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Epidemiological Profile of Autoimmune Diseases in Thiès, Senegal: About a Descriptive Observational Study over 11 Years in 2 Internal Medicine Departments and a Dermatology Department

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Abstract

Introduction: Autoimmune diseases are characterized by a very large clinical polymorphism that can lead to a diagnostic wandering. So, we aimed to determine their epidemiological profile outside the context of Dakar (capital of Senegal) where the technical plateau is more elevated. **Methodology:** We conducted a retrospective descriptive and observational study from January 1, 2007 to December 31, 2017. All patients admitted or followed in outpatient in the Internal Medicine departments of the Saint Jean de Dieu and Regional Hospitals of Thiès as well as in the dermatology department of the CHRT (Regional Hospital Center of Thiès), and who met the MAI criteria (autoimmune diseases) have been included. The data were collected on a standardised sheet and analysed by EPI INFO version 7.2. **Results:** A total of 121 patients were included out of 25951 records *i.e* a prevalence of 0.46% in internal medicine departments. In dermatology, out of 31973 patients, 95 had MAIS (systemic autoimmune diseases): 0.29% as hospital prevalence. The average age was 40.7 years in internal medicine departments compared to 37.66 years 14.8 years in the dermatology department. Patients aged 30 to 59 years represented 57.89% of the study population. The sex ratio (H/F) was 0.3 in the internal

medicine departments compared to 0.17 in the dermatology department. Circumstances of discovery were incidental in 16.52% and clinical in 3.30%. Biermer disease accounted for 29.75% of organ-specific MAI. Concerning systemic presentations, rheumatoid arthritis (RA) was present in 23.14%. Lupus was more representative in dermatology (65.2%) as well as systemic scleroderma (21%), dermatomyositis (6.3%). Cytopenia was found in 105 patients, showing in detail anemia (42.9%); leukopenia (14.8%); thrombocytopenia (2.4%). Autoantibodies were tested in 58 patients (47.9%). Skin histology was contributory in all cases of systemic scleroderma and in 5 cases of lupus. The main therapy prescribed was corticosteroid therapy alone or in combination with an immunosuppressant. **Conclusion:** In addition of infectious diseases, Subsaharan Africa is under the era of changing face of its epidemiology, and cardiovascular diseases shows signs of emergence, like auto-immune presentations. However, the difficult apprehension of these so subtle last diseases suggests that they are few reported. Technical tools in regions should be enhanced associated to a non-binding capacity building system targeting such diseases with an emphasis on good record keeping.

Keywords

Systemic Autoimmune Diseases, Internal Medicine, Dermatology, Senegal

1. Introduction

Autoimmune diseases result from a malfunction of the immune system, which attacks the body's own components. Most of them are characterised by a high degree of clinical polymorphism, which can lead to misdiagnosis. They are also under-estimated and are often detected at a stage of severe complications in the African setting [1] [2].

There are numerous factors responsible for this underestimation, amongst which are patients' and even practitioners' lack of awareness of certain misleading presentations. Moreover, there are many signals in favor of an epidemiological transition in sub-Saharan Africa.

Significant, well-documented cases are increasingly being reported in Dakar, the capital of Senegal, where the largest number of specialist doctors in the country practise [3] [4].

In the Thiès region, studies on MAIS have not been carried out in the past. This study will help draw the attention of practitioners to the importance of looking for these supposedly rare pathologies, which do not always correspond to reality. They remain underdiagnosed on the one hand because of their ignorance by certain practitioners and on the other hand because of the expensive cost of certain complementary examinations.

Given the posting of specialists outside the capital, we conducted this retrospective observational descriptive study in Thiès (70 km from Dakar) with the following objectives:

- Firstly, to determine the epidemiological profile of autoimmune and systemic diseases in the municipality of Thiès through recruitment in two internal medicine departments and one dermatology department.
- Secondly, to participate in the popularisation of these diseases and their overall management.

2. Patients and Methods

2.1. Type and Setting of Study

This was a retrospective, descriptive, observational study conducted in the internal medicine and dermatology departments of the CHRT and also in the internal medicine department of the Saint Jean de Dieu hospital in Thiès.

