Open Journal of Rheumatology and Autoimmune Diseases, 2025, 15(4), 181-190
https://www.scirp.org/journal/ojra
ISSN Online: 2164-005X
ISSN Print: 2163-9914

Spinal Disorders in Sub-Saharan Africa: A 10-Year Hospital Experience from Senegal

Harine Abdel Aziz Garba[1*], Ramadhane Bouchrane[2], Adama Bah[3], Hamid Harine Abdel Aziz[1], Moustapha Niasse[4], Diallo Saïdou[4]

[1]Department of Rheumatology, CHURN—University of N'Djamena, Chad
[2]Rheumatology Unit, National Center for Orthopedic Fitting (CNAO), Dakar—Cheikh Anta Diop University, Dakar, Senegal
[3]Department of Rheumatology, Ignace Deen University Hospital—Gamal Abdel Nasser University, Conakry, Guinea
[4]Department of Rheumatology, Coud Hospital—Cheikh Anta Diop University, Dakar, Senegal
Email: *garbaharine28@gmail.com

How to cite this paper: Garba, H.A.A., Bouchrane, R., Bah, A., Aziz, H.H.A., Niasse, M. and Saïdou, D. (2025) Spinal Disorders in Sub-Saharan Africa: A 10-Year Hospital Experience from Senegal. *Open Journal of Rheumatology and Autoimmune Diseases*, **15**, 181-190.
https://doi.org/10.4236/ojra.2025.154021

Received: September 13, 2025
Accepted: November 16, 2025
Published: November 19, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
http://creativecommons.org/licenses/by/4.0/

Open Access

Abstract

Objective: To describe the epidemiological, diagnostic, therapeutic, and outcome characteristics of spinal pathologies managed in the Rheumatology Department of Aristide Le Dantec University Hospital, Dakar. **Methods**: This was a retrospective, descriptive study of 6196 patients followed between January 2012 and December 2022. Sociodemographic, clinical, paraclinical, therapeutic, and outcome data were analyzed. **Results**: Spinal disorders accounted for 60.8% of consultations. The mean age was 60.3 years, and the sex ratio was 0.51 in favor of women. Low back pain was the most frequent complaint (44.5%), followed by neck pain (19.2%). Degenerative diseases were the most common diagnoses. Management relied on analgesics, NSAIDs, corticosteroids, DMARDs, and physiotherapy. Functional evaluation using the Lequesne, EIFFEL, NHP, SF-36, and WOMAC scores demonstrated a statistically significant improvement in quality of life. **Conclusion**: Spinal disorders represent a major public health issue in Senegal. Their functional and socioeconomic impact highlights the need to strengthen diagnostic and therapeutic resources adapted to the African context.

Keywords

Spinal Pathologies, Epidemiology, Rheumatology, Senegal, Sub-Saharan Africa

1. Introduction

The spine, or vertebral column, is a flexible bony structure extending from the

base of the skull to the pelvis, serving as the axial support of the trunk and enclosing the spinal cord [1]-[6]. Its role in weight transmission and the accumulation of mechanical stress throughout life explain its vulnerability to acute, subacute, and chronic disorders. These conditions are multiple but are classically grouped into two main categories: degenerative and inflammatory pathologies [7] [8].

Vertebral pain is among the leading reasons for consultation in rheumatology, regardless of location (cervical, dorsal, lumbar). Globally, degenerative spinal disease remains the most common rheumatologic condition, while in Africa most available data derive from hospital-based epidemiological and clinical studies [9]-[12].

In Senegal, and specifically in the Rheumatology Department of Aristide Le Dantec University Hospital, the scarcity of dedicated research on spinal disorders has long limited precise estimation of their burden. The objective of this study was to describe the epidemiological, diagnostic, therapeutic, and outcome characteristics of spinal pathologies recorded in a Senegalese rheumatology service.

2. Materials and Method

This was a retrospective, descriptive study conducted in the Rheumatology Department of Aristide Le Dantec University Hospital (Dakar, Senegal), over the period from January 2012 to December 2022. For each patient, demographic, diagnostic, therapeutic, and outcome data were analyzed.

