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Challenges in Diagnosis and Management of SLE in Africa: An Online Survey

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Objective. We surveyed African physicians about challenges in diagnosis and management of systemic lupus erythematosus (SLE).

Methods. We used a cross-sectional, online questionnaire–based survey of African specialist physicians on availability of laboratory tests, medications, and specialized services for the diagnosis of SLE.

Results. Our 226 respondents from 31 countries were dermatologists (38%), rheumatologists (28%), and nephrologists (23%), the majority practicing at university/state-funded hospitals (80.8%), but over half of patients (59.6%) were self-funded for laboratory tests and medications. Antinuclear antibody (ANA), antiphospholipid antibody, and complement tests were available to 79.4%, 67.6%, and 62.3% of respondents, respectively, but fewer in the East and West African regions. Median turnaround time for the ANA test was within two weeks but more than four weeks for 5.6% of respondents, and longer in West Africa compared with other regions ($P = 0.0002$). Availability of urine protein-to-creatinine test, skin and renal histopathology was 82%, 82.5%, and 76.2%, respectively. Median turnaround times were within one to two weeks, but more than four weeks for 13.8% of respondents for skin histology results and usually within four weeks but more than four weeks for 24.5% of respondents for renal histology. Glucocorticoids and antimalarials were readily available across all regions, with variable availability of immunosuppressants from 93.7% for methotrexate to 65% for calcineurin inhibitors and only 58.4% for the biologic rituximab. Intensive care units/high care facilities, hemodialysis, and renal transplantation were available to 69.8%, 91.9%, and 56.5% of respondents, respectively.

Conclusion. Variable availability of laboratory tests, medications, and supportive services coupled with cost constraints are major impediments to early diagnosis and optimal management of SLE in most of Africa and are likely factors contributing to underreporting and poor prognosis of SLE in Africa.

INTRODUCTION

Systemic lupus erythematosus (SLE) is a multisystem immune-mediated inflammatory disorder that affects especially women during child-bearing years. Because the disorder is known to carry a worse prognosis in young adults and patients of African extraction, delay in diagnosis has a profound negative effect on health-related quality of life, organ damage, and death in patients with SLE.[1] Numerous factors play a role in diagnostic delay such as insidious onset of symptoms, nonspecific early protean manifestations of the disease (often mimicking infectious and hematologic diseases), and access to appropriate expert medical care. In low-income households and countries, cost constraints are a major additional challenge that affect the availability of and access to laboratory and imaging investigations, medication, and supportive care.[2]

Several studies have highlighted disparities in prevalence, disease severity, and long-term outcomes of SLE among different ethnic groups in the United States of America.[1] African Americans have been found to have an earlier age at onset, more severe disease, and almost three times higher mortality rate compared with White Americans.[3,4] The differences are not fully explained by genetic, biologic, or hormonal factors, and socioeconomic factors play a critical role. Poverty, social status, educational levels, and

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access to health care are additional factors associated with morbidity and mortality in SLE.[1,3,5]

The general notion in the past was that SLE is rare in sub-Saharan Africa. However, numerous recent publications on the clinical spectrum and outcome of SLE in various parts of the continent and experience of African physicians suggest that the disease is not uncommon.[5–7] A systematic review and meta-analysis estimated a pooled SLE prevalence of 1.7% among 28,575 native sub-Saharan Africans, mainly from West Africa, seeking in-patient medical care in internal medicine and rheumatology settings.[8] As in African Americans, SLE is associated with increased morbidity and mortality in Africans.[6–8]

With infectious diseases such as HIV, tuberculosis, and malaria being a major burden on health services in much of sub-Saharan Africa, it is not surprising that noncommunicable diseases such as chronic rheumatic diseases receive little attention and state funding.[9] In the case of SLE, early diagnosis and appropriate therapy play a key role in reducing morbidity and mortality[10] and require both specialized clinical expertise and availability and access to appropriate investigations such as antinuclear antibody (ANA) tests and skin and renal histopathology. However, laboratory investigations are not only costly and unaffordable for many patients but are often not readily available in many African countries.[11] Serum and histopathology samples are frequently sent to other countries such as South Africa and France, which increases both cost and turnaround times for results. For example, the cost of a complete set of immunologic tests for SLE can be as high as 500 USD.[8,11]

All together, these challenges affect our understanding of the epidemiology of SLE and, more importantly, the burden of the disease in Africa. Hence, the aim of the present study was to document challenges in diagnosis and management of SLE in Africa.

