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## The epidemiology of rheumatic disorders in a rural area of the Democratic Republic of Congo (DRC): A COPCORD study

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### Abstract

**Objective:** To determine the prevalence of rheumatic diseases in a rural area of DR Congo.

**Methods:** A cross-sectional study was performed in six randomly chosen villages of the health division of Gombe-Matadi, in Kongo-Central province (near Kinshasa), from 15<sup>th</sup> October to 15<sup>th</sup> November 2012. Investigators questioned all individuals living in these villages, using the COPCORD Core questionnaire (CCQ). Age, sex and rheumatic complaints were noted. X-rays, and laboratory tests (C-reactive protein, erythrocyte sedimentation rate, blood cells count, uric acid and some serological assays) were performed.

**Results:** In total, 1500 individuals were questioned. Rheumatic complaints were reported by 743 individuals (49.5%), of whom 424 women and 319 men (sex ratio H/F 0.8). Their average age was 48.8±15.4 years. The encountered diseases were: osteoarthritis in 552 patients (prevalence of 36.8%), spondylarthropathies in 57 patients (prevalence of 3.8%), soft tissue rheumatism in 78 patients (5.2%), rheumatoid arthritis in 21 patients (1.4%), juvenile arthritis in 19 patients (1.26%), infectious arthritis in 11 patients (0.73%), rheumatic fever in 9 patients (0.6%) and gout in 1 patient (0.06%).

**Conclusions:** All types of rheumatic diseases can be found in rural areas and some of them like SpA, RA were found with very high frequencies. Also, clinical and demographic differences were observed compared to literature data.

**Key words:** Rheumatic diseases, Rural area, DR Congo

### Introduction

To know the prevalence of musculoskeletal disorders is a capital preoccupation of The Community Oriented Program for Control

of Rheumatic Diseases (COPCORD) is an emanation of the International League of Associations for Rheumatology (ILAR) with the collaboration of the World Health Organization (WHO) since 1981<sup>1</sup>. This program is adapted for recognition, prevention and control of rheumatic disorders in the developing world such as sub-Saharan Africa.

Many studies are realized in urban and rural areas in the world<sup>2,8</sup>. But in DR Congo, only the epidemiology of rheumatoid arthritis in urban areas (Kinshasa) was the population-based study conducted as per the COPCORD guidelines<sup>3</sup>. This study was initiated to determine the prevalence of rheumatic disorders in a rural area of the Democratic Republic of the Congo.

### Materials and Methods

This was a cross-sectional study conducted from 15<sup>th</sup> October to 15<sup>th</sup> November 2012 in the health division of Gombe-Matadi, at the South-western part of the DR Congo. Six villages of this health division (Yanda, Lukengo, N'Kamba, Nzundu, Ntimansi and Ngombe-Kinsuka) were randomly selected. One thousand six hundred and forty inhabitants live in the six villages. Only 1500 inhabitants were interviewed, and then underwent clinical examination, X-rays, and laboratory tests. The 140 others habitants didn't complete the clinical examination or one of other types of the study for diverse reasons. Four investigators performing the screening were physicians in training for internal medicine for at least 3 years and with at least 6 months of training in rheumatology. These physicians were trained for the present study by a rheumatologist.

The COPCORD core questionnaire was used and comprised the following main sections: background information, work history, articular symptoms (pain-tenderness-swelling-stiffness during the

last week and in the past), functional disability, history of treatment and evaluation in the past, extra-articular symptoms of some rheumatic diseases. After a pretest with 30 subjects, the questionnaire was translated in Kikongo (the local common language) and asked to all participants. People who presented rheumatic complaints were examined by the investigators. X-rays and laboratory tests were performed at Masensa-Kikiunga (N’Kamba Hospital). The immunology’s analysis was performed at the LOMO laboratory of Kinshasa. X-rays were analysed by 2 radiologists of the University Hospital of Kinshasa. The diagnosis that was finally retained for each patient was validated by a rheumatologist. International criteria of diagnostics were used for case definitions.

The statistical analysis had used SPSS 21 program. The Chi-squared test, t-student and ANOVA were used respectively to compare proportions, average of two groups and average of more than two groups. The odds ratio was calculated for measuring the strength of the association between two factors. The level of statistical significance ( $\alpha$ ) was set to 0.05 (The p-value was fixed to 0.05). The present study was approved by the ethics committee of the University of Kinshasa.