Inclusion criteria: All records with a confirmed diagnosis of spinal pathology, based on the following:

- Degenerative disorders: ACR (1986), Dougados, and Kellgren criteria.
- Spondyloarthritis: Amor, ESSG, ASAS, and modified New York criteria.
- Rheumatoid arthritis and Sjögren's syndrome: ACR-EULAR (2010), American-European Consensus (2002), Vitali (2016).
- Other spinal disorders (such as spondylolisthesis, osteoporotic vertebral fractures, congenital malformations) established using clinical, epidemiological, and paraclinical arguments.

Exclusion criteria:

- Patients with uncertain or unconfirmed diagnosis still under investigation.
- Patients with rheumatic diseases other than spinal involvement.
- Patients lost to follow-up or with irregular follow-up.

Variables studied: sociodemographic data (age, sex, geographic origin, occupation, marital status); clinical and radiological data (onset pattern, diagnostic delay, spinal segments involved, family history, radiological lesions); paraclinical data (hematology, imaging, immunology, infectious serologies); therapeutic data (analgesics, NSAIDs, corticosteroids, DMARDs, biologics, infiltrations, physiotherapy, surgery); and outcome/functional scores (Lequesne, EIFFEL, NHP, SF-36, BASDAI, ASDAS, BASFI).

Statistical analysis: Data were entered using Word and Excel 2019, then analyzed with Sphinx software. Frequencies and means were calculated. Comparisons

of functional scores were performed using the paired Student's t-test for normally distributed variables and the Wilcoxon test for non-normally distributed variables.

3. Results

Epidemiological data: During the study period (2012-2022), a total of 11,359 records were collected, of which 10,189 were usable. We retained 6196 cases of spinal disorders, corresponding to a hospital prevalence of 60.8%. There were 2102 men (33.9%) and 4094 women (66.1%), with a sex ratio of 0.51. The mean age was 60.3 years (range: 25 - 93 years). The most represented age group was 60 - 69 years (30.3%), followed by 50 - 59 years (21.3%).

Reasons for consultation: All patients consulted for spinal pain. Low back pain accounted for 44.5%, buttock pain 12.6%, lumboradiculalgia 15.6%, dorsal pain 8.1%, and neck pain 19.2%. Onset was progressive in 72.1% of cases, insidious in 18.1%, and abrupt in 9.8%. The mean diagnostic delay was 8 years.

Axial involvement: As shown in **Table 2**, the distribution of spinal pain by anatomical region highlights the predominance of lumbar disorders, followed by cervical and dorsal locations. Lumbar involvement was the most frequent (57.8%), followed by cervical (23.6%) and dorsal (12.1%). Mixed forms represented 6.5%.

General and extra-articular manifestations: Asthenia (23.9%), anorexia (21.2%), weight loss (10.5%). Digestive involvement predominated (14.2%), followed by endocrine (11.2%), neurological (2.1%), and cardiac (1.1%). Uveitis was present in 1.5% of cases.

Paraclinical data: A nonspecific inflammatory syndrome was found in 44.3% of patients. ESR was elevated in 25.2%, CRP in 15.8%. Anemia was noted in 23.6%, thrombocytopenia in 12.6%, thrombocytosis in 1.7%. In cases of Pott's disease, Quantiferon was positive in 100%, TST in 70.8%, with GeneXpert confirmation in 2 cases.

Diagnostic data: As shown in **Table 1**, degenerative disorders were the leading diagnostic category, followed by inflammatory and traumatic causes. Degenerative disorders were dominated by lumbar osteoarthritis (1256 cases; 30.1%), followed by common lumboradiculalgia (781 cases; 18.7%) and herniated disc (17.6%). Inflammatory disorders were led by spondyloarthritis (970 cases; 48.1%) and rheumatoid arthritis with spinal involvement (26.8%). Traumatic pathology was rare (0.16%), represented by 5 cases of vertebral compression and 3 vertebral fractures. Rheumatoid arthritis associated with Sjögren's syndrome was the most frequent comorbidity (98.9%).

Therapeutic management: As shown in **Table 3**, pharmacologic and non-pharmacologic therapies were distributed according to disease type and clinical presentation. Treatment included analgesics (step I–III), NSAIDs, corticosteroids, adjuvant analgesics. Patients also received DMARDs (sulfasalazine, methotrexate, leflunomide), biologics (anti-TNFα), antituberculosis drugs, physiotherapy, and surgery. As shown in **Figure 2**, pharmacologic and non-pharmacologic treatments were var-

iably distributed according to disease type and patient profile.

