ORIGINAL ARTICLE

Survey to assess Medical Doctors' knowledge on Rheumatology patient care and utilization of Rheumatology Services in Zambia 2020-2022

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ABSTRACT

Background: Worldwide, majority of rheumatic and musculoskeletal disease (RMD) patients do not receive care from a rheumatologist. The study assessed doctors' knowledge and capability to diagnose RMDs, and prescription practices of disease modifying anti-rheumatic drugs (DMARDs).

Methods: This was an online based survey with doctors purposively surveyed using the Zambia Medical Association's email list.

Results: A total of 3,519 emails were sent to individual doctors, 1,317 (37%) opened their emails, and 156 (4%) clicked the survey link and completed it. Of these, 28% were females, 60% were aged 25-35 years, while 47% had less than 5 years' experience. On medical training, 67% had only a primary medical qualification (only two, 1% were rheumatologists, and three, 2% orthopedic surgeons).

Over 63% of respondents were from the major cities, 65% saw less than five RMD patients and only 17% saw more than 20 patients over a six-month period. Knowledge and confidence on use of laboratory biomarkers and diagnosis of most RMDs was low (5 – 44%) with scleroderma and systemic vasculitis being the list diagnosed. The likelihood of diagnosing an RMD without biomarker use was comparable between those familiar with auto-antibody tests and those not (Odds Ratio [OR] was 1.06, 95% Confidence Interval [CI], 0.67 to 1.67). While those that saw more than 10 RMD patients in six months were more confident in making a diagnosis of systemic sclerosis and psoriatic arthritis than those that saw less than 10 patients (OR 16.52, 95% CI, 9.44 to 28.92, and OR 13.9, 95% CI, 8.09 to 24.02 respectively).

80% of doctors were familiar with DMARDS, and yet 73% were not confident to prescribe them (OR 10.95, 95% CI, 6.45 to 18.58), 69% had never

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Keywords: *Arthritis, autoantibodies, disease modifying anti-rheumatic drugs, knowledge, rheumatic and musculoskeletal diseases, rheumatology.*

This article is available online at: http://www.mjz.co.zm, http://ajol.info/index.php/mjz, doi: https://doi.org/10.55320/mjz.52.2.593

The Medical Journal of Zambia, ISSN 0047-651X, is published by the Zambia Medical Association

prescribed any over a 12-month period, while less than 30% knew methotrexate as the recommended first line treatment for rheumatoid arthritis. 96% were not aware of any DMARDS covered by National Health Insurance.

Conclusion: Knowledge of rheumatic diseases, including biomarker tests and DMARDs used in diagnosis and treatment respectively, is lacking. There is a clear need for policy change, including enhanced rheumatology training and expansion of services across Zambia.

INTRODUCTION

Zambia with an estimated population above 20.6 million has no established rheumatology services.[1] At the time of data collection, the country only had three rheumatologists, with only one serving in the public sector, and the other two were in the private sector. Thus, most patients with rheumatic and musculoskeletal diseases (RMDs) in Zambia do not receive care from a rheumatologist.

A review of the global literature shows similar trends to the care of RMD patients. The challenges faced by clinicians include minimal exposure to rheumatology during undergraduate training and fewer numbers of rheumatologists in most countries. [2, 3, 4] Systemic factors that may limit the care of such patients also include limited availability of diagnostic services such as immunology and radiology services, as well as limited availability of pharmacologic agents especially in less developed countries. [4]

Attempts to improve rheumatology training and services in Zambia have been made by other teams in the past with minor improvements in overall uptake. James Chipeta et al. in a paper titled “Progress made towards enhancement of rheumatology education and practice in Zambia: review of an ILAR-supported project” did highlight most of the challenges and pitfalls of rheumatology services in the country. [5] The inadequacy and challenges of rheumatology services in most of Africa and globally have further been collaborated in other publications. [6, 7, 8] Similarly, developed countries like the United States of America (USA) also do have existing gaps in rheumatology services, but not as wide as seen in most of Africa. [9] The story is no different to what is pertaining in Asia, where an Indian survey among physicians affiliated to the Physicians' Association of India did elaborate the shortfalls and low confidence among most of them to handle rheumatology conditions. This was largely attributable to inadequate undergraduate curriculum coverage for rheumatology. [2]