## Results

Table 1 shows the distribution of patients according to their age and sex. In total, 1500 persons (91.6% of inhabitants) responded to the questionnaire. Musculoskeletal complaints were noted in 743 persons (49.5% of the study population). The mean age was  $46.9 \pm 16.9$  years for males and  $50.7 \pm 14.2$  years for females ( $p = 0.001$ ) with the ratio male ( $n=319$ ) to female ( $n=424$ ) was 0.75.

**Table 1:** The distribution of patients according to their age and sex

Age (years)	Male No. (%)	Female No. (%)	All
<18	16 (5.0)	11 (2.6)	27(3.6)
18-29	37 (11.6)	20(4.7)	57 (7.7)
30-39	48 (15.0)	50 (11.8)	98 (13.2)
40-49	64 (20.1)	101 (23.8)	165 (22.2)
50-59	71 (22.3)	135 (31.8)	206 (27.7)
60-69	65 (20.4)	61 (14.4)	126 (17.0)
70-79	13 (4.1)	36 (8.5)	48 (6.6)
$\geq 80$	5 (1.6)	10 (2.4)	15 (2.0)
Total	319 (42.9)	424 (57.1)	743 (100)

Table 2 shows the prevalence of principal’s symptoms (complaints) in musculoskeletal diseases. In descending order: Joint pain, stiffness and joint swelling were the most musculoskeletal complaints in this study.

**Table 2:** Prevalence of musculoskeletal complaints

Manifestations	Effective	(%)
Joint pain	741	99.7
Joint swelling	125	16.8
Stiffness	163	21.9
Limited movement	103	13.9
Extra articular manifestations	32	4.3

Table 3 gives the distribution of participants according to the topographical sites of the rheumatic complaints and the types of pain. It emerges from the observations that among the participants, some people had more complaints located in at least two joints. Also, some participants reported having pain of two types. Thus, in descending order of frequency, the sites of the most encountered complaints were the lumbar spine, the hand, the knee and the hip. As for the type of pain, the mechanical type followed by inflammatory type were the most frequent.

**Table 3:** Topographical sites (joint distribution) of musculoskeletal complaints and type of pain ( $n = 743$ )

Variables	No.	(%)
Joint distribution		
Hand	201	27.1
Wrist	70	9.4
Elbow	35	4.7
Shoulder	10	1.3
Cervical spine	15	2.0
Dorsal spine	8	1.1
Lumbar spine	202	27.2
Hip	133	17.9
Knee	140	18.8
Ankle	95	12..8
Type of pain		
Mechanical	500	67.2
Inflammatory	400	53.8
Psychic	33	4.4
Neurological	5	0.7

Table 4 shows the distribution of the prevalence of rheumatic diseases encountered in this study by sex. This study shows also that except the gout, IR, and SpA, the prevalence of rheumatic diseases varied significantly ( $p < 0.05$ ) between females and males; the female predominance was characteristic for PR, URA, ARF, soft tissue rheumatism and IR. By decreasing prevalence, the most common pathologies were: OA (36.8%); ABR (5.2%); SpA (3.8%); URA (3.3%); RA (1.4%). Women were 1.6 times more likely to develop RA than men and there was a statistically significant relationship between RA and sex (95% CI, OR: 1.3-2.1,  $p = 0; 003$ ). On the other hand men have 1.8 times more chance of developing OA compared to women; And there was a statistically significant association between OA and sex (95% CI, OR: 1.4-2.2,  $p = 0.0001$ ).

**Table 4:** Prevalence of musculoskeletal diseases (n=1500)

Musculoskeletal diseases	All	Male	Female	OR IC95%	P-value
	No. (%)	No. (%)	No. (%)		
RA	21 (1.4)	4 (0.5)	17(2.3)	1.6 (1.3-2.1)	0.003
URA	49 (3.3)	10 (1.3)	39(5.2)	1.7 (1.4-1.9)	0.0001
OA	552 (36.8)	315 (42.4)	237(31.9)	1.8 (1.4-2.2)	0.0001
SpA	57 (3.8)	30 (2.7)	27(1.8)	1.0 (0.6-1.2)	0.77
Soft tissue rheumatism	78 (5.2)	35 (2.3)	43(2.9)	0.7 (0.5-1.2)	0.28
IJA	10 (0.7)	9 (0.6)	1 (0.1)	2.1 (1.1-4.8)	0.013
IR	11 (0.7)	0 (0.0)	2 (0.1)	0.7 (0.5-1.0)	0.15
Gout	7 (0.5)	7 (0.5)	3 (0.2)	2.2 (0.6-8.7)	0.22
ARF	9 (0.6)	0 (0.0)	9 (100)	-	0.022
Osteoporosis	7 (0.5)	1(0.1)	6 (0.8)	1.0 (1.0-1.3)	0.05
Femoral necrosis	1(0.07)	0(0)	1(0.1)	1.0(0.9-1.0)	0.31
limitedness lumbar canal	1(0.07)	0(0)	1(0.1)	1.0(0.9-1.0)	0.31
Scoliosis	1(0.07)	0(0)	1(0.1)	1.0(0.9-1.0)	0.31

