

RADIOGRAPHIC FINDINGS AMONG PATIENTS PRESENTING WITH LOWER LIMB PATHOLOGIES IN ARWANDAN HOSPITAL

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ABSTRACT

Introduction: Complaints of the lower extremities medical conditions are a prevalent problem because of their substantial impact on functional disability. Interpretation of lower limb radiographs among patients with musculo-skeletal complaints is a challenge to general doctors and radiographers due to the complexity of radiographic findings. This leads to delay in provision of diagnosis for lower limb pathologies.

Aim: The aim of the study was to describe the radiographic findings among non-traumatic patients with lower limb pathologies.

Materials and Methods: This was a descriptive cross sectional survey design study was adopted for this study design involving 150 patients enlisted using purposive sampling. The target population were all patients who attended radiology department at Ruli hospital with non-traumatic lower limb pathologies from June 2015 to April 2016.

Results: The findings of 144(96%) patients appeared abnormal at first impression. Joint and soft tissues were mostly affected n=68(14.3%). The tibia was most affected bone n= 48(32%) followed by femur n=39(26%). The most predominant lesions were mixed n=58(38,7%) and main diffuse n=52(34.7%).

Conclusion: The common radiographic findings were mixed lesions related to bone and joint infections. An additional guideline or systematic approach is suggested to aid lower limb plain x-ray image interpretation.

INTRODUCTION

Lower limb medical pathologies are prevalent and cause severe long-term pain around the world [1]. According to Stoesser *et al.*, there is no age group differences in the prevalence of all age groups but

adults are more likely to be affected [2]. Among the Americans, it has been estimated that one out of four consultations in primary health care is due to problems of the lower limb [3]. In Nigeria lower limb symptoms remain one of the commonest

indication for surgical procedures with prevalence of 30% (4). The increasing prevalence was attributed to uncontrolled metabolic bone diseases resulting from complications of diabetes [4].

In Rwanda a study by Atijosan showed that 55.6% of complaints were attributed to untreated musculo-skeletal condition and 25% were caused by non-traumatic conditions of the lower limbs including congenital, infectious, neurological and metabolic causes [5].

It has been observed that lower limb pain is a common clinical symptom at Ruli Hospital in Rwanda with its attendant challenges to doctors and radiographers. There is however paucity of literature on the prevalence of lower limb problems, radiographic findings and the socio-demographic association among patients attending Ruli District Hospital in Rwanda. Therefore, this study was aimed to describe the radiographic findings among non-traumatic patients with lower limb symptoms.

METHODOLOGY

Cross-sectional survey was adopted for the study. This study was conducted at Ruli district hospital x-ray Unit. The Ruli hospital is a 176 bed hospital located in Northern Province/Gakenke District/Ruli Sector / Kigali City of Rwanda. Ethical approval was obtained from Menzo Hospital Research Review Committee (MHRRC) and ECUREI Research Committee. Permission and authorization was obtained from Ruli District Hospital administration.

All patients who attended Ruli Hospital from June 2015 to April 2016 with lower limb pathologies and consented to participate in the study were enlisted. The researcher explained the procedures and the aims of study to the patients and they were made to sign the consent form. Confidentiality of the patients' information was maintained throughout the duration of the study. A researcher-developed questionnaire and data capture sheet based on objectives of the study was used for data collection. The questionnaire was adopted from a similar

study [5] and modified according to Rwandan context. The questionnaire was pretested to ensure clarity and patients' understanding of the questions. Socio-demographic data, clinical information and other necessary data were obtained. All the enlisted patients underwent radiographic X-ray of the lower limb in antero-posterior and lateral projections. The radiographic findings were evaluated and described initially by the researcher and reported by a radiologist. The findings and the differential diagnosis were documented in the data capture sheet. Data were subjected to descriptive statistics using SPSS version 16 and presented in percentages, tables and figures.

RESULTS

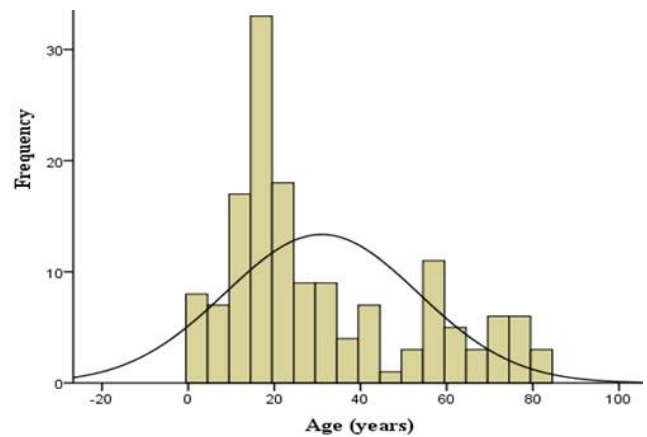


Fig. 1, shows the different age categories of the patients with non-traumatic lower limb injuries.