METHODS

Design. A cross-sectional, online questionnaire–based survey of specialists known to manage SLE in Africa was conducted among rheumatologists, nephrologists, dermatologists, and internists with an interest in treating autoimmune disease. The study was conducted over a three-month period, July to September 2022. African regions were defined according to the United Nations Organization groupings into North, South, East, West and Central Africa (Supplementary Material A).[12]

Questionnaires were disseminated by email and WhatsApp invitations directly or via subspecialty societies, with appropriate permissions of the respective learned societies and academic heads of internal medicine in countries identified to have no subspecialists. After the initial invitation, two further reminders were sent out. In countries identified with a low response rate after the first two invitations, personal emails from the authors were sent to encourage participation. In total, 1,037 invitations were sent out (207 rheumatologists, 299 nephrologists, 31 internists, and 500 dermatologists). Participation by respondents was deemed as consent to participate in the survey. Data were collected via Google form (Supplementary Material B). The four main domains of the questionnaire were as follows:

1. Personal/demographics of respondents, including demographic information, subspecialty/specialty, number of years in clinical practice, practice setting (academic vs state-funded vs private), country, and average number of patients with SLE seen per month.
2. Availability and turnaround times of special serological tests, histopathology and imaging.
3. Availability of medications and specialized care services such as intensive/high care and dialysis facilities.
4. Perceptions of respondents of the challenges and barriers to optimal SLE care in Africa.

Ethical considerations. The study was approved by the Biomedical Research Ethics Committee of University of Kwa-Zulu Natal (BREC: 00004044/2022). The study was time bound and anonymous. The internet protocol addresses were not collected to protect respondents' anonymity.

Statistical methods. Unpaired *t*-test or Mann–Whitney test was used to compare continuous variables between two groups depending on whether the data were distributed normally or skewed, respectively. For multiple group comparisons, analysis of variance or Kruskal–Wallis tests were applied. Chi-square test or, where applicable, two-tailed Fisher's test was applied to compare categorical variables. A P value <0.05 was regarded as statistically significant. All statistical analyses were performed using MedCalc Statistical Software version 22.019 (https://www.medcalc.org; 2024).

RESULTS

Here, we report only on the results of the first three domains of the questionnaire. The 226 respondents, representing a response rate of 21.8% from 31 countries, were mostly from West Africa 106 (47.1%), followed by East Africa 56 (24.9%), and only two were from Central Africa (Democratic Republic of Congo) (Table 1) (distribution of respondents by country shown in Supplementary Figure 1). Most respondents were dermatologists 87 (38.5%), followed by rheumatologists 64 (28%) and nephrologists 52 (23%). In the case of five countries (Angola, Burkina Faso, Guinea, Guinea Bissau, and Tunisia), responses were received from either dermatologists or internists only and none from rheumatologists or nephrologists (Supplementary Material C). The majority practiced at university or state-funded hospitals with no significant regional differences in practice settings. Median (interquartile range [IQR]) number of years in practice and number of patients with SLE visits per month were 10.0

Table 1. Responses of 226 African physicians to an online systemic lupus questionnaire on practice characteristics*

Characteristics	All regions, n (%)	North, n (%)	East, n (%)	West, n (%)	Central, n (%)	South, n (%)	*P* value
No of respondents	226 (100)	18 (8)	56 (24.9)	106 (47.1)	2 (0.9)	43 (19.1)	–
Rheumatologists	64 (28.4)	12 (66.6)	11 (19.6)	24 (22.6)	2 (100)	15 (34.9)	–
Dermatologists	87 (38.7)	6 (33.3)	38 (67.9)	24 (22.6)	0 (0)	19 (44.2)	–
Nephrologists	52 (23.1)	0 (0)	6 (10.7)	42 (39.6)	0 (0)	4 (9.3)	–
Physicians	23 (9.8)	0 (0)	1 (1.8)	16 (15.1)	0 (0)	5 (11.6)	
Type of practice							
University	127 (56.4)	9 (50)	27 (48.2)	75 (70.8)	2 (100)	14 (32.6)	<0.0001[a]
State	55 (24.4)	3 (16.6)	21 (37.5)	19 (17.9)	0 (0)	12 (27.9)	–
Private	35 (15.6)	6 (33.3)	6 (10.7)	7 (6.6)	0 (0)	16 (37.2)	–
Other	8 (3.6)	0 (0)	2 (3.6)	5 (4.7)	0 (0)	1 (2.3)	–
Years in practice, median (IQR)	10 (2–15)	15 (7.2–17.5)	6 (4.0–11.5)	8 (4.0–13.0)	13.5 (13.0–14.0)	14.0 (7.3–7.5)	0.0008[b]
No of patients with SLE per month, median (IQR)	2 (1–5)	4 (1–12)	2 (1–5)	2 (1–4)	1.8 (0.5–3)	5 (2–11.5)	0.0000[b]
Patient funding							
State	44 (19.6)	5 (27.8)	7 (12.5)	5 (4.7)	0 (0)	27 (62.8)	0.0000[a]
Medical insurance	26 (11.6)	8 (44.4)	4 (7.1)	3 (2.8)	0 (0)	11 (25.6)	–
Private	134 (59.6)	4 (22.2)	36 (64.3)	89 (84.0)	1 (50)	4 (9.3)	–
Unknown	21 (9.3)	1 (5.5)	9 (16.1)	9 (8.5)	1 (50)	1 (2.3)	–