RA: Rheumatoid Arthritis; URA: Undifferentiated Reactive Arthritis; SpA: spondylarthropathy; IJ A: Idiopathic Juvenile Arthritis (n=1500); Soft Tissue Rheumatism (Epicondylite 61,5% ; scapulohumeral periartthritis 38,4% ; Carpal tunnel syndrome 6,4%;Tarsal Canal Syndrome 2,6%; Tenosynovitis of De Quervain 15,4%.); ARF: Acute Rheumatic Fever; IR: Infectious Rheumatism.

Table 5 shows the average age of participants with musculoskeletal diseases found in this study. Before 50 years of age, patients developed preponderantly ARF, gout, IJA, IR, ABR and OA; and beyond 50 years of age, RA, URA and SpA. The difference was statistically significant ( $p < 0.05$ ) between the average age in the presence of RA, ARF and IJA, and that in their absence. In a nutshell, the average age of patients varied across the kind of rheumatism; and the statistical significance of the difference between their average ages in the presence and the absence of disease was also inconstant according to the kind of rheumatism.

**Table 5:** Average age of participants by presence or absence of disease

Rheumatic diseases	Average age $\pm$ SD		P-value
	(Standard deviation)		
	Presence	Absence	
RA	61.4 $\pm$ 13.4	49.0 $\pm$ 15.2	0.0001
URA	52.4 $\pm$ 12.9	49.1 $\pm$ 15.3	0.126
OA	48.4 $\pm$ 15.8	49.7 $\pm$ 14.9	0.117
SpA	51.7 $\pm$ 16.8	49.2 $\pm$ 15.2	0.215
Soft Tissue Rheumatism	45.9 $\pm$ 17.5	49.4 $\pm$ 15.1	0.055
ARF	14.1 $\pm$ 2.1	49.4 $\pm$ 15	0.0001
Gout	44.6 $\pm$ 13.4	49.2 $\pm$ 15.2	0.338
IJA	16.5 $\pm$ 1.5	49.4 $\pm$ 15	0.0001
IR	29.5 $\pm$ 13.4	49.2 $\pm$ 15.2	0.067
Osteoporosis	59.7 $\pm$ 7.2	49.2 $\pm$ 15.3	0.06
Femoral necrosis	63.0	49.2 $\pm$ 15	0.36
Limitedness lumbar canal	50.0	49.2 $\pm$ 15.2	0.95
Scoliosis	38.0	49.2 $\pm$ 15.2	0.46

RA: Rheumatoid Arthritis; URA: Undifferentiated Rheumatism Arthritis; SpA: Spondylarthropathy; IJA: Idiopathic Juvenile Arthritis; IR: Infectious Rheumatism; ARF: Acute Rheumatic Fever; OA: Osteoarthritis

In Table 6, the rheumatic patients encountered in this study are ranked according to whether they are obese or not. The table shows that 1.3 times more likely to have female rheumatism than male; There was also a statistically significant relationship between obesity in rheumatism and sex (95% CI: 1.1-1.6,  $p = 0.003$ ).

**Table 6:** Obesity distribution by sex in rheumatism population

Obesity	Male	Female	OR (IC 95%)	P-value
	No. (%)	No. (%)		
Yes	32 (8.5)	58 (15.8)	1.3 (1.1-1.6)	0.003
None	348 (91.5)	310 (84.2)		

## Discussion

This study provides the prevalence of musculoskeletal diseases in a rural area of DR Congo. It was the first experience of COPCORD study in a rural area of the country. In the overall population, this study shows a prevalence of 49.5% of musculoskeletal complaints with predominance in women ( $p < 0.05$ ) and the mean age of the males was inferior as compared to the females ( $p < 0.001$ ). This prevalence is superior to that found in Europe<sup>4,5</sup>, the US<sup>6</sup>, Chile, Brazil and Mexico<sup>7</sup>, urban areas of Iran<sup>8</sup>, and

in South Africa<sup>9</sup>. Nevertheless, this overall prevalence was inferior as compared to the study of Davatchi *et al*<sup>10</sup> in rural areas of Iran. We think that the age of female rheumatics was high because females lose progressively their hormonal protection as they approach menopause. This finding is corroborated by the literature<sup>4,11</sup>.