The limited availability of pharmacologic agents i.e. disease modifying anti-rheumatic drugs (DMARDS), and restrictions placed on patient access to them as a consequence of exorbitant pricing leaves most doctors not to consider the accrual benefit of their use and long term poor outcomes associated with non-utilization of these therapies as highlighted in the 2016 update of the 2007 American College of Rheumatology, and the European Alliance of Associations for Rheumatology (ACR/EULAR) guidelines on recommendations for the management of early arthritis. [10, 11]

Furthermore, the limited recognition and coverage of rheumatology services under the country's universal insurance as evidenced by its omission in the inaugural benefit package of 2019 (now revised with a few DMARDS added) of the National Health Insurance Management Authority (NHIMA) that was introduced in Zambia highlights these major gaps in health care systems. [12]

Therefore, an assessment of the doctors' knowledge and understanding of rheumatic diseases is an important first step towards improved health care services for patients afflicted by RMDs and other autoimmune diseases.

The study thus aimed to assess medical doctors' knowledge on patient care and utilization of rheumatology services in Zambia. It focused on four key domains:

i. Knowledge in understanding rheumatic diseases
ii. Knowledge about arthritis

iii. Capability to diagnose rheumatic diseases
iv. Attitudes and practices on disease modifying anti rheumatic drugs (DMARDS) prescription in Zambia.

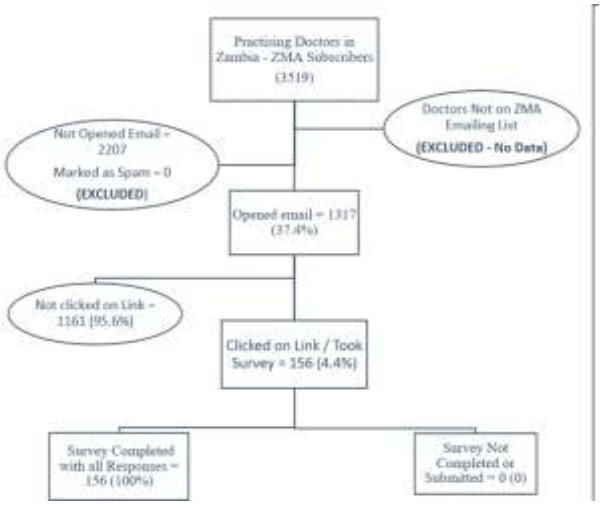
METHODOLOGY

This was an online-based electronic survey. A third party (the Zambia Medical Association) was used to conduct the survey. The questionnaire was designed and discussed by the authors to reach consensus on the key themes they felt would give more insight into the subject matter. The formulated questionnaire was then pre-trialed with 10 respondents and some themes were then modified to the final version.

Doctors practicing across Zambia were purposely surveyed using the Zambia Medical Association's Email list. This included Primary Care Physicians, Public health Specialists, Clinical Specialists in (Internal Medicine and Subspecialties, Orthopedics and Surgical Subspecialties, Pediatrics and Child Health, Obstetrics and Gynaecology), Specialist Trainees in Medicine and Subspecialties, as well as other specialty training fields. To encourage wide participation, including for doctors serving in rural Zambia, reminder emails were sent twice every month for the duration of the study's data collection period.

Some of the survey themes included baseline data like age group, years of medical practice, level of medical training, and number of patients with rheumatic diseases seen over a given period, their experiences with rheumatic diseases including arthritis, diagnostic tools including laboratory measures, the use of Disease Modifying Anti-Rheumatic Drugs (DMARDs), and experience with rheumatology services.

As the survey was an electronic based one, the respondents were asked to consent by clicking on the “accept/next button to proceed” as a way of consenting to take part in the study. To ensure data validity, all fields were marked as mandatory for one to proceed to the next question and complete the survey.



Question/Option	Total Responses n = 156	Percent (%)
Gender		
Female	*44*	*28.2*
Age Group (Years)		
25 - 35	*93*	*59.6*
36 - 45	*35*	*22.4*
46 - 55	*20*	*12.8*
>55	*8*	*5.1*
Level of Training		
Primary Medical Degree, e.g. MB ChB	*104*	*66.7*
MMed or Equivalent	*35*	*22.4*
Fellowship	*11*	*7.1*
PhD	*2*	*1.3*
Other	*4*	*2.6*
Years of Practice		
0 - 5	*73*	*46.8*
6 - 10	*35*	*22.4*
11 -15	*22*	*14.1*
>15	*26*	*16.7*
Practice Type		
Public	*141*	*90.4*
Primary Care (First Level)	*32*	*20.5*
Secondary (General Hospital)	*33*	*21.2*
Tertiary (Teaching &	*82*	*52.6*