*IQR, interquartile range; SLE, systemic lupus erythematosus.
[a]Chi-squared.
[b]Kruskull–Wallis test.

(4–15) years and 2 (1–5), respectively. Respondents in the North and South Africa regions had spent significantly longer in practice and were seeing more patients with SLE per month compared with the East and West Africa regions (Table 1). Most respondents reported that patients in their countries were self-funded for health care (59.6%), but with significant regional differences. In the West and East Africa regions, most patients were self-funded (paid for their own consultations, investigations and medications) (84.0% and 64.3%, respectively), unlike the South and North Africa regions, where patients were either state-funded or had private medical insurance (88.3% and 72.2%, respectively). Further results of the survey excluded Central Africa because only two responses were received from the region.

Laboratory and imaging investigations. ANA and extractable nuclear antibody (ENA) tests were available to most respondents (79.4% and 74.7%, respectively); antiphospholipid antibody (aPL) tests and complement C3/C4 tests were available to only to 67.6% and 62.3%, respectively, and were significantly less likely to be available in East and West regions (Table 2). Median turnaround time for the ANA test, where available, was within two weeks, but turnaround time was over four weeks for 5.6% of respondents. Turnaround times were significantly longer in West Africa compared with the other regions (P = 0.0002), where only 68% of the results were available within two weeks and 28.7% after two weeks. Urine microscopy, culture, and sensitivity and urine protein-to-creatinine ratio tests were available to 82.4% and 82.5% of respondents, respectively, and significantly less in East Africa (66.1%, P = 0.0003). Brain imaging studies (computed tomography/magnetic resonance imaging) were widely available (91.5%).

Histopathology of skin, renal and muscle was available for 82.5%, 76.2%, and 51.1% of respondents, respectively (Table 3). Overall median turnaround time for skin histology, where available, was within one to two weeks for the majority of respondents, over four weeks for 13.8% of respondents and significantly shorter for North Africa (P = 0.02). For renal histopathology results, median turnaround time was within four weeks, significantly longer in the West and East Africa regions compared with the South and North Africa regions (P < 0.0001). Moreover, 24.5% of respondents noted that the turnaround time was over four weeks.

Availability of medications and specialized care. Oral glucocorticoids (99.6%) and antimalarials (hydroxychloroquine/chloroquine, 100%) were readily available across all regions, but there was variable availability of glucocorticoid-sparing immunosuppressants such as methotrexate (93.7%), azathioprine (83.4%), mycophenolate mofetil (77%), intravenous cyclophosphamide (72.5%), and calcineurin inhibitors (65%), with least availability of immunosuppressants in East Africa (Table 4). Availability of biologic medications was limited—rituximab (58.4%) and belimumab

Table 2. Availability of laboratory and imaging investigations*

Test	Total region n (%)[a]	North, n (%)	East, n (%)	West, n (%)	South, n (%)	*P* value
ANA	177 (79.4)	15 (83.3)	47 (83.9)	73 (68.9)	42 (97.6)	0.0014
ENA	170 (76.4)	16 (88.8)	33 (58.9)	81 (76.4)	40 (93.0)	<0.0001
APS	151 (67.6)	15 (83.3)	22 (39.3)	75 (70.8)	39 (90.7)	<0.0001
Complement	139 (62.3)	16 (88.8)	24 (42.9)	60 (63.6)	39 (90.7)	<0.0001
UMCS	183 (82.4)	15 (83.3)	47 (83.9)	81 (76.4)	40 (93.0)	0.1394
UPCR	183 (82.5)	17 (94.4)	37 (66.1)	87 (82.1)	42 (97.7)	<0.0007
Brain imaging	204 (91.5)	18 (100)	49 (87.5)	80 (75.5)	42 (97.7)	0.2285
Skin biopsy	184 (82.5)	18 (100)	51 (91.0)	74 (69.8)	41 (95.3)	<0.0001
Renal histology	170 (76.2)	17 (94.4)	35 (62.5)	80 (75.5)	38 (88.3)	0.0097
Muscle histology	114 (51.1)	16 (88.8)	29 (51.8)	16 (19.0)	35 (81.4)	<0.0001

*Out of total response N = 224. ANA, antinuclear antibody; APS, antiphospholipid syndrome; ENA, extractable nuclear antigen; UMCS, urine microscopy, culture, and sensitivity; UPCR, urine protein-to-creatinine ratio.
[a]Total excluding Central Africa (two respondents only).