Outcomes: As shown in **Table 4**, functional and quality-of-life indices demonstrated significant post-treatment improvement across patient groups. Evaluated with functional and quality-of-life indices. Lequesne, EIFFEL, NHP, and SF-36 scores showed improvement after management. In patients with spondyloarthritis, BASDAI and ASDAS scores confirmed therapeutic response. Overall, a statistically significant improvement ($p < 0.05$) in clinical and functional outcomes was observed in most cases. As shown in **Figure 1**, the mean post-treatment scores for pain, mobility, and overall quality of life improved significantly in most patients.

Table 1. Distribution of patients according to age and sex.

Tranche d'âge (ans)	Hommes n (%)	Femmes n (%)
25 - 39	210 (10.0%)	420 (10.3%)
40 - 49	315 (15.0%)	650 (15.9%)
50 - 59	448 (21.3%)	870 (21.3%)
60 - 69	635 (30.2%)	1240 (30.3%)
70+	494 (23.5%)	914 (22.2%)

Table 2. Distribution of patients according to the reason for consultation.

Motif de consultation	Effectifs (%)
Lombalgies	2754 (44.5%)
Pygalgies	781 (12.6%)
Lomboradiculalgies	969 (15.6%)
Dorsalgies	501 (8.1%)
Cervicalgies	1191 (19.2%)

Table 3. Distribution of patients according to the type of axial injury.

Atteinte axiale	Effectifs (%)
Cervicale	1 461 (23.6%)
Dorsale	753 (12.1%)
Lombaire	3 581 (57.8%)
Mixte	401 (6.5%)

Table 4. Distribution of patients according to WOMAC score.

Domaines WOMAC	Score moyen ± ET
Douleur	55.8 ± 14.3
Raideur	50.2 ± 13.5
Fonction physique	58.6 ± 15.1
Score global	54.9 ± 13.9

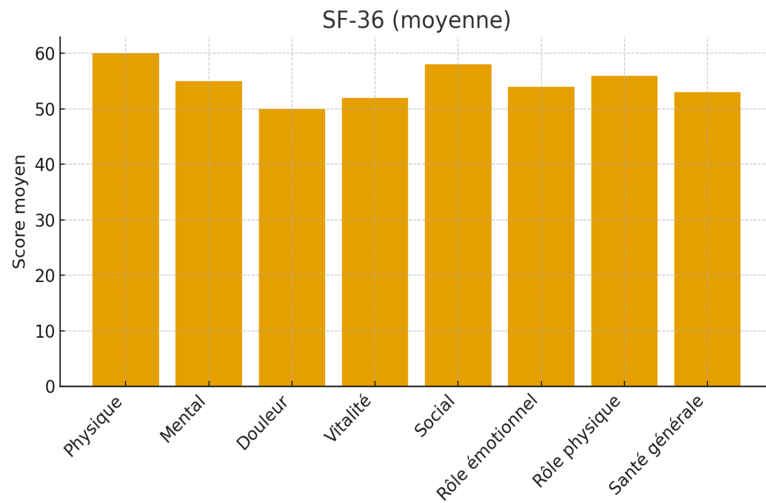

Figure 1. SF-36 score (mean).

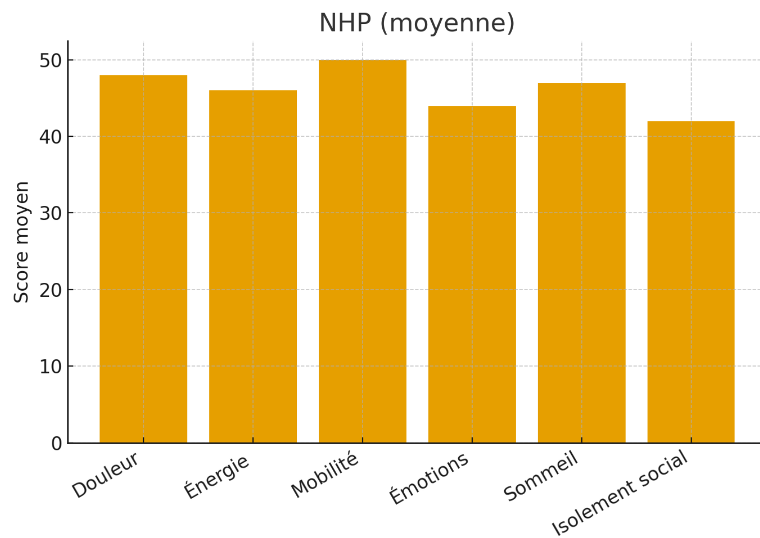

Figure 2. NHP score (mean).