MBChB = Bachelor of Medicine & Bachelor of Surgery, MMed = Master of Medicine, PhD = Doctor of Philosophy

Others = Non-governmental organisations, Ministry of Health - administration, Research Organisation, etc)

Table 2: Respondents' Experience and Knowledge of Rheumatic & Musculo-Skeletal Diseases (or Arthritis)

Question/Option	***Total Responses n = 156***	***Percent (%)***			
Number of patients with Rheumatic or Musculo-Skeletal Disease e.g. Arthritis seen in the last Six (6) Months					
0 - 5	*102*	*65.4*			
6 - 10	*19*	*12.2*			
11 - 20	*8*	*5.1*			
>20	*27*	*17.3*			
Confidence in ability to diagnose Arthritis					
	Not Confident	*Somewhat Confident*	*Confident*	*Very Confident*	*Comment*
Rheumatoid Arthritis (RA):	*3 (1.9%)*	*36 (23.1%)*	*78 (50%)*	*39 (25%)*	*OR 1.15, 95% CI 0.68 – 1.94*
Psoriatic Arthritis (PsA):	*52 (33.3%)*	*73 (46.8%)*	*20 (12.8%)*	*11 (7.1%)*	*OR 13.9, 95% CI 8.09 – 24.02*
Gout Arthritis:	*4 (2.6%)*	*31 (19.9%)*	*55 (35.3%)*	*66 (42.3%)*	
Osteoarthritis (OA):	*2 (1.3%)*	*23 (14.7%)*	*62 (39.7%)*	*69 (44.2%)*	
Confidence in ability to diagnose other Systemic Rheumatic Diseases:					
Systemic Lupus Erythematosus (SLE):	*26 (16.7%)*	*56 (35.9%)*	*44 (28.2%)*	*30 (19.2%)*	*OR 3.83, 95% CI 2.35 – 6.25*
Undifferentiated Connective tissue diseases including Overlap diseases:	*59 (37.8%)*	*69 (44.2%)*	*21 (13.5%)*	*7 (4.5%)*	

Systemic Sclerosis (Scleroderma):	*69 (44.2%)*	*60 (38.5%)*	*17 (10.9%)*	*10 (6.4%)*	*OR 16.52, 95% CI 9.44 – 28.92*
Confidence in ability to diagnose Systemic Vasculitis:	*62 (39.7%)*	*68 (43.6%)*	*18 (11.5%)*	*8 (5.1%)*	
Laboratory Parameters (Tests)					

How confident are you with the application/ or use of Auto -Antibodies in diagnosis of Rheumatic Diseases? *[Total responses, n = 156 (100%)]*

	Not Confident	*Somewhat Confident*	*Confident*	*Very Confident*	Comment
Anti-Nuclear Antibodies (ANA)	*30 (19.2%)*	*44 (28.2%)*	*46 (29.5%)*	*36 (23.1%)*	*Mainly offered in private laboratories*
Rheumatoid Factors	*16 (10.3%)*	*40 (25.6%)*	*55 (35.3%)*	*45 (28.8%)*	
Anti-Citrullinated Peptide Antibodies ACPA (e.g. CCP)	*65 (41.7%)*	*41 (26.3%)*	*24 (15.4%)*	*26 (16.7%)*	
double stranded DNA Antibodies (dsDNA)	*55 (35.3%)*	*47 (30.1%)*	*27 (17.3%)*	*27 (17.3%)*	
Anti-Neutrophil Cytoplasmic Anti-bodies (ANCA)	*64 (41%)*	*40 (25.6%)*	*33 (21.2%)*	*19 (12.2%)*	
MPO & PR3 AN CA (Myeloperoxidase and Proteinase 3)	*95 (60.9%)*	*35 (22.4%)*	*18 (11.5%)*	*8 (5.1%)*	*Mainly offered in private laboratories*

How likely would you make a diagnosis of any arthritis or rheumatic disease without above antibody tests?