(3.5%)—and worse in East Africa (Table 3). Hemodialysis was widely available (92%), but less so for plasmapheresis (55%). Renal transplantation was available in just over 50% of regions, and intensive care unit/high care facilities varied and were only available to 69.9% of care providers and was as low as 55% for providers in East Africa.

DISCUSSION

Our findings underscore diverse challenges in the diagnosis and management of SLE in Africa. Limited availability of diagnostic laboratory tests such as the ANA test, especially in East and West Africa, coupled with cost constraints, partly explains the misperception that SLE is rare in Africa.[5–7] Respondents managed a median of two patients with SLE per month overall for the continent and a median of four to five patients per month in the more affluent North and South Africa regions, which is further evidence that SLE is not uncommon in Africa, even in East and West Africa.[9,11] The scarcity and unaffordability of medications and specialized care facilities are likely factors that contribute to disease severity and poor outcomes in African patients with SLE. Numerous studies in affluent countries have shown that socioeconomic factors contribute to poor outcomes in SLE.[1,3,13] In the United States, for example, African American patients from poorer communities have worse prognosis than their European American counterparts, who are mostly from more affluent communities.[14]

Laboratory investigations such as ANA and complement tests are crucial for early and precise diagnosis of SLE, and histopathology, especially renal histopathology, plays a vital role for deciding on appropriate immunosuppressive therapy.[5,11,13] Thus, access and availability constraints of these investigations in many parts of the African continent, previously reported by Gbané-Koné et al in a Nigerian study,[15] result in diagnostic delays, imprecise management, and ultimately, poor long-term prognosis. In the current study, only 80% of respondents had availability of the ANA test, and when available, they experienced delays of one to two weeks to obtain ANA results, not dissimilar to a study in 2014.[5] The situation is even worse with respect to ENA, aPL, and complement tests that are important for disease stratification and assessing disease activity,[16,17] which were unavailable to at least a quarter of respondents.

Of further concern is the variable availability of skin and renal histopathology coupled with the costs and long turnaround times for results. Our findings suggest that little has changed in terms of availability and access to renal histopathology from almost a decade ago: 75% in 2014[5] compared with 76.5% in this study. Moreover, even when available, a quarter of respondents in the current study reported turnaround times of >4 weeks and in some cases >12 weeks. Dey et al previously showed that unavailability and delays in obtaining histopathology reports in Ghana was a huge challenge and an impediment to timely diagnosis and choice of appropriate therapeutic interventions.[11]

That antimalarials and glucocorticoids are readily available across the continent is consistent with the meta-analysis of African SLE studies.[8] Respondents in the current study had improved availability of methotrexate as compared with the findings of a previous African survey on access for the drug in patients with rheumatoid arthritis (RA), where 66% of physicians reported no consistent access to the methotrexate.[18] The availability of other immunosuppressive agents and specialized services such as intensive care and renal replacement therapy was more limited,

Table 3. Median and IQR turnaround times in weeks for special investigations*

Investigation	All regions	North	East	West	South	*P* value
ANA	2 (1–2)	2 (1–2)	2 (1–2)	2 (2–4)	2 (1–2)	<0.0001
Skin histology	2 (2–4)	2 (2–2)	4 (2–4)	2 (2–4)	2 (2–4)	0.02
Renal histology	2 (2–2)	1 (1–2)	2 (2–2)	2 (2–3)	1 (1–2)	<0.0001

*ANA and skin histology: ANA test 1, <1 week; 2, 1–2 weeks; 3, 2–3 weeks; and 4, 3–4 weeks. Renal histology: 1, <2 weeks; 2, 2–4 weeks; 3, 4–12 weeks; and 4, >12 weeks. ANA, antinuclear antibody; IQR, interquartile range.

