IHD. Patient education focusing on OA prevention is highly recommended.

Keywords: *knee osteoarthritis, ischaemic heart disease*

Introduction

Osteoarthritis is a leading cause of physical disability and impaired quality of life (1). It is a degenerative joint condition that affects entire joint, including the surrounding tissues (2). Osteoarthritis is a major contributor to morbidity in older adults and increased cost of healthcare. Numerous individual and collective risk factors are associated with the onset and course of illness (3). As people become older, the prevalence of OA increases. Before the age of 50, the risk of developing OA is low, and afterward, it increases drastically. Consequently, most adults over 60 will show some radiological signs of OA, though only one-quarter of them are symptomatic (4). The knee is the most common joint affected by osteoarthritis and it is most common in elderly and obese women (5).

Globally, cardiovascular disease (CVD) is one of the primary causes of death. The term CVD refers to a group of heart and blood vessel disorders, which include coronary heart disease, deep vein thrombosis, congenital heart disease, rheumatic heart disease, peripheral arterial disease, and cerebrovascular disease. The WHO estimates that 17.9 million deaths worldwide occurred in 2019 as a result of CVDs. More than one-third of all CVD fatalities occur in low- and middle-income nations (6). Ischaemic heart disease (IHD), also called coronary heart disease (CHD) or coronary artery disease (CAD), is the most prevalent type of heart disease. It includes myocardial infarction (MI) and angina (7).

Thus, the relationship between OA and CVDs has been studied in several countries, although there are no known studies to date in Sri Lanka. Hence, this study aimed to determine the prevalence of knee OA among patients with a diagnosis of IHD compared to a control group without an IHD diagnosis and assess the relationship between knee OA and IHD among patients attending NHSL.

Methods

This comparative study was conducted at the Cardiology Institute and medical clinics in the National Hospital of Sri Lanka from 21st March 2022 to 22nd April 2022.

Study population and sampling

The study involved two groups based on the presence or absence of IHD. The study group consisted of 40 patients aged 50 to 75 years with a previous diagnosis of IHD, selected from Cardiology Institute and medical clinics at NHSL. The age and gender-matched control group consisted of 40 patients who had never been diagnosed with IHD and were selected from the medical clinics at NHSL. Those who had any type of arthritis other than knee OA, OA in joints other than the knee, diagnosis of knee OA after the diagnosis of IHD, congenital heart diseases, and any form of walking disability were excluded from both groups. The diagnosis of knee OA and IHD was based on a prior valid diagnosis made by a medical doctor. To reduce the effect of recall bias on the study, medical records were used to confirm the diagnosis of both knee OA and IHD. Participants were purposively recruited for the study.

Data analysis

An interviewer-administered questionnaire was used to collect data on socio-demographic characteristics, ischemic heart disease, and knee osteoarthritis. It was prepared in simple language, and translation-back-translation technique was ensured its suitability for administration to Sinhala and Tamil speaking populations. The questionnaire was pre-tested among a group of homogenic patients, and further modifications were done to initial version of the questionnaire based on responses. SPSS (Statistical Package for Social Science), version 23.0, was used to analyse data. Statistical significance was set at $p < 0.05$.

Table 1. Characteristics of patients with ischaemic heart disease (IHD) and controls

Characteristic		Groups, No. (%)		p value
		Cases (n=40)	Controls (n=40)	
Age (years)	51-55	11 (27.5)	11 (27.5)	1.0
	56-60	4 (10.0)	4 (10.0)	
	61-65	12 (30.0)	12 (30.0)	
	66-70	7 (17.5)	7 (17.5)	
	71-75	6 (16.0)	6 (16.0)	
Gender	male	18 (45.0)	18 (45.0)	1.0
	female	22 (55.0)	22 (55.0)	
Duration of IHD (Years)	<1	21 (52.5)		
	1-2	5 (12.5)		
	2.1-3	5 (12.5)		
	3.1-5	5 (12.5)		
	5.1-10	4 (10.0)		
	>10	0 (0.0)		
Duration of knee osteoarthritis (OA) (Years)	no OA	25 (62.5)	34 (85.0)	0.075
	<1	1 (2.5)	2 (5.0)	
	1-2	0 (0.0)	0 (0.0)	
	2.1-3	1 (2.5)	0 (0.0)	
	3.1-5	2 (5.0)	2 (5.0)	
	5.1-10	5 (12.5)	2 (5.0)	
	>10	6 (15.0)	0 (0.0)	
Physical activity	light	31 (77.5)	4 (10.0)	<0.001
	moderate	5 (12.5)	7 (17.5)	
	vigorous	4 (10.0)	29 (72.5)	
BMI category	underweight	0 (0.0)	2 (5.0)	<0.001
	normal weight	8 (20.0)	18 (45.0)	
	overweight	12 (30.0)	18 (45.0)	
	obese	20 (50.0)	2 (5.0)	
Smoking status	current smoker	6 (15.0)	3 (7.5)	0.223
	former smoker	9 (22.5)	5 (12.5)	
	non-smoker	25 (62.5)	32 (80.0)	
Alcohol consumption	regular drinker	3 (7.5)	2 (5.0)	0.809
	frequent drinker	3 (7.5)	5 (12.5)	
	occasional drinker	9 (22.5)	7 (17.5)	
	abstainer	25 (62.5)	26 (65.0)	

Data are presented as mean (SD)

Approval for the study was received from the Ethics Review Committee of the Faculty of Medicine, University of Colombo, Sri Lanka.