	Total Responses n = 156	Percent (%)	Comment
Not at All	*22*	*14.1*	*OR 1.06, 95% CI 0.67 – 1.67*
Somewhat Likely	*75*	*48.1*	
Likely	*46*	*29.5*	
Very Likely	*13*	*8.3*	

CI = confidence interval, OR = odds ratio, SD = standard deviation

Question/Option	*Total Responses n = 156*	*Percent (%)*	*Comment*
Are you familiar with any disease modifying anti-rheumatic drugs?			
Yes	*125*	*80.1*	*SD 0.400, 95% CI 0.74 – 0.87*
How confident are you in prescribing DMARDS			
Not Confident	*52*	*33.3*	*OR 10.95, 95% CI 6.45 - 18.58*
Somewhat Confident	*62*	*39.7*	
Confident	*35*	*22.4*	
Very Confident	*7*	*4.5*	
In the last 12 months, how often have you made a prescription of any DMARD?			
Never	*108*	*69.2*	*OR 9.07, 95% CI 5.39 – 15.2*
1 – 5 times per month	*42*	*26.9*	
6 – 20 times per month	*3*	*1.9*	
Often (> 20) times per month	*3*	*1.9*	
In treating Rheumatoid Arthritis, which one of the following is the favored recommended first line DMARD by both ACR and EULAR?			
Sulfasalazine	*10*	*6.4*	
Leflunomide	*2*	*1.3*	
Methotrexate	*46*	*29.5*	
Rituximab	*6*	*3.8*	
Hydroxychloroquine	*26*	*16.7*	
I don't know	*66*	*42.3*	
Other (Specify)	-	-	

Are you aware of any DMARDs that are covered in the National Health Insurance Management Authority (NHIMA) benefit package?

Yes	*5*	*3.2*	*96.8% were not aware of any DMARDS covered by NHIMA*
Examples Given			
Cyclophosphamide	*1*		*These drugs were not listed in the 2019 Benefit Package under heading " treatment of rheumatic diseases ". Those that appeared were covered under cancer chemotherapy.*
Hydroxychloroquine	*2*		
Methotrexate	*1*		
No drug name mentioned	*1*		

CI = confidence interval, OR = odds ratio, SD = standard deviation

The results further show that there was a strong positive correlation between knowledge or confidence to interpret auto-antibody tests (e.g. CCP antibodies & ds DNA) and the confidence to diagnose RMDs even when such laboratory tests were not available (Pearson's coefficient correlation +0.78 and +0.82 respectively). Doctors with confidence to interpret ANA tests were also more likely to be able to interpret rheumatoid factors, CCP anti-bodies, ds DNA and ANCA (Pearson's coefficient correlation +0.75, +0.69, +0.75, +0.67 respectively), while the correlation between confidence to interpret CCP antibodies and ds DNA, ANCA, MPO/PR3 – ANCA was +0.78, +0.80 and +0.71 respectively. Similarly, there was a strong correlation between doctors' confidence (ability) to diagnose psoriatic arthritis and RMDs like connective tissue disorders (including overlap syndromes), systemic sclerosis, and systemic vasculitides (Pearson's coefficient correlation +0.59, +0.62, +0.60 respectively).

Furthermore, confidence in prescribing DMARDS had a strong positive correlation with the frequency of prescribing them (Pearson's coefficient correlation was +0.61); but a strong negative correlation with knowledge of the preferred first line DMARD for rheumatoid arthritis (Pearson's coefficient correlation was -0.42). Similarly, having confidence to diagnose systemic vasculitides had a strong negative correlation with frequency of prescribing DMARDS (Pearson's coefficient correlation was -0.33); while the specialty of practice had moderate negative correlation with the number of RMD patients seen (Pearson's coefficient correlation -0.23)

(Snapshot of common responses (quotations) from respondents on how much they thought rheumatic

Only made worse by the fact that many first contact practitioners are not comfortable with this group of diseases
They are a problem but the challenge is lack of proper laboratory diagnostic capacity at the government facilities and lack of medication to treat the disease effectively. Nhima affiliated Institutions are also limping.not providing the basic standard care especially in patients with what we term exotic diseases
I think they are a problem but we lack skills to identify them so probably missing alot of them in the process
Neglected sub specialty, with large number of patient who need care, currently only 1 rheumatologist in public services, need to train more
They are never covered in major health programs including teaching
I am not sure about the extent of the problem in Zambia
Rheumatic disease remain a serious problem in zambia due to lack of rhumatologists, lack of basic diagnostic services mostlyin rural areas
My take is over 80% remain undiagnosed and 90% remains undertreated