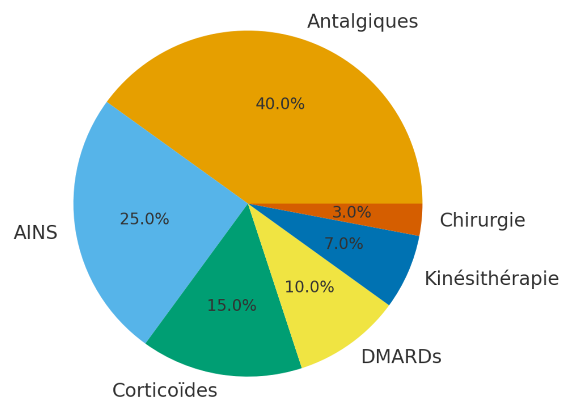

Figure 3. Distribution of patients according to treatment.

Table 5. Frequency of spinal pathologies according to African literature.

Country	Author	Year	Duration	Frequency (%)	Ref.
Côte d'Ivoire/ Ivory Coast	Diomandé	2020	15 ans/15 years	P. infectieuse (43.81); P. dégénératif (28.65); P. inflammatoire (8.04)	[36]
Burkina Faso	Ouedraogo	2014	5 ans/5 years	P. dégénératif (79.63); P. métabolique (5.02); P. indéterminé (4.98)	[9]
Togo	Mijiyawa	1991	1 an/1 year	P. dégénératif (53); P. abarticulaire (13.8); P. inflammatoire (1.4)	[34]
Bénin/Benin	Zomaletho	2014	14 ans/14 years	P. dégénératif (66.6); P. inflammatoire (8.8)	[39]
Guinée/Guinea	Kamissoko	2018	1 an/1 year	P. dégénératif (70.8); P. inflammatoire (24.27)	[37]
Sénégal/Senegal	Notre étude/ Our study	2012-2022	10 ans/10 years	P. dégénératif (67.32%); P. inflammatoire (32.52%)	[Notre étude/ Our study]

Legend: Compilation of major African studies published on spinal pathologies.

4. Discussion

As shown in **Table 5**, our findings are consistent with other sub-Saharan African series, particularly those from Togo, Côte d'Ivoire, and Burkina Faso. To our knowledge, this is one of the largest hospital-based African series on spinal disorders, including 6196 patients over a 10-year period. Its strengths lie in the large sample size, diagnostic diversity, and systematic functional evaluation. However, some limitations must be acknowledged, particularly its retrospective and hospital-based design, which may limit generalizability to the overall population.

The hospital prevalence found (60.8%) is similar to that reported in Togo by Oniankitan *et al.* (57%) and higher than that observed in Benin (48%) [13]-[16]. Degenerative disorders predominated, in line with several African and international studies. The female predominance and mean age of 60 years confirm previous reports identifying aging, menopause, and metabolic factors as major determinants [17].

Our study also highlights the issue of a mean diagnostic delay of 8 years, consistent with findings in other chronic rheumatic diseases in Africa, particularly rheumatoid arthritis [18]-[26]. This reflects both limited access to specialized care and poor recognition of early warning signs.

As shown in **Figure 3**, pharmacologic treatments such as NSAIDs, corticosteroids, and DMARDs predominated, while non-pharmacologic modalities were less frequent, a distribution consistent with other African studies. From a therapeutic perspective, management relied mainly on analgesics, NSAIDs, DMARDs, and physiotherapy. The use of biologics remained marginal, not only because of their high cost but also due to the lack of specialized infrastructures and adapted national guidelines. This constraint is consistent with observations in other African

countries [27]-[32].

Finally, the functional and socioeconomic burden is substantial. Although our study did not directly assess costs, impairment in quality-of-life scores (SF-36, NHP, WOMAC) reflects productivity loss and social integration challenges. Future studies should incorporate medico-economic assessments to complete these findings [33]-[39].

