

# Status of Surgical Research and Publication in Africa

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## Summary

**Introduction:** The research output in surgical branches such as orthopedics and sports medicine (OSM) is meager from Africa, considering the population and the high burden of health-related problems. We conducted this study to analyze the trend of publications in OSM from African countries and compared it with other surgical specialities. **Methods:** We used the SCOPUS data from the Scimago Journal & Country Rank website, as it allows us to draw substantial journal metrics for research. **Results:** During the past three decades (between 1996 and 2022), Africa's global contribution to all surgical specialities has increased. In OSM, this was only 0.65% in 1996 and had risen to 1.79% in 2022. The total publications in OSM were 8297 from 49 countries during this period. The number of publications has risen from 61 (in 1996) to 931 (in 2022), with the maximum surge seen during the past decade. South Africa, Egypt, and Tunisia are the leading African nations in OSM publications and have contributed 77%

of the total publications from Africa in 2022. There were only three orthopedic and four other surgical specialities indexed journals listed in the SCImago, arising from Africa. **Conclusions:** There was an increased research output from Africa in OSM during 1996–2022, especially in the past decade. However, only three nations have contributed more than three-fourth of these publications. There is a scarcity of indexed journals in the surgical disciplines arising from Africa.

**Keywords:** Research, Publication, Africa, Orthopedic

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## Introduction

The African continent is the second largest and the second most populous after Asia. In 2021, its estimated population was 1.4 billion, which accounts for 18% of the world population. It houses 54 countries, is plentiful in natural resources, and covers 20% of the world's land area. Despite all these facts, it is the least wealthy continent per capita (1). There is a substantial discordance between its population and the research output, in the field of medical sciences. It is known that developing or low-income countries [LIC] (like many of

the African nations) inhabit more than 75% of the world's population and also have the highest burden of musculoskeletal (MSK) diseases. However, they contribute less than 10% of the total global publications (2). The total number of publications by a country or region is one of the best indicators of research output and productivity. These are also important aspects of clinical excellence (3). Zhi et al. (4) found that in the recent past, although orthopedic research has grown in volume, the research status of different countries is not very clear.

STATUS OF SURGICAL RESEARCH AND PUBLICATION IN AFRICA

There is a paucity of data available on the status of surgical research output from Africa, in particular, in orthopedics and sports medicine (OSM). Hence, we conducted this study to analyze the trend of publications in OSM from African countries and compare them with other surgical specialities.

**Methods**

We used the SCOPUS data from the SCImago Journal & Country Rank website (5), as it allows us to draw substantial 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 >> Orthopedics & Sports Medicine >> Africa >> Year (1996–2022 and 2022).

The data were downloaded from these respective fields into Excel sheets for analysis, for several important publication metrics. The country rankings of Africa in the field of OSM were evaluated and compared with the other surgical specialities, from 1996 to 2022 (26 years).

Table 1. Publications from Africa in surgical and orthopedic specialities (1996–2022)

SPECIALITIES	1996–2022			1996			2022		
	ALL REGIONS	AFRICA	AFRICA'S GLOBAL CONTRIBUTION (%)	ALL REGIONS	AFRICA	AFRICA'S GLOBAL CONTRIBUTION (%)	ALL REGIONS	AFRICA	AFRICA'S GLOBAL CONTRIBUTION (%)
ALL SURGICAL SPECIALITIES	1,501,786	23,373	1.56	8759	238	0.83	110,136	3142	2.85
ORTHOPE DICS & SPORTS MEDICINE	668,479	8297	1.24	9402	61	0.65	52,120	931	1.79

Source: SCImago (5).