DISCUSSION

We studied doctors' knowledge on rheumatic and musculoskeletal diseases, and their DMARDs prescribing ability or trends. We further looked at their interest and involvement in rheumatology services. The study has demonstrated that the uptake of rheumatology services has remained low across Zambia, although notable strides have been achieved with regard patient and family education through a patient driven organisation called the Rheumatic Diseases Association of Zambia (REDAZ) that has been in existence for over 10 years. [5] However, there seems to remain a very wide gap when it comes to interest in rheumatology by doctors. The results in Figure 1 elaborate the low interest among doctors in responding to the survey, despite the salience of the subject, and the fact that prompts for them to take the survey were sent as multiple emails over a six-month period. The reasons as to why there was such low interest in participating in this knowledge-based survey are not known but could be diverse. [13] Of the total respondents, few females participated, while male doctors accounted for 60%. This is like a study in the United States of America where findings among primary care physicians had a response rate around 25% (though much higher than in our study) while majority studies globally had response rates between 20% and 70%.[9]

Most of our respondents were aged 25-35 years, and only 5% were above 55 years probably reflecting the demographics of Zambia as a country with predominantly a youthful population. [1] This should offer hope as other countries like Korea have developed rheumatology services through a drive by younger doctors.[14] These approaches if replicated in our settings could help Zambia close this gap, just like most East Asian countries have done in recent years. [15]

The survey has also shown that Zambia's doctor population has very few trained specialists in most medical subspecialties. Over 66% respondents had only a primary medical qualification, and few with post-graduate qualification like Master of Medicine or Fellowship. Notably, only two were rheumatologists, and three were orthopedic surgeons, specialties that are critical in managing most rheumatic diseases. This study thus raises a serious concern of a lack of access to rheumatology services in Zambia, like challenges faced by most developing nations globally.[2,3,4]

Although the number of respondents is small to offer generalization of these results, experience by the authors who have both worked in Zambia for many years agrees with this assessment. As pointed out above regarding Zambia's demography, most respondents were youthful and had less than 5 years of medical practice experience, with less than 20%

having had experience greater than 15 years in practice, making it more likely that patients presenting with rheumatic diseases may go undiagnosed or given other disease diagnostic labels for many years before a correct diagnosis and appropriate treatment are instituted. This was collaborated in an oral presentation at the 7th East, Central and Southern Africa College of Physicians Congress where case vignettes of untreated gouty arthritis patients from Zambia were presented.[8]

The study has also shown the imbalance in doctor distribution across Zambia, where the majority were based in the country's four largest cities (Lusaka, Kitwe, Ndola and Livingstone), reflecting the more propensity for most specialist services including rheumatology to be clustered in the more developed urban communities and countries.[2, 3] On the other hand, only 17% were from rural towns, with a third of them having no access to private laboratories that offer most of the immunological tests. This poses real challenges on the backdrop of most doctors not having the felt confidence to make the diagnosis and treat majority of rheumatic diseases. In Zambia, this is compounded by a lack of, or limited access to immunological tests, and probably the unexplored question of background undergraduate medical training coverage of rheumatology.

The study has also highlighted the knowledge and skills gap in diagnosis of rheumatic diseases, as well as prescription of disease modifying anti rheumatic drugs (DMARDS). Of the most notable are gaps in felt confidence to diagnose diseases like scleroderma, systemic vasculitis, and systemic lupus erythematosus (SLE) which ranged between 5% - 20%, as shown in table 2. The data further shows that doctors who are familiar with DMARDS are nine times more likely to prescribe them (OR = 9.07, 95% CI = 5.39 – 15.2), and that those that see more than 10 patients with a rheumatic disease are also more likely to prescribe with confidence. These felt inadequacies are not very different to those highlighted in studies from India and the USA among primary care physicians.[2,9]

The study has further shown that there was no strong correlation between the likelihood of making a diagnosis of an RMD where the doctor has no auto-antibody tests to support the diagnosis, and a doctor's confidence in interpreting those auto-antibody results (OR = 1.06, 95% CI = 0.67 – 1.67). Therefore, a drive for rheumatology trainings would probably help strengthen the rheumatology knowledge base among Zambian doctors. This argument is supported by the evidence showing a strong correlation between confidence to interpret ANA tests, and confidence to interpret other autoantibodies like RFs, CCP, ds DNA and ANCA, while the majority 50 – 70% had no confidence. Although 58% of the respondents were familiar with ANCA testing, the ANCA subclasses of myeloperoxidase (MPO) and Proteinase-3 (PR3) were only known to less than 17% of respondents. Similarly, less than 20% of respondent doctors had confidence to diagnose some rheumatic diseases that are less well documented in Zambia and most Sub-Sahara Africa like psoriatic arthritis, scleroderma (systemic sclerosis), systemic vasculitis, and some overlap CTDs (strong positive correlation). This clearly supports the hypothesis of high likelihood of low coverage and exposure to rheumatology topics during the medical training for majority of the Zambian doctors, as anecdotal data from some unpublished rheumatology registries suggest that these diseases are in fact quite common.