5. Conclusions

Spinal disorders represent a major reason for consultation in rheumatology in Senegal, with a high hospital prevalence and predominance of degenerative conditions. Advanced age, female sex, and mechanical and metabolic factors appear to be important determinants. The functional and quality-of-life impact is considerable, as revealed by the Lequesne, EIFFEL, NHP, SF-36, and WOMAC scores.

Management relies on a multidimensional approach combining pharmacological treatments, rehabilitation, and, in some cases, surgery. However, limited access to biologics remains a major challenge in our context. Strengthening diagnostic and therapeutic capacities, together with improved patient awareness, is needed to enhance outcomes. This large-scale study provides a strong foundation for developing adapted strategies and paves the way for prospective population-based research.

Declarations

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Author Contributions

All authors contributed substantially to the design, data collection, analysis, and interpretation of results. All participated in drafting and critical revision of the manuscript and approved the final version.

Ethics Approval and Consent

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The retrospective nature of the study and the anonymization of data did not require individual informed consent. Authorization was obtained from the department.

References

[1] Gallucci, M., Limbucci, N., Paonessa, A. and Splendiani, A. (2007) Degenerative Disease of the Spine. *Neuroimaging Clinics of North America*, **17**, 87-103. https://doi.org/10.1016/j.nic.2007.01.002

[2] Prescher, A. (1998) Anatomy and Pathology of the Aging Spine. *European Journal of Radiology*, **27**, 181-195. https://doi.org/10.1016/s0720-048x(97)00165-4

[3] World Health Organization (2003) The Burden of Musculoskeletal Conditions at the

Start of the Millennium. WHO Technical Report Series, Vol. 919, 1-218.

[4] Ekman, M., Jönhagen, S., Hunsche, E. and Jönsson, L. (2005) Burden of Illness of Chronic Low Back Pain in Sweden. *Spine*, **30**, 1777-1785. https://doi.org/10.1097/01.brs.0000171911.99348.90

[5] Maniadakis, N. and Gray, A. (2000) The Economic Burden of Back Pain in the Uk. *Pain*, **84**, 95-103. https://doi.org/10.1016/s0304-3959(99)00187-6

[6] Fianyo, E., Oniankitan, O., Tagbor, K.C., Kakpovi, K., Houzou, P., Koffi-Tessio, V.E.S., *et al.* (2017) Coût de la lombalgie commune en consultation rhumatologique à Lomé. *La Tunisie Médicale*, **95**, 168-71.

[7] Chen, Z., Luo, R., Yang, Y. and Xiang, Z. (2021) The Prevalence of Depression in Degenerative Spine Disease Patients: A Systematic Review and Meta-Analysis. *European Spine Journal*, **30**, 3417-3427. https://doi.org/10.1007/s00586-021-06977-z

[8] Wettstein, M., Eich, W., Bieber, C. and Tesarz, J. (2019) Pain Intensity, Disability, and Quality of Life in Patients with Chronic Low Back Pain: Does Age Matter? *Pain Medicine*, **20**, 464-475. https://doi.org/10.1093/pm/pny062

[9] Ouédraogo, D., Ntsiba, H., Tiendrébéogo/Zabsonré, J., Tiéno, H., Bokossa, L.I.F., Kaboré, F., *et al.* (2014) Clinical Spectrum of Rheumatologic Diseases in a Department of Rheumatology in Ouagadougou (Burkina Faso). *Clinical Rheumatology*, **33**, 385-389. https://doi.org/10.1007/s10067-013-2455-4

[10] Stein, M. and Davis, P. (1990) Rheumatic Disorders in Zimbabwe: A Prospective Analysis of Patients Attending a Rheumatic Diseases Clinic. *Annals of the Rheumatic Diseases*, **49**, 400-402. https://doi.org/10.1136/ard.49.6.400

[11] Louw, Q.A., Morris, L.D. and Grimmer-Somers, K. (2007) The Prevalence of Low Back Pain in Africa: A Systematic Review. *BMC Musculoskeletal Disorders*, **8**, Article No. 105. https://doi.org/10.1186/1471-2474-8-105

[12] Mijiyawa, M., Koumouvi, K., Bellow, A., N'Dakena, K. and Doury, P. (1992) Pathologie dégénérative du rachis en consultation à Lomé (Togo). *Revue du Rhumatisme et des Maladies Osteoarticulaires*, **59**, 797-800.