The ages range from zero to 85 years with the highest frequency between 15 and 20 years.

Table 1, below shows that the non-traumatic lower limb symptoms were mostly in the age group of 11-20 years (34%). The longest duration of symptoms was 12-36 months (25.3%) and shortest period was 7-12months(6.7%).

The female patients were more (51.3%) as against the males (48.7%). Patients who were from the catchment area of Ruli hospital constituted majority (58%). Most of the patients were outpatients (76.5%).

Table 1 Social and demographic profile of respondents

Variable	Categories	Frequency(N=150)	Percentage(%)
Pain	Yes	138	92.0
	No	12	8.0

Variable	Categories	Frequency(N=150)	Percentage(%)
Swelling	Yes	120	80.0
	No	30	20.0
Deformity	Yes	86	57.3
	No	64	42.7
Limited movement	Yes	99	66.0
	No	51	34.0
Skin wound	Yes	57	38.0
	No	93	62.0
Discharge	Yes	55	36.7
	No	95	63.3

The most prevalence symptoms were the pain 138(92%), swelling 120(80%) and limited movement 99(66%).

Table 3: Distribution of radiographic abnormalities in different lower limb anatomical parts among patients with non-traumatic lower limb symptoms

Variable	Categories	Frequency(N=150)	Percentage(%)
First impression	Normal	6	4.0
	Abnormal	144	96.0
Affected limb	Right	66	44.0
	Left	63	42.0
	Both	21	14.0
Limb parts affected	Bone	11	7.3
	Joint	17	11.3
	Soft tissues	23	15.3
	Bone and soft tissues	16	1.7
	Joint and soft tissues	68	54.4
	Multiple parts	11	7.3
	None	4	2.7
Affected bone	Femur	39	26.0
	Tibia	48	32.0
	Fibula	4	2.7
	Foot	4	2.7
	None	55	36.7
Bone parts affected	Epiphysis	37	24.7
	Metaphysis	41	27.3
	Diaphysis	15	10.0
	Multiple parts	14	9.3
	None	43	28.7

From table 3, a total of 144 of the radiographs show abnormal findings. The right leg (44%) was more affected than the left. Joint and soft tissues were more affected (54.4%) while abnormalities to the tibia had the highest frequency (32%). Metaphysis of bones were mostly affected (27.3%).

Table 4: Specific characteristic of radiographic lesions found among patients with non-traumatic Lower limb symptoms at Ruli Hospital.

Variable	Categories	Frequency (N=150)	Percentage (%)
Bone appearances	Osteolytic	10	6.7
	Osteoblastic	23	15.3
	Mixed	58	38.7
	None	59	39.3
Osteolytic classification	Solitary	17	11.3
	Diffuse	52	34.7
	None	81	54.0
Osteoblastic classification	Solitary	9	6.0
	Diffuse	70	46.7
	None	71	47.3
Affected joint	Hip	17	11.3
	Knees	38	25.3
	Ankle	5	3.3
	Foot	6	4.0
	None	84	56.0
Joint appearance	Tissue swelling around joint	13	8.7
	Space narrowing	19	12.7
	Articular fine erosions	1	0.7
	Deformity due eccentric joint space narrowing	18	12.0
	Widening	6	4.0
	Loss of joint space	3	2.0
	None	90	60.0
Provisional diagnosis	Infection	118	78.7
	Metabolic disease	5	3.3
	Tumor	2	1.3
	Congenital	8	5.3
	Degenerative	17	11.3

The majority of bone lesions were mixed (osteolytic and osteoblastic) at the rate of 38.7%. Diffuse changes were more in both categories, osteolytic (34.7%) and osteoblastic (46.7%). The most affected joint was the knee (25.3%).