2.2. Study Period

The study was conducted from 1 January 2007 to 31 December 2017, *i.e.* 11 years for the internal medicine departments, and from 1 January 2009 to 31 December 2016, *i.e.* 8 years for the dermatology department.

2.3. Diagnostic Criteria

Patients seen for an autoimmune disease meeting the classification criteria of the American College of Rheumatology (ACR).

2.4. Inclusion Criteria

All inpatient and outpatient records with known autoimmune disease.

2.5. Non-Inclusion Criteria

Excluded were patients hospitalised or undergoing outpatient treatment for another disease or for whom the criteria for AID were not complete.

2.6. Data Collection

Data were collected from the patients' files and entered on a standardised form comprising of:

1) Socio-demographic and epidemiological data
2) History and medical conditions
3) Paraclinical data
4) Types of Autoimmune diseases
5) Treatments administered

2.7. Data Entry and Analysis

Data entry and statistical analysis were performed using the EPI INFO statistical software version 7.2.

3. Results

216 patients met our inclusion criteria, including 121 from internal medicine

departments and 95 from dermatology departments.

The mean age of our patients was 40.7 years, with a range from 15 to 80 years. Patients aged between 30 and 59 represented 57.89% of our study population; as for the dermatology department, the mean age was 37.66 ± 14.8 years [13 - 75 years].

In our study, females predominated, with a M/F sex ratio of 0.3. Females represented 74.38% (n = 90) of our patients compared to 25.61% (n = 31) males, as shown in Figure 1. There were 15% (n = 14) men for 85% (n = 81) women, with a sex ratio of 0.17 in the dermatology department.

Married patients were the most represented in our study population with a frequency of 57.85% (n = 70). Single patients accounted for 24.79% (n = 30) of cases. This data was not studied for cases collected in dermatology.

In our study, 49 patients (40.49%) had no formal occupation. The tertiary sector of the economy accounted for 29.75% (n = 36). The distribution of patients according to occupation is reported; in the dermatology department 63% (n = 60) were unemployed.

45.45% (n = 55) of our patients lived in urban areas. Rural and suburban areas represented 41.32% (n = 50) and 13.22% (n = 16) of cases respectively; this parameter was not taken into account in the study carried out in dermatology.

The majority of our patients came from the Thiès Regional Hospital. The number of patients recruited in this facility was 106, *i.e.* 87.60% of cases, compared to 15 patients, *i.e.* 12.39% of cases, at Hôpital Saint-Jean de Dieu.

In our study, the circumstances of discovery were not specified in 91 patients, *i.e.* 75.20% of cases. Elsewhere, the circumstances of discovery were: incidental in 20 patients (16.52%), clinical in 4 patients (3.30%), paraclinical in 6 patients (4.95%).

In our study population, we did not find any antecedents in 53 patients, *i.e.* 43.80% of cases.

Previous follow-up was noted in 52 patients, *i.e.* 42.97% of cases; in the dermatology department, the mean duration of evolution before the first consultation was 23.4 months ± 39.04 months [6 - 240 months]. 57.8% (n = 55) of patients used Phytotherapy.

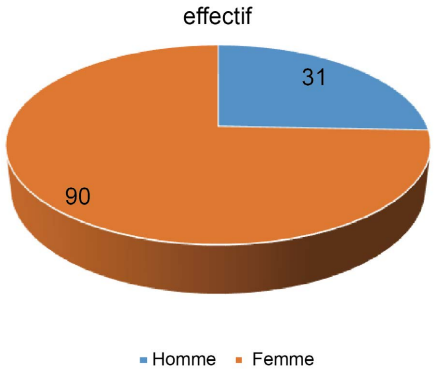

Figure 1. Distribution of patients by gender.

In our series, organ-specific autoimmune diseases were the most common, accounting for 90.90% of cases (n = 110). Biermer's disease was found in 36 patients (29.75%), rheumatoid arthritis in 28 patients (23.14%) and type 1 diabetes in 22 patients (18.18%), as shown in Table 1.

