



Original Research

## Research Output in Orthopaedics and Sports Medicine from Nigeria and Africa – A Bibliometric Analysis

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### Abstract

**Background:** Nigeria has a relatively large scientific community that produces an adequate research output among African countries. Not many studies have analysed the research output in orthopaedics and sports medicine from Nigeria and Africa. Hence, we aimed to analyze the research output in orthopaedics and sports medicine from Nigeria and Africa.

**Methodology:** We used the SCOPUS data from the Scimago Journal & Country Rank website. It allows us to draw various journal metrics for research.

**Results:** Between 1996 and 2022, Nigerian research publications in orthopaedics and sports medicine had grown from 4 in 1996 to 39 in 2022 (a 10-fold growth) but overall is 62nd in the world representing 0.07% of publications in the period. In the same period, Africa published 8297 papers in orthopaedics and sports medicine representing only 1.24% of the global publications in this field.

**Conclusion:** There is low research output in Orthopaedics and Sports Medicine from Nigeria and, the whole African continent. However, there has been a growth in the publications from Africa.

**Keywords:** Research; Publication; Africa; Orthopaedic; Nigeria; Sports Medicine; Surgery

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## Introduction

Nigeria is the most populous country in Africa and the seventh most populous in the world, with a population of 223.8 million people<sup>(1)</sup>. Nigeria is classified as a 3<sup>rd</sup> world country and by the World Bank and also as a low-middle-income country (LMIC) with a Gross Domestic Product (GDP) of 9148 US dollars (as of 2022) and ranks behind South Africa, Egypt and Morocco but places it ahead of other West African countries<sup>(2)</sup>. Even though Nigeria has the largest economy in Africa, it has the world's largest population of people living in extreme poverty<sup>(3)</sup>, which ultimately affects access to research funding for local researchers<sup>(4)</sup>.

Nigeria has a relatively large scientific community with over 200 tertiary institutions employing over 60,000 researchers (as of 2019). They also produce a significant research output in Africa being third only to South Africa and Egypt<sup>(5)</sup>.

There is paucity of studies in analysing the research output in orthopaedics and sports medicine (OSM) from Nigeria and Africa before. Hence, we aimed to analyze the research output in OSM from Nigeria and Africa over three decades and to draw attention to the obstacles to research from this part of the world.

## Methods

We used the SCOPUS data from the Scimago Journal & Country Rank website. It allows us to draw various journal metrics for research. Our search strategy on the SCImago website (<https://www.scimagojr.com/>) was as follows:

- A) For All Country Regions: SCImago website >> Country ranking >> All Subject Areas >> Orthopedics & Sports Medicine >> All Regions >> Year (1996-2022 and 2022).
- B) For Africa: SCImago website >> Country ranking >> All Subject Areas >> Orthopaedics & Sports Medicine >> Africa >> Nigeria >> Year (1996-2022 and 2022).

The data was downloaded of these respective fields into Excel sheets for analysis. The country rankings of Africa and Nigeria in OSM were evaluated and compared.

## Results

### Nigeria

Nigeria has shown growth in research publications in OSM by 10-fold in the last 26 years (i.e., from 1996 to 2022) (Figure 1). Nigeria ranked 62nd in the world among 199 participating countries and 5th in Africa (among 49 participating countries) with a total of 310 publications, during 1996-2022. It follows South Africa, Egypt, Tunisia, and Morocco in the quantum of publications in OSM. Kenya, Ghana, Ethiopia, Algeria, and Malawi make up the top 10 in that order (4).

In 2022, Nigeria (with 39 publications) contributed only 0.07% of research output in orthopaedics and sports medicine on the global scale and 4.19% in Africa (Table 1). In the last 26 years (between 1996 and 2022), Nigeria has contributed 0.05% on the world stage and 3.76% in Africa.

### Africa

Africa overall has a relatively low research output. In the period between 1996 and 2022, all African countries published 8297 OSM papers which represent 1.24% of the global output (8297 out of 668479). Of this number, the top three countries of South Africa, Egypt and Tunisia published 77% of the OSM papers.

All other 46 countries including Nigeria accounted for the remaining 23% of publications. In 2022, Africa produced a total of 931 publications out of 52,120 representing a relatively low 1.8% of publications.