Results

Table 1 provides a detailed comparison of the characteristics of the study (n=40) and control (n=40) groups across several categories, including age,

gender, physical activity, BMI, smoking status, and alcohol consumption. The majority of the participants were females (n=22, 55.0%) and belonged to the 61 and 65 years of age category (n=12, 30.0%) in both the study and control groups. The study group had a higher proportion of participants with longer durations of knee OA (over 10 years) (n=6, 15.0%) and higher rates of light physical activity (n=31, 77.5%) and obesity (n=20, 50.0%). In contrast, the control group had more participants engaging in vigorous physical activity (n=29, 72.5%), with a higher proportion belonging to normal weight and overweight categories (n=18, 45.0%). Both groups had similar smoking and alcohol consumption patterns, with the majority being non-smokers and abstaining from alcohol (Table 1).

In terms of knee OA, the study group had a significantly higher proportion of individuals with

knee osteoarthritis (37.5%) compared to the control group (15.0%), with this difference being statistically significant ($p=0.022$). This difference highlights the greater prevalence of knee OA in individuals with ischaemic heart disease (IHD) compared to those without IHD, providing a statistically significant relationship between knee osteoarthritis and ischemic heart disease (Table 2).

An odds ratio of 3.4, with a 95% confidence interval of 1.156-9.996, demonstrates that patients with knee osteoarthritis are at a significantly higher risk of developing ischemic heart disease. This indicates that individuals with knee OA are 3.4 times more likely to develop ischemic heart disease than those without knee OA, and the statistical significance of this finding is reinforced by the 95% confidence interval (CI), which does not cross 1, suggesting the result is not due to random chance. (Table 3).

Table 2. Comparison of presence of knee osteoarthritis (OA) between study and control groups

Group	Patients with knee OA	Patients without knee OA	Total	Statistics
	No. (%)	No. (%)		
Study group	15 (37.5%)	25 (62.5%)	40	$\chi^2=5.23$ d.f.=1 p=0.022
Control group	6 (15.0%)	34 (85.0%)	40	

Data are shown as N (%)

Table 3. Odds ratio for ischemic heart disease

Risk estimate	Value	95% confidence interval	
		Lower	Upper
Odds ratio for IHD (Yes / No)	3.4	1.16	9.996
For cohort Knee OA = Yes	2.5	1.08	5.786
For cohort Knee OA = No	0.735	0.56	0.966

Abbreviations: IHD- Ischaemic heart disease, OA – Osteoarthritis

Discussion

Numerous studies have explored the relationship between OA and CVD, revealing varying degrees of association. Similar to the findings of the current study, several studies suggest a significant link

between knee OA and cardiovascular conditions.

The association between knee OA and IHD has been studied worldwide. Japanese population has been reported with a significant association between knee OA and CVD, especially IHD and stroke (8). A

stronger association between OA in either hip or knee and CVD has also been reported. Those with OA have shown more potential CVD risk factors than those without OA (9-10). A significant correlation between knee OA and heart diseases such as angina and congestive heart failure has been established in both men and women (11), particularly in older adults (12). A systematic review (13) and a meta-analysis (14) further supported these findings by showing a significant prevalence of cardiovascular disease in patients with OA, noting that individuals with OA have a higher chance of developing IHD and heart failure compared to matched controls (13). Contrasting findings are also available in literature reporting no direct relationship between OA and the risk of CVD, although having a disability regardless of the presence of OA has been found as a predictor of future CVD (15).

Knee OA has been found to be an independent predictor of new or recurring cardiovascular events. OA-related difficulty walking has been identified as a clinically significant risk factor for CVD (16). Functional restrictions, particularly walking difficulties, caused by knee or hip OA may serve as modifiable risk factors for CVD (17).

The results of the current study should be interpreted in the background of potential sampling bias owing to convenient sampling.

Conclusions

Patients with knee osteoarthritis are more prone to suffering from IHD, necessitating early diagnosis of osteoarthritis, lifestyle modifications, proper treatments, and patient education to improve physical activity and weight management. The growing body of evidence pointing to a connection between OA and CVD emphasizes the need for integrated management strategies. Recognizing the potential link between these conditions could lead to improved clinical outcomes, particularly through interventions aimed at improving physical activity and managing pain. However, the variability in

research findings calls for further investigation to better understand how OA and CVD interact and to develop evidence-based recommendations for clinical practice.

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Author Declarations

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Author contributions: UD & SR conceptualized the research and developed the proposal, collected the data and wrote the original manuscript. SR supervised the procedure.

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