[13] Houzou, P., Oniankitan, O., Kakpovi, K., Koffi-Tessio, V., Tagbor, K.C., Fianyo, E., *et al.* (2013) Profil des affections rhumatismales chez 13 517 patients ouest-africains. *La Tunisie Médicale*, **91**, 16-20.

[14] Nakua, E.K., Otupiri, E., Dzomeku, V.M., Owusu-Dabo, E., Agyei-Baffour, P., Yawson, A.E., *et al.* (2015) Gender Disparities of Chronic Musculoskeletal Disorder Burden in the Elderly Ghanaian Population: WHO SAGE Study. *BMC Musculoskeletal Disorders*, **16**, Article No. 204. https://doi.org/10.1186/s12891-015-0666-3

[15] Stewart Williams, J., Ng, N., Peltzer, K., Yawson, A., Biritwum, R., Maximova, T., *et al.* (2015) Risk Factors and Disability Associated with Low Back Pain in Older Adults in Low- and Middle-Income Countries: WHO SAGE Results. *PLOS ONE*, **10**, e0127880. https://doi.org/10.1371/journal.pone.0127880

[16] Borenstein, D. (1996) Epidemiology, Etiology, Diagnostic Evaluation, and Treatment of Low Back Pain. *Current Opinion in Rheumatology*, **8**, 124-129. https://doi.org/10.1097/00002281-199603000-00007

[17] Nguyen, C., Sanchez, K., Roren, A., Palazzo, C., Falcou, L., Drapé, J., *et al.* (2016) Anatomical Specificities of the Degenerated Cervical Spine: A Narrative Review of Clinical Implications, with Special Focus on Targeted Spinal Injections. *Annals of Physical and Rehabilitation Medicine*, **59**, 276-281. https://doi.org/10.1016/j.rehab.2015.12.006

[18] Freund, M. and Sartor, K. (2006) Degenerative Spine Disorders in the Context of

Clinical Findings. *European Journal of Radiology*, **58**, 15-26. https://doi.org/10.1016/j.ejrad.2005.12.005

[19] Rat, A. and Guillemin, F. (2004) Épidémiologie et impact médico-économique des cervicalgies. *Revue du Rhumatisme*, **71**, 653-658. https://doi.org/10.1016/j.rhum.2004.05.005

[20] Mäkela, M., Heliövaara, M., Sievers, K., Impivaara, O., Knekt, P. and Aromaa, A. (1991) Prevalence, Determinants, and Consequences of Chronic Neck Pain in Finland. *American Journal of Epidemiology*, **134**, 1356-1367. https://doi.org/10.1093/oxfordjournals.aje.a116038

[21] Brattberg, G., Thorslund, M. and Wikman, A. (1989) The Prevalence of Pain in a General Population. The Results of a Postal Survey in a County of Sweden. *Pain*, **37**, 215-222. https://doi.org/10.1016/0304-3959(89)90133-4

[22] Binder, A.I. (2007) Cervical Spondylosis and Neck Pain. *BMJ*, **334**, 527-531. https://doi.org/10.1136/bmj.39127.608299.80

[23] Vogt, M., Simonsick, E., Harris, T., Nevitt, M., Kang, J., Rubin, S., *et al.* (2003) Neck and Shoulder Pain in 70- to 79-Year-Old Men and Women: Findings from the Health, Aging and Body Composition Study. *The Spine Journal*, **3**, 435-441. https://doi.org/10.1016/s1529-9430(03)00150-5

[24] Goode, A.P., Freburger, J. and Carey, T. (2010) Prevalence, Practice Patterns, and Evidence for Chronic Neck Pain. *Arthritis Care & Research*, **62**, 1594-1601. https://doi.org/10.1002/acr.20270

[25] Adebajo, A. and Davis, P. (1994) Rheumatic Diseases in African Blacks. *Seminars in Arthritis and Rheumatism*, **24**, 139-153. https://doi.org/10.1016/s0049-0172(05)80007-1