Table 4. Availability of medications and supportive care across the different regions*

Treatment	All regions, n (%)	North, n (%)	East, n (%)	West, n (%)	South, n (%)	*P* value
Oral prednisone	222 (99.6)	18 (100)	56 (100)	105 (99.0)	43 (100)	NS
IV prednisone	205 (91.5)	18 (100)	44 (78.6)	105 (94.3)	43 (100)	0.0005
Antimalarial (HCQ/CQ)	223 (100)	18 (100)	56 (100)	106 (100)	43 (100)	–
Methotrexate	209 (93.7)	18 (100)	56 (100)	92 (86.8)	43 (100)	0.0009
Azathioprine	186 (83.4)	18 (100)	45 (62.5)	90 (84.9)	43 (100)	<0.0001
MMF	171 (76.7)	17 (94.4)	17 (55.4)	82 (77.3)	41 (95.3)	<0.0001
CYP (IV)	161 (72.2)	18 (100)	27 (48.2)	81 (76.4)	35 (81.4)	<0.0001
CYP (oral)	135 (59.2)	12 (66.7)	15 (26.8)	73 (68.9)	32 (74.4)	<0.0001
CNI	147 (58.7)	14 (77.8)	28 (50)	65 (61.3)	40 (93.0)	<0.0001
Rituximab	131 (65.9)	16 (88.9)	19 (33.9)	61 (57.5)	35 (81.4)	<0.0001
IVIG	95 (42.6)	15 (83.3)	12 (26.8)	30 (28.3)	38 (88.3)	<0.0001
Belimumab[a]	8 (3.6)	1 (5.5)	1 (1.8)	4 (3.8)	2 (4.6)	<0.0001

*Out of total response N = 224. CNI, calcineurin inhibitor; CQ, chloroquine; CYP, cyclophosphamide; HCQ, hydroxychloroquine; IV, intravenous; IVIG, intravenous immunoglobulin; MMF, mycophenolate mofetil; NS, not significant.
[a]Belimumab (Benylsta).

with cost being an additional barrier to accessing more costly medications such as mycophenolate mofetil and specialized supportive care.[19,20] Specialized services such as dialysis are often not widely available in middle- to low-income countries. In Africa, the annual costs range from USD 7,369.73 per annum for hemodialysis to USD 42,112.75 per annum for peritoneal dialysis.[13,21,22] A US study has shown that annual costs associated with SLE care were significantly higher compared with other rheumatic musculoskeletal diseases such as RA and fibromyalgia.[23]

The regional differences that we observed with respect to availability of diagnostics, therapeutics, and supportive care facilities, which were significantly worse in the West and East Africa regions compared with the North and South Africa regions, reflect not only differences in financial resources but also public health priorities and costs in the different regions. The average gross domestic product per capita is substantially lower in West and East Africa, and this is reflected in our results, in which both laboratory tests and medications are least available in those regions.[24] Moreover, even when tests and medications are available, these are often not accessible to many patients because of financial difficulties, both at a personal level for patients and at the state level because of resources being spent mainly to manage the high burden of tuberculosis, HIV, and malaria, which are endemic in many parts of tropical Africa.[25,26] Moreover, there are substantial regional variations in the availability of specialist physicians for the diagnosis and management of SLE, more in the South and North Africa regions compared with the rest of Africa.[27,28]

One of the limitations of the survey is that there was a poor response from Central Africa, where there is a shortage of rheumatologists.[28] Secondly, there was a relatively poor response and similar underrepresentation from North African countries, which arguably have the largest concentration of specialists. Responses to online surveys have an inherent bias being that responses are more likely to come from respondents who have a particular interest in the subject matter. Furthermore, because health-related web-based surveys are a relatively new concept, there are no validated methods of power calculations for sample size. A sample size of 200 to 250 responses has been suggested based on a review of other similar online surveys in which the mean sample size was 255.[29]

The prevalence, diagnosis, and management of SLE in Africa has long been surrounded by controversy. Historically, the disease is thought to be rare in African populations; however, this assertion is increasingly becoming difficult to hold true, as shown in recent metanalyses and current study findings. Confirmatory laboratory tests for SLE are limited on most of the sub-Saharan continent, resulting in underreporting of the disease. Our findings provide further evidence of the many challenges in diagnosing and managing SLE in Africa. These difficulties also preclude most African countries from participating in novel methods of assessing disease activity, diagnostic scoring metrics, and new medications. The variable and inadequate availability of medications and supportive care facilities coupled with financial constraints are important factors that impact negatively on morbidity and mortality associated with SLE in Africa.

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AUTHOR CONTRIBUTIONS

All authors contributed to at least one of the following manuscript preparation roles: conceptualization AND/OR methodology, software, investigation, formal analysis, data curation, visualization, and validation AND drafting or reviewing/editing the final draft. As corresponding author, Dr F. Paruk confirms that all authors have provided the final approval of the version to be published, and takes responsibility for the affirmations regarding article submission (eg, not under consideration by another journal), the integrity of the data presented, and the statements regarding compliance with institutional review board/Helsinki Declaration requirements.

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