In the Dermatology Department, systemic lupus was the most common AID with 65.2% of cases (n = 62), followed by systemic scleroderma in 21% (n = 20), dermatopolymyositis in 6.3% (n = 6), and Goujerot Sjögren's syndrome in 2.1% (n = 2). The associations found were systemic lupus + systemic scleroderma 2.1% (n = 2), systemic lupus + systemic scleroderma + dermato-polymyositis 1% (n = 1), systemic lupus + dermato-polymyositis 1% (n = 1), systemic scleroderma + dermato-polymyositis 1% (n = 1).

Clinical manifestations were dominated by mucocutaneous signs 91.5% (n = 81), including alopecia 29.4% (n = 28), speckled achromia 24.2% (n = 23), and Raynaud's phenomenon 24.2% (n = 23) (Table 2).

With regard to laboratory tests, complete blood counts (CBC) and CRP (C reactive protein) were prescribed in all patients.

Inflammatory syndrome was found in 42 patients, with a predominance of women. It was more prevalent in patients aged between 30 and 59.

In our series, autoantibodies were detected in 58 patients.

In dermatology, upon laboratory tests, inflammatory anaemia was noted in 20% (n = 21) of cases, 24-hour proteinuria was greater than 0.15 g/24h in 6% of cases, and muscle enzymes (creatine phosphokinase > 165 UI/l, lactate dehydrogenase > 425 UI/l) were elevated in 11 cases. Specific autoantibodies were requested in 29 (30.5%) patients. Skin histology was positive in all cases of systemic scleroderma and in 5 cases of lupus.

Table 1. Distribution of patients according to type of Auto-immune disease.

Types of Auto-immune disease	Number of patients	Percentage
Organ specific Autoimmune diseases	**82**	**67.76%**
Biermer's Disease	36	29.75%
Type 1 Diabetes	22	18.18%
Grave's Disease	18	14.87%
Hashimoto's Thyroditis	5	4.13%
Vitiligo	1	0.82%
Systemic Autoimmune Diseases	**39**	**32.23%**
Rhumatoid Arthritis	28	23.14%
Systemic Lupus Erythematous	4	3.30%
Sharp Syndrome	1	0.82%
Horton's Disease	1	0.82%
Behcet's Disease	5	4.13%
Total	**121**	**100%**

Table 2. Distribution of patients according to clinical manifestations.

Manifestations	Number of Patients (N)	Percentage (%)
Mucocutanous	23	24.2
Mottled Achromia	28	29.4
Alopecia	12	12.6
Discoid Lupus	27	28.4
Osteoarticular	33	34.7
Reynaud's Phenomenon	23	24.2
Others	5	5.2
Digestive	9	9.4
Renal	6	6.3
Pleuropulmonary	5	5.2
Ocular	2	2.1

The main treatments prescribed for our patients were corticosteroids (Prednisone) alone or combined with an immunosuppressant (Methotrexate, Hydroxy chloroquine). Other treatments included parenteral vitamin B12, Carbimazole (Neomercazole), insulin and hormone replacement therapy (Levothyrox).

In terms of treatment for dermatological cases, 66.3% (n = 63) of patients were on corticosteroids + hydoxychloroquine and 22.1% (n = 21) of patients were on corticosteroids + D-penicillamine. The remaining 8.4% (n = 8) were on corticosteroids alone and 3.2% (n = 3) on a combination of corticosteroids + hydoxychloroquine + D-penicillamine.

The mean follow-up time was 17.09 ± 25.5 months [4 - 121 months]. A total of seven patients were not traceable for follow-up.

Twelve patients (12.6%) had complications: infectious in 8.4% of cases (n = 8), renal in 6.3% of cases (n = 6), cardiac in one case of systemic scleroderma combining mitral insufficiency and moderate pulmonary artery hypertension (PAH). Two deaths (2%) were linked to renal impairment in a case of systemic lupus and PAH (pulmonary hypertension) in a case of systemic scleroderma.

4. Discussion

For the series of patients from the internal medicine departments, the mean age was 40.7 years. We found a greater prevalence of autoimmune diseases in young adults. Louzir [5] also found an average age of 30.6 years in a Tunisian study conducted between 1990 and 1999.

The age groups between 30 - 44 and 45 - 59 years were the most represented.