The mechanical pain was found to be the dominant type in this study. This is supported by the predominance of OA. Lumbar and knee pains are more frequent. This result corroborates the study of Davatchi *et al*<sup>10</sup> which shows the predominance of dorsolumbar pain. We think that the use of hoe, pickaxe and machete as rudimentary instruments of the farmers and the genuflexion due to the influence of the Kimbanguistes' religion explain the lumbar and knee locations.

Osteoarthritis was the predominant rheumatic disease in our study. We can attribute that to the ageing of the population and the mechanical constraints by agriculture work with rudimentary tools. The average age of patients with OA was  $48.4 \pm 15.8$ . This average age shows that OA occurs prematurely in this population. Quid about the ethnicity, genetic and biochemical component part. The masculine predominance correlates with the context of age inferior to 50 years old<sup>4,11,12</sup>. This study also shows that obesity was associated with musculoskeletal complaints and the female gender (Table 6). So, the obesity favors OA through mechanical constraints on joints and the effect of adipokines<sup>12,13</sup>.

*Soft tissue rheumatism*: The high prevalence (5.2%) corroborates the results of hospital study in Kinshasa University Hospital<sup>14</sup>. The female predominance corroborates the publications of Guillemin<sup>4</sup> and Cofer<sup>15</sup>.

*Spondylarthropathy*: This study indicates a prevalence of 3.8%. The fact that the MRI had not been performed for the diagnosis of sacroiliitis may constitute a limit of this study since clinical examination and X-rays may not detect an early sacroiliitis. HLA typing may also be an additive argument for the diagnosis of spondylarthrititis. This limit may be corrected by a study on spondylarthrititis in Congolese which is currently conducted and which includes HLA typing and the MRI. This prevalence was very high compared to worldwide estimations. Nevertheless, in Alaska the prevalence reported in Eskimos was higher as compared to this study<sup>11</sup>. The average age of the participants with SpA was  $51.7 \pm 16.8$ . This corroborates the studies of Mijiyawa *et al*<sup>16</sup>, Houzou *et al*<sup>17</sup>, Moustafa *et al*<sup>18</sup> and Bela *et al*<sup>19</sup>. No statistically significant difference was noticed between sex ( $p=0.77$ ). This results corroborates with other studies<sup>9-16</sup>.

*Rheumatoid arthritis*: The prevalence of RA was 1.4% in the rural area of Gombe–Matadi in DR Congo. This prevalence is higher than that found in the urban area of Kinshasa<sup>20</sup>. But many studies show very high prevalence notably Reyes Lierna GA *et al*<sup>21</sup> with prevalence of 2.7% in Cuba; Lutalo SK *et al*<sup>22</sup> with prevalence of 2% in rural Zimbabwe; Meyers *et al*<sup>23</sup> with 2.2% in the Xhosa tribe of South Africa; Gabriel *et al*<sup>24</sup> and Silman *et al*<sup>25</sup> with prevalence of 5.3% in Indian Pima and Chippewa.

*Gout*: The prevalence of 0.7% for gout found in this study is low when compared to the US and Europe according to the study of Roddy *et al*<sup>26</sup>. The predominance in males corroborates the literature. In the past, it was said that gout did not affect females, but the current study identified female cases as found in a hospital's case series study in Kinshasa by Divengi Nzambi *et al*<sup>27</sup>.

*Infectious rheumatism*: The predominance of IR was 0.7%. This prevalence corroborates the results of Malemba and Mbuyi-Muamba<sup>14</sup> in a hospital context.

*Idiopathic Juvenile Arthritis (IJA)*: Considering that there were only 27 individuals under 18 years, the prevalence of IJA must be revisited with another study on a more large population.

*Osteoporosis*: The prevalence of osteoporosis was 0.5%. This prevalence was certainly underestimated because it was not technically possible to determine the mineral density of bones with absorptiometry and there is no local standard to diagnose osteoporosis. The standard radiography suggests the diagnosis only when 30% of bone is lost<sup>28</sup>.

### **Limitation of study**

It should be noted that the present study has suffered from the unavailability of certain diagnostic tools such as Magnetic Resonance Imaging (MRI) and the knowledge of the typical HLA.

### **Conclusion**

The prevalence of rheumatic disorders in the rural area of Gombe-Matadi in DR Congo is very high and needs attention of the health authority of the country. Osteoarthritis, soft tissue rheumatism and chronic inflammatory rheumatism were the dominant conditions. There was discrepancy to an extent related to demographic and clinical findings in some pathologies as compared to the literature.

## Disclosures

None

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