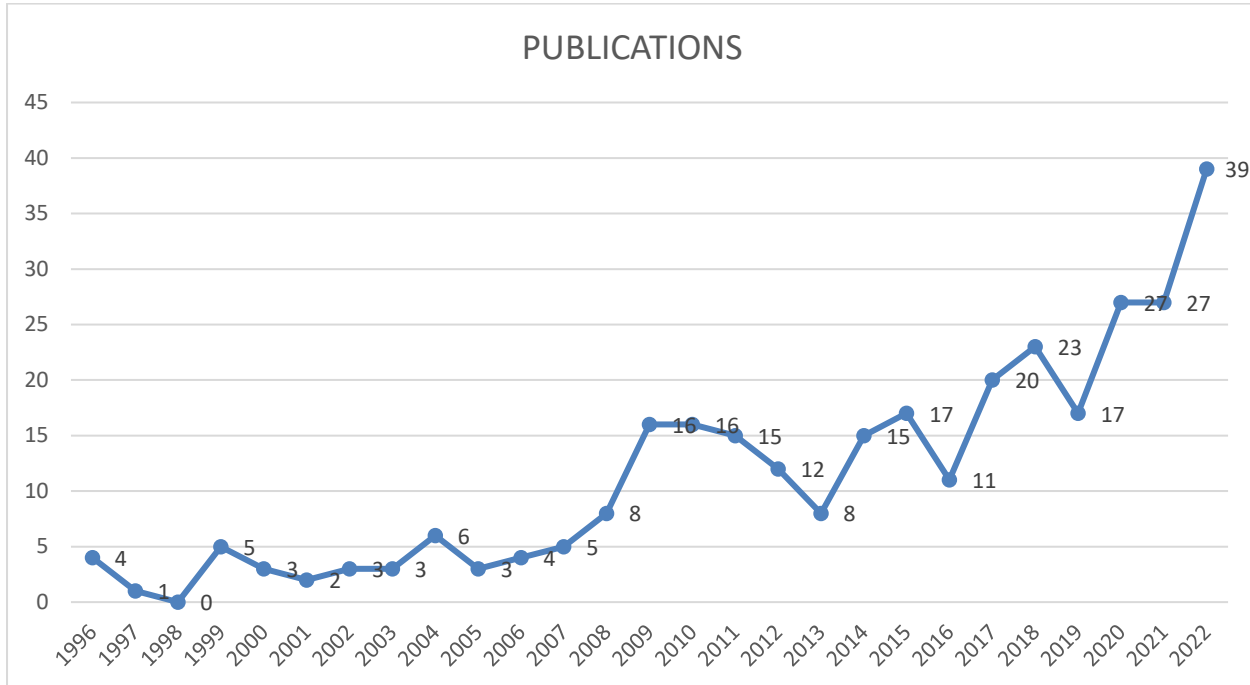


Figure 1: Trend of publications from Nigeria 1996 – 2022 (Data source: SCImago<sup>6</sup>)

**Discussion**

The research output from Nigeria has grown in the last 26 years by tenfold from 4 publications in 1996 to 39 in 2022. However, compared to some other African countries and the rest of the world, Nigeria has a very low research output in OSM. There are around 350 qualified orthopaedic surgeons in Nigeria (7), serving a vast population of 223 million people. Comparatively, Tunisia has about 400 Orthopaedic surgeons but has published a total of 102 OSM articles in 2022, which is 2.6 times the research output of Nigeria. South Africa has more than twice as many specialists as Nigeria (9) but has published 8.7 times more than Nigeria in 2022.

Table 1: The Publication metrics of African countries in Orthopaedic and Sports Medicine in 2022 (Data source: SCImago<sup>6</sup>)

Rank	Country	Total Publications	Total Citations	Citations Per Publication	H Index
1	South Africa	339	309	0.91	111
2	Egypt	276	158	0.57	54
3	Tunisia	102	168	1.65	73
4	Nigeria	39	47	1.21	30
5	Ethiopia	25	2	0.08	19
6	Morocco	23	3	0.13	27