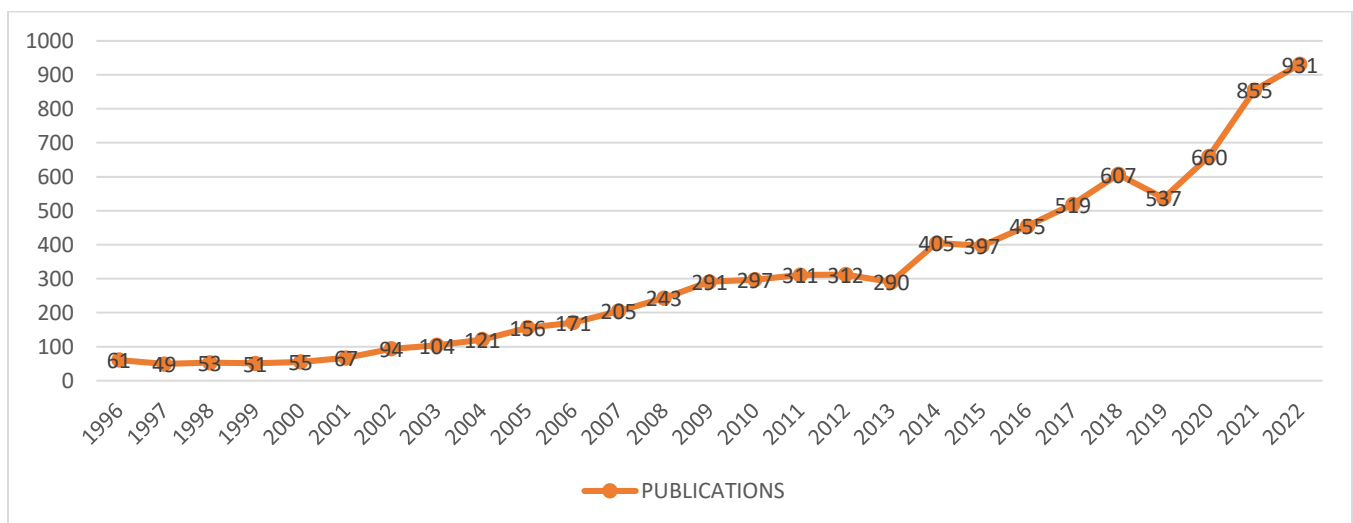


Figure 1. Rising trend of publications in orthopedics and sports medicine in African countries from 1996 to 2022

## Results

### *Surgical publications from Africa*

During the past three decades (between 1996 and 2022), on average Africa's global contribution in all surgical specialities (excluding OSM) was 1.56%. It was only 0.83% in 1996 and had risen to 2.85% in 2022. Whereas in OSM, Africa's average global contribution was 1.24%. It was only 0.65% in 1996 and had risen to 1.79% in 2022 (Table 1).

### *Publication metrics of Africa in orthopedics and sports medicine research*

#### Publications

Most African countries have shown a rise in their OSM publications from 1996 to 2022. Their total publications were 8297 from 49 countries during this period of 26

years. The number of publications has risen from 61 (in 1996) to 931 (in 2022), with the maximum surge seen during the past decade (Figure 1). Only three African countries (South Africa, Egypt, and Tunisia) have published more than 100 papers in 2022 (Table 2), and are leading in the OSM publications. These three countries contributed 77% of the total publications from Africa in 2022.

#### Citations

A total of 142,652 citations were received by these publications, with an average citation per paper (CPP) of 17.93. The most average CPP was registered by the publications from Mozambique (50.07), followed by Kenya (37.11), Botswana (25.08), South Africa (24.17), and Zimbabwe (23.12).

**Table 2:** Top 15 publishing African countries in orthopedics and sports medicine from Africa (1996–2022)

COUNTRY	AFRICAN RANKING (IN 2022)	GLOBAL RANKING (IN 2022)	TOTAL PUBLICATIONS (IN 2022)	TOTAL PUBLICATIONS (IN 1996)
South Africa	1	27	339	37
Egypt	2	32	276	6
Tunisia	3	46	102	1
Nigeria	4	62	39	4
Ethiopia	5	71	25	2
Morocco	6	73	23	2
Ghana	7	81	18	0
Algeria	8	90	11	2
Uganda	9	91	11	0
Tanzania	10	92	11	0
Kenya	11	93	9	1
Malawi	12	96	7	0
Cameroon	13	97	7	0
Liberia	14	100	7	0
Botswana	15	105	6	0

Source: SCImago<sup>5</sup>

## Rankings

The rankings of African countries in the field of OSM revealed that South Africa is the leading country, followed by Egypt, Tunisia, Nigeria, and Ethiopia (Table 2). However, considering the global rankings, African countries are lagging, and the leading African country, South Africa, ranked at 27 globally, in 2022.

### *Surgical journals*

There are only three African journals related to OSM listed in the SCImago, out of a total of 306 global journals (i.e., 0.98%). Two of these are from South Africa and one is from Egypt. There are four African journals in Surgery (out of 512 global surgical journals;

i.e., 0.78%); two of these are from Egypt, and one each is from South Africa and Kenya (Table 3). None of the African Surgical or OSM journals is in Quartile 1, the

majority of African nations do not publish any journals of their own.