[26] Aggarwal, R., Liao, K., Nair, R., Ringold, S. and Costenbander, K.H. (2009) Anti–Citrullinated Peptide Antibody Assays and Their Role in the Diagnosis of Rheumatoid Arthritis. *Arthritis Care & Research*, **61**, 1472-1483. https://doi.org/10.1002/art.24827

[27] Alonge, T., Adebusoye, L., Ogunbode, A., Olowookere, O., Ladipo, M., Balogun, W., *et al.* (2017) Factors Associated with Osteoporosis among Older Patients at the Geriatric Centre in Nigeria: A Cross-Sectional Study. *South African Family Practice*, **59**, 87-93. https://doi.org/10.1080/20786190.2016.1272248

[28] Amor, B., Dougados, M. and Mijiyawa, M. (1990) Critères de classification des spondylarthropa-thies. *Revue du Rhumatisme et des Maladies Ostéo-Articulaires*, **57**, 85-89.

[29] Dr. Aspray, T.J., Prentice, A., Cole, T.J., Sawo, Y., Reeve, J. and Francis, R.M. (1996) Low Bone Mineral Content Is Common but Osteoporotic Fractures Are Rare in Elderly Rural Gambian Women. *Journal of Bone and Mineral Research*, **11**, 1019-1025. https://doi.org/10.1002/jbmr.5650110720

[30] Bija, M.D., Luma, H.N., Temfack, E., Gueleko, E.T., Kemta, F. and Ngandeu, M. (2015) Patterns of Knee Osteoarthritis in a Hospital Setting in Sub-Saharan Africa. *Clinical Rheumatology*, **34**, 1949-1953. https://doi.org/10.1007/s10067-014-2702-3

[31] Bileckot, R., Audran, M., Ntsiba, H., Simon, P. and Rénier, J.C. (1991) La densité minérale osseuse chez 20 jeunes adultes africains de race bantoue est identique à celle des sujets de race blanche. *Revue du Rhumatisme et des Maladies Ostéo-Articulaires*, **58**, 787-789.

[32] Eti, E., Kouakou, H.B., Daboiko, J.C., Ouali, B., Ouattara, B., Gabla, K.A. and Kouakou, M.N. (1998) Aspects épidémiologiques, cliniques, radiologiques de la

gonarthrose en Côte d'Ivoire. *Revue du Rhumatisme*, **65**, 890-894.

[33] Lioté, F. and Nguyen, C. (2007) Goutte: Critères de diagnostic, de classification et de qualité de vie. *Revue du Rhumatisme Monographies*, **77**, 144-147. https://doi.org/10.1016/j.monrhu.2010.02.005

[34] Mijiyawa, M., Djagnikpo, A.K., Agbanouvi, A.E., Amegdanato, D.M. and Weil, B. (1991) Maladies rhumatismales observées en consultation hospitalière à Lomé (Togo). *Revue du Rhumatisme et des Maladies Ostéo-Articulaires*, **58**, 349-354.

[35] Mkandawire, N. (2003) Ankylosing Spondylitis in a Malawian. *Malawi Medical Journal*, **15**, 14-16. https://doi.org/10.4314/mmj.v15i1.10773

[36] Diomandé, M., Bamba, A. and Traoré, A. (2020) Epidemiology of Rheumatologic Diseases in Abidjan (Côte d'Ivoire). *Revue Africaine de Médecine Interne*, **7**, 22-30.

[37] Kamissoko, A.B., Diallo, M.L., Traoré, M., Diallo, A., Yombouno, E., Barry, A., *et al.* (2018) Panorama des maladies rhumatismales à Conakry. *European Scientific Journal*, **14**, 422-431.

[38] Singwe-Ngandeu, M., Meli, J., Ntsiba, H., Nouedoui, C., Yollo, A.V., Sida, M.B., *et al.* (2007) Rheumatic Diseases in Patients Attending a Clinic at a Referral Hospital in Yaounde, Cameroon. *East African Medical Journal*, **84**, 404-409. https://doi.org/10.4314/eamj.v84i9.9549

[39] Zomalheto, Z.C., Gounongbé, M. and Avimadje, M. (2014) Affections rhumatologiques en milieu africain à l'ère du 21ème siècle: Profil de 9992 patients ouest-africains. *Médecine d'Afrique Noire*, **3**, 449-453.