7	Ghana	18	48	2.67	20
8	Algeria	11	37	3.36	16
9	Uganda	11	3	0.27	15
10	Tanzania	11	6	0.55	11
11	Kenya	9	7	0.78	28
12	Cameroon	7	2	0.29	17
13	Malawi	7	2	0.29	24
14	Liberia	7	2	0.29	2
15	Botswana	6	42	7	13
16	Zimbabwe	6	11	1.83	12
17	Libya	3	1	0.33	4
18	Rwanda	3	0	0	4
19	Sudan	3	2	0.67	11
20	Senegal	3	0	0	10
21	Côte d'Ivoire	2	0	0	8
22	Burkina Faso	2	1	0.5	6
23	Benin	2	1	0.5	6
24	Guinea	2	0	0	0
25	Zambia	2	0	0	7
26	Reunion	2	5	2.5	8
27	Swaziland	1	0	0	1
28	Congo	1	1	1	9
29	Angola	1	2	2	2
30	Mauritius	1	7	7	2
31	Gambia	1	0	0	5
32	Gabon	1	1	1	1
33	Cape Verde	1	0	0	0
34	Burundi	1	0	0	2
35	Sierra Leone	1	0	0	3
36	Somalia	1	1	1	1

The research contribution in OSM publications of Nigeria at the global level was 0.05% during 1996 and 2022, and 0.07% in 2022. Whereas its contribution among African countries was 3.74% during 1996-2022, and 4.19% in 2022. Africa did not fare much better on the global stage contributing only 1.8% in 2022 to global OSM publications.

The obstacles to scientific research and publications in Nigeria had been enumerated in a paper by Igiri et al. (4) including limited access to research funds amongst other reasons. The fact that most of the research in OSM comes from high-income countries (HIC) support this position (6). These same problems also affect other African countries. A similar pattern has been demonstrated in other parts of the world in similar work done in Asia (9). Vaishya et al. also showed that the majority of the high-impact publications were from HIC (10).

Another major problem for African countries is a relative lack of opportunities to publish with limited journals to access locally. For example, only 3 journals for OSM and indexed on Scopus as coming from Africa; 2 from South Africa (*South African Journal of Sports Medicine*, and *South African Orthopaedic Journal*) and one from Egypt (*Advances in Orthopedics*) (6). At the moment there is no active OSM journal from Nigeria. This limits the chances of local research and publication.

At least in some African countries language barrier limits their access to publications as these countries do not speak English. It has been demonstrated by Vaishya et al that language barrier can affect the rate of scientific publications (11).

Article processing charges (APC) could also be an obstacle in Africa as it is elsewhere (12) in developing countries. Since many researchers in Nigeria lack access to research funding and have to fund their work out of their pocket (4), these APCs can be a major factor in discouraging research and publications (12).

Igiri et al. (4) felt the main obstacles to publications are lack of knowledge and experience in research and publications. Some of these problems can be improved by cross-border collaborations. Travelling fellowships in orthopaedics may not only increase the skills and knowledge of surgeons but also expose them to strengthen research collaborations and even give them access to funding for collaborative research (13).

Scimago is a freely available public resource that assesses research output from different parts of the world based on Scopus data (6). Hence, we used information from Scimago to do a bibliometric analysis of research output in OSM between Nigeria, Africa, and the rest of the world.

### **Future Direction**

An analysis of the data on SCImago shows an obvious dichotomy in publications with the majority of the publications being from developed or HICs (6). The reasons for this may not be unrelated to the fact that there are more opportunities for research with more journals, research funding, and international collaboration. This research sets the tone for clinical practice and the tone set for practice may not always be well tailored to the unique situation in LMIC like Nigeria and other African countries where despite the relatively higher population and disease burden compared to HIC, the research output is relatively scanty. Nigeria for instance has the highest population in Africa and 7<sup>th</sup> highest in the world but is only responsible for 0.05% of OSM publications in the last 26 years.

The clinical problems, health financing constraints and healthcare delivery challenges of LMIC particularly of African countries are unique and may not be well taken care of by solutions tailored to HIC. It is therefore imperative that more research and publications are encouraged from these countries to bring solutions that are more efficient and cost-effective for the healthcare problems of the local population. Deliberate efforts should also be made to increase access to research funding to increase the quality and quantity of local research. Such efforts should include but not be limited to providing research

funding, encouraging local journals, encouraging travel fellowships and training local researchers on research methodology.

### Limitations of the study

We only employed data from one data set. We felt this data was representative enough and mixing datasets could lead to duplications. Hence, there may be data not captured in the Scopus database that we may have missed or excluded.

### Conclusion

There is low research output in Orthopaedics and Sports Medicine from Nigeria and overall whole African continent. However, there has been a growth in the publications from Africa. We suggest encouraging more local research to improve the development of better ways to tackle musculoskeletal problems and their challenges in the African continent.

### Disclosures

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