The lack of tailored curriculum that gives weight and emphasis to rheumatic diseases in undergraduate training could be a major contributing factor to this. As shown in table 3, and respondent comments in chart 3, between a third and two-thirds of respondents had no felt confidence in interpreting the utilization of key immunological tests including ANA, ds DNA, ACPA (CCP), and MPO/PR3 – ANCA, hence posing challenges whenever they encountered these patients. Most of these doctors identify and see less than five rheumatology patients over a six-month period. This creates a huge burden on the patient population who may go undiagnosed until they develop irreversible complications many years later.[8]

Our study was further able to elaborate on the lack of, or inadequate training, knowledge and skills in managing rheumatic diseases. Although we did not specifically ask whether respondents had received medical training on any specific rheumatology topics, over 69% of them had never prescribed DMARDs even though the majority of these are general medical doctors who may routinely come across patients with rheumatology complaints in their out-patient departments. This assertion will however require further examination by a separate study to validate it. Nonetheless, we can draw inference on prescription habits for DMARDs by comparing the study by Garneau et al. who were able to elaborate the challenges faced by primary care physicians in a setting where medical services including rheumatology are well developed. Key competence areas like ability to switch or start DMARDs were found to be lacking in majority of respondents. This is also like a French study that demonstrated challenges with medical training and a lack of continued medical education (CME) for rheumatology topics like fibromyalgia among doctors, including rheumatologist, and leads to inadequacies and low confidence in making diagnoses and treatment. [16] In our study, most respondents (over 70%) were unaware of the fact that Methotrexate is the recommended first line therapy (DMARD) for rheumatoid arthritis. [10, 11] This by itself points to inadequate CMEs or deficiencies in the medical training programs even though prevalence of rheumatic diseases, especially rheumatoid arthritis and other autoimmune diseases are on the rise in Zambia and globally as noted in some small studies done in the past.[5, 7]

With regards to the National Health Insurance Services under the National Health Insurance Management Authority (NHIMA), over 96% respondents were not aware of any DMARDs covered in the 2019 NHIMA benefit package, which has since been revised.[12] Thus we may draw conclusions that there is a lack of interest in rheumatic diseases both from doctors and decision makers. This could have contributed to the low availability and coverage of key DMARDs like methotrexate and hydroxychloroquine that almost all doctors were not aware were covered by the National health insurer. However, some positive strides are being made, for example, the revised and updated NHIMA benefit package has now included one or two biologics classed under other disease conditions e.g. Rituximab and Abatacept, as well as Cyclophosphomide which is listed under cancer chemotherapy. [12]

Furthermore, the limited available space for CMEs on rheumatology topics across the country also remains a major challenge that needs overcome if these gaps are bridged.

CONCLUSION

Knowledge of biomarker tests and DMARDs used in diagnosis and treatment of rheumatic diseases respectively, is lacking. This is coupled with a background of having very few doctor numbers that indicate having confidence in identifying and managing rheumatic diseases, as well as non-availability of key drugs for treating some of the commonest conditions like rheumatoid arthritis. The findings of our study call for more robust and well-structured interventions if rheumatology services are to be improved in Zambia. There is thus a clear need and demand for policy change and enhanced rheumatology training and expansion of services across the country.

LIMITATIONS

The study was highly limited in sample size in that only medical doctors affiliated to the Zambia Medical Association and had active emailing addresses were contacted. Furthermore, because there was no personal interaction between the researchers and respondents, this could have significantly contributed to the low response rates. Self-selection bias was another limitation as both participation and survey completion were voluntary, except for the repeat email prompts that were sent.

CONFLICT OF INTEREST AND FUNDING DISCLOSURE

The Investigators declare no conflict of interest. Part Funding for the project included on-going rheumatology training and patient care and was supported by the Scottish Government through the Royal College of Physicians and Surgeons of Glasgow (RCPSG). The Ministry of Health through Kitwe Teaching Hospital's Senior Medical Superintendent granted permission to conduct the study with some funding through the hospital's Research Committee.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the support and facilitation by the Zambia Medical Association, and its former Secretary General, Dr. Masiku Phiri for having allowed the use of the ZMA platform for the survey.

Further acknowledgement goes to the Royal College of Physicians and Surgeons of Glasgow, RCPSG who supported Dr. Liusha financially during implementation of the rheumatology cascade programme in Zambia which contributed to the conception of this study.

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