For rheumatoid arthritis, the mean age was 44.39, which may be superimposed on the mean age (45.8 years). Bileckot [6] in Congo-Brazzaville found an average age of 43.5 years; and Adelowo [7] in Nigeria (46.9 years).

For Biermer's disease, the mean age was 50.33. His series showed a relatively low age (51 years) in African subjects in a retrospective study of 26 cases.

Type 1 diabetes was mostly found in people under 30.

For Graves' disease, the average age was 35.72, with a peak between 15 and 29.

Behcet's disease was found in 5 of our patients with an average age of 47. It is reported at varying ages in Africa. Ouedraogo [8] reported a case in a 56-year-old patient in Togo, while Diedhiou [9] described a case in a 22-year-old female patient in Senegal.

In the cases of dermatology patients, the mean age was 37.66 ± 14.8 years.

Rheumatoid arthritis is the most frequently described type of arthritis in most African studies [8] [10] [11]. The most common presenting complaint in internal medicine and rheumatology departments was osteoarticular symptom such as pain. No cases of rheumatoid arthritis were recorded. It should be emphasised that in systemic lupus erythematosus, joint involvement is the most frequent inaugural manifestation. At the time of diagnosis, the most common clinical picture is a combination of cutaneous and articular manifestations. Systemic lupus erythematosus, although rare, was found in first place in our study, and in second place in most African studies; it appears to be more common in the North African region [8] [11]. In Burkina Faso, systemic scleroderma was the leading cause in 33% of cases, compared with 21% in our series. According to some authors, these high proportions in black subjects can be explained by genetic factors. These are genes encoding for factors potentially involved in the fibrosis process in systemic scleroderma. These include cytokines (TNF-(Tumor Necrosis Factor), interleukin-1, chemokines), growth factors (TGF-β) ((transforming growth factors-β), extracellular matrix proteins (collagen, fibrillin, fibronectin) and agents that modulate vascular tone. One hypothesis to explain the rarity of autoimmune diseases in sub-Saharan Africa is the abnormally high concentration of nitric oxide in patients who have had asymptomatic malaria; this increase in nitric oxide is thought to have a protective effect by reducing the proliferation of auto-reactive cells, making these diseases rare in this part of the world. Gougerot Sjögren's disease has been poorly described in some African studies (0.8% in Benin and 0.3% in Central Africa), but 32 cases were reported in a study carried out in Dakar [8] [11]. We have reported seven cases of isolated dermato-polymyositis in which no neoplasia was diagnosed. A large number of cases have been described by Senegalese authors [12] [13].

As in most systemic disorders, our study showed a predominance of females (74.38%).

In our study, the sex ratio was 0.31.

In RA, the data in the literature suggest a frequency four times greater in young women, with a difference that diminishes with age over 70. In our study, the sex ratio (F/M) was 6. These results were comparable to those of Ndongo and Radouani [14].

For Biermer's disease, the sex ratio (F/M) was 1.4, whereas for Diop [15], it

was 2.1 in a series of 28 patients collected in the same internal medicine department (CHRT) between May 2007 and June 2013.

For Graves' disease, all the patients in our study series were female; however, in other studies, particularly African studies [16] [17], men were included, but the predominance of women was obvious.

In the dermatology series, female predominance was observed in almost all studies [10] [11] [16].

The majority of our patients were married (56.89% of the series), followed by single patients (29%), widowers (9.48%), divorcees (5.17%) and those whose status was not specified (3.44%). These results are in line with the percentages found in some studies.

The majority of our patients came from urban and suburban areas and less than 20% of the series came from rural areas. Because of their geographical location and age, the 2 facilities receive patients from all areas.

In our series, 49 patients (42.24%) had no occupation, *i.e.* were unemployed or housewives. However, 20 had a liberal profession, *i.e.* were in the informal sector, and 14 patients, *i.e.* 12.07%, were in the formal sector. This could explain the relatively low socio-economic level of our study population.

In our series, we did not find any particular history in most of the patients. However, 10 of them had a history of smoking. Studies have shown that smoking, in addition to its atherogenic role, is considered to be a risk and severity factor in systemic diseases.