DISCUSSION

Musculoskeletal symptoms are prevalent and their impact is pervasive. They are most common cause severe physical disability and they affect hundreds

of millions worldwide [6]. The most prevalence symptoms in this study were pain 138(92%), swelling 120(80%) and limited movement 99(66%). Our finding is similar to that of Thiem *et al.*, [7] which reported lower limb pain as the most prevalent symptoms in the general population. Our study shows that non-traumatic lower limb symptoms were mostly in age the groups of 11-20 years and 21-30 years. This is because they are the most active age group in Rwanda. They often

engage in several musculoskeletal activities. It is our opinion that lack of early presentation, aseptic conditions and poor hygiene predispose the young people to bone and joint infection. Our finding is similar to that of Horvath *et al.*, conducted in Central European region [8].

The longest duration of symptoms in the current study was 12-36 months. Our study showed that most of pain was due to non traumatic condition which is similar to an earlier study [9].

The male to female ratio from our study was almost 1:1. This shows that women and men are affected equally by non-traumatic lower limb pain. The study by El-Metwally, *et al.* [10] attributed cause to be psychosomatic which is contrary to the finding from our study where abnormalities on radiographs were found in most patients.

The women in Rwanda predominantly carry out domestic work and have no time for physical fitness and exercise. This often results in unexplained musculo-skeletal pain compared to the males who participate in physical exercises. The study by Ceballos *et al.*, [11] in Brazil to determine the factors associated with pain in the lower limb especially ankle and foot showed that females were predominantly affected (86.1%) pain due to their hypermobility/hyper flexibility [11].

In this study 96% of the radiographs appeared abnormal at first impression and 4% appeared normal. This suggests that limb x-rays in patients with symptoms are most likely to be abnormal in Rwanda.

A study by Roddy *et al.*, on the population prevalence of symptomatic radiographic foot osteoarthritis in community-dwelling older adults revealed that plain radiography is more sensitive towards detecting non traumatic lower limb bone lesion [12].

The current study observed that metaphysis of the bones was mostly affected (27.3%). This may be probably due to the finding that chronic osteomyelitis had metaphysis as the primary site of infection. A study in Argentina on primary hydatid disease of the tibia showed lesions involving metaphysis and diaphysis of left proximal tibia as a common radiographic features which is contrary to the finding in the present study [13].

Majority of the bone lesions were mixed lytic and sclerotic (38.7%). This was reported to be due to sub-acute and chronic osteomyelitis which presented as radiolucencies (Brodie's abscess) and changes due to new bone deposition [14]. However

other studies found the radiographic features suggesting an atypical and minimal form of bone necrosis on radiographs such as areas of mixed bone sclerosis as osseous lesions [15] and osteolysis surrounded by sclerotic margins [16].

A study by Pineda *et al.*, [17] documented the features suggestive of active infection to include: change in appearance since previous radiographs (increasing lysis); immature periosteal reaction (i.e. thin and linear); presence of sequestra; presence of draining sinuses, soft tissue swelling and obliteration of the normal intermuscular fat planes due to the oedema [17].

It was observed that in most cases that after some 2 weeks a periosteal reaction and underlying bone destruction involving the medulla and cortex start to develop, and there will be loss of density in the surrounding bone due to the hyperaemia as indicated in studies done by Mitha *et al.*, [18].

The most affected joint was the knee (25.3%) [19]. The finding is probably due to the geographic inaccessibility of Rwanda due to many hills in the remote areas and walking long distances climbing mountains. Our finding is similar to the finding in a study done among UK population which showed knee joints was the most affected [20].

The most prevalence symptom from our study was pain (92%). This is similar to an earlier study which suggested the causes as impact on the nerve system which supply lower extremity as well as poor blood supply [21].

The common radiographic findings were mixed bone lesions (osteolytic and osteoblastic) at 38.7%. It was attributed to both bone and joint infections in previous studies [23,24]. The studies reported that well defined osteolytic bone lesion, ill-defined lytic and sclerotic lesions should be considered as benign bone tumor and that the morphology should be correlated with different age groups.

Our study showed narrowing of joint spaces on the radiograph (12.7%) probably due to absorption of synovial fluid secondary to the infection. A study by Jacobson *et al.*, observed reduction in joint spaces in patients with arthritis and degenerative joint diseases similar to that due to infection [25]. It was therefore suggested that caution should be applied in the interpretation of radiographs with narrowing of joint spaces.

CONCLUSION

The common radiographic findings were mixed

lesions related to bone and joint infections. An additional guideline or systematic approach is suggested to aid lower limb plain x-ray image interpretation.

Conflict of interest: Nil

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