9 patients (7.83%) had hypertension; 5 patients (4.35%) had type 2 diabetes; 1 patient had cancer; 1 patient had a history of retroviral disease (this patient also carried the HBV (hepatitis B virus) surface antigen). It should be noted that the use of immunosuppressive therapy during systemic diseases also exposes patients to the risk of reactivation of latent infections such as HBV [18].

Nearly 45% of the study population had previous treatment, 84% of which was phytotherapy-based. However, 11.54% had had previous treatment with modern but unspecified medication. The remainder of the patients had previous medical treatment combined with phytotherapy. Given that most of the population was of either rural or urban origin, the lack of information could explain this excessive use of phytotherapy.

Anaemia was the most frequently encountered blood count abnormality, present in 52 patients (44.82%). Anaemia is most often multifactorial in Autoimmune diseases, as confirmed by two studies by Diop [2] [19]. However, in our study it was more frequent than in the Tunisian publication concerning systemic lupus erythematosus, where haemolytic anaemia was noted in 6.7% of cases [5].

Leukopenia was found in 18 patients, *i.e.* 15.51% of patients. However, with regard to leukopenia, the results of our study contradicted those of Louzir [5] (45%) and other series reported in literature.

Thrombocytopenia was found in only 3 patients (2.4%), whereas Louzir [5] reported 16% in a 10-year series involving 295 cases. With regards to immu-

nological data, the majority of patients had not been able to benefit from it, probably due to a lack of resources or accessibility. However, anti-FI Antibody was the most frequently found antibody in our study, particularly in 17 patients for whom Biermer's disease was suspected, in accordance with literature. This is explained by previous work carried out in Thiès on this type of Autoimmune diseases [2] [19], which convinced the laboratory management to make this test available.

Anti Citrullinated Ptotein antibodies were found in 13 patients suspected of having rheumatoid arthritis. This biological test has also been routinely performed at the CHRT for the past 3 years, thanks to collaboration with European laboratories.

There were no major problems with the availability of drugs, apart from some shortages linked to the low socio-economic level. However, the major challenge remains ongoing therapeutic education to ensure good compliance with these long-term treatments. These two authors have shown the importance of compliance with aminopterin (MéthotrexateR) and hydroxychloroquine (PlaquenilR) treatment in 2 series of 87 and 60 patients respectively.

In the dermatology department, the various treatment options for Autoimmune diseases are prescribed according to the type of involvement. Most patients are treated with corticosteroids as a first-line treatment. Synthetic antimalarials have now become indispensable in the treatment of all forms of lupus. As for scleroderma, its disease-modifying treatment remains disappointing to date. Methotrexate is by far the most widely used immunosuppressant in the treatment of Autoimmune diseases. Despite treatment, patients may also develop complications linked to the connective tissue itself. In our series, we had two deaths due to kidney damage and PAH. Mijiyawa et al in Lomé reported two deaths due to nephrotic syndrome and one fatal septicaemia in a patient with systemic lupus erythematosus [10]. Infections represent a cause of mortality that is increased by a medical condition [20]. Currently, anti-TNFα and other biotherapies, particularly rituximab, represent a major breakthrough in the treatment of connective tissue diseases. However, the exorbitant cost and the risk of reactivating latent tuberculosis limit the use of these different molecules.

Limitations of our study were the retrospective nature of the study: some data could not be obtained or determined with precision. The inadequacy of the technical platform which made it impossible to measure auto-antibodies but also the lack of financial means for patients, which was illustrated by the national statistics agency concerning the last census in 2009 and in 2005/2006, almost a third of thièssois had a job, with a clear male predominance, *i.e.* 49.2% against 17.4% for women. Lack of knowledge of autoimmune diseases by some unsophisticated practitioners who worked in the department.

5. Conclusion

In addition to infectious diseases, sub-Saharan Africa is in an era of changing

epidemiology, and cardiovascular diseases are showing signs of emergence, such as autoimmune presentations. However, the difficulty of understanding these latter diseases, which are very subtle, suggests that they are underreported. Technical tools in the regions should be improved and combined with a voluntary capacity building system targeting these diseases with emphasis on good record keeping.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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