**Table 3.** Profile of African journals in orthopedics and sports medicine, and surgery

	JOURNAL	SCImago JOURNAL RANK (SJR)	QUARTILE	H-INDEX	TOTAL DOCUMENTS (2022)	COUNTRY
<i>A) Orthopedics &amp; Sports Medicine</i>						
1.	<i>Advances in Orthopedics</i>	0.436	Q3	19	37	Egypt
2.	<i>South African Journal of Sports Medicine</i>	0.230	Q3	05	27	South Africa
3.	<i>South African Orthopedic Journal</i>	0.115	Q4	01	37	South Africa
<i>B) Surgery</i>						
1.	<i>Journal of Healthcare Engineering</i>	0.404	Q2	47	988	Egypt
2.	<i>South African Journal of Surgery</i>	0.160	Q4	24	65	South Africa
3.	<i>Egyptian Journal of Ear, Nose, Throat &amp; Allied Sciences</i>	0.123	Q4	10	54	Egypt
4.	<i>Annals of African Surgery</i>	0.122	Q4	5	40	Kenya

Source: SCImago<sup>5</sup>

**Discussion**

We reported an increase in OSM publications across the globe (6). However, most publications have come from high-income countries (HIC) and disproportionately much less from low-income countries (LIC) and low-and middle-income countries (LMIC). Graham et al. (7) in a bibliometric study found that 131,454 articles were published in 76 orthopedic journals over 10 years. Out of these, only 0.1% were published from LIC, 2.7% from LMIC, and the majority of 85.7% were published from HIC. Hence, there is a vast mismatch in the orthopedic research output from the LIC and LMIC, which are geographical areas of the greatest clinical need. The authors recommended that there is an urgent need for

orthopedic research from LIC to guide treatment and improve outcomes, rather than assuming evidence from high-income settings. It has been realized that there is an urgent need to strengthen the health sciences research capacity in African countries. It can contribute to improvements in health, social welfare, and poverty reduction through domestic application of research findings. Furthermore, the development of research infrastructure may help drive macroeconomic growth. Yet efforts to understand and boost health sciences research are limited (8).

Hohman et al. (9) in an African study reported, from the Web of Science data, that out of 23,021 orthopedic publications from 66 countries, South Africa published

only 19 articles and was ranked 41st in publication numbers and 40th for the impact. When compared with the other African countries it ranked second, after Egypt. Egypt is an “Arabic country,” but cherishes the status of an “African nation” also and has created a positive impact on the research output metrics of Africa (10), hence its publication metrics are included in this research.

There is a scarcity of indexed journals, from Africa, in the OSM and other surgical branches, with only three OSM and four other surgical journals listed in the SCImago. We believe that this must be addressed on priority by instituting more journals from these regions to encourage and provide the African researchers with a unique platform to publish their research. It is interesting to note that the journal-level metrics of medical journals are higher than the Surgical and Orthopedic journals (11). We suspect that many Africans are doing research (like many do for the master’s programs), but fail to publish their research either due to lack of motivation, mentorship, or due to lack of novelty in their research. We chose to use the data for this research from the publicly available free portal of SCImago Journal & Country Rank. It allows one to rank and compare scientific journals, regions, and countries using Scopus data (5). Scopus has the most comprehensive scholarly data and analytical tools for researchers and covers 93 million records, which is around twice the number of peer-reviewed publications than the other databases. It also outperforms them by providing a broader range of research metrics (12).

#### *Problems and solutions*

More concrete efforts are needed in the area of research and publications in all medical specialities from Africa. Since most African countries fall under the category of LMIC, their disease burden is high and unique. There are several challenges to dealing with these enormous health-related issues, including the treatment availability and costs involved. We believe that due to lesser research in Africa, about the regional problems, the treatment guidelines of HIC are being applied, which may not be appropriate, expensive, and non-affordable to most people (13, 14).

The researchers and clinicians from Africa need to focus on and address the health problems of their population, share their experiences, and find cost-effective solutions for them. To narrow down the disparities between Africa and the rest of the world and within African countries, we suggest the following strategies to improve and enhance the research output:

- *Infrastructural development:* Attention to the development and upgrade the diagnostic facilities such as laboratories, imaging, and equipment (basic and high-end). The lack of these facilities is considered a major hampering factor for research in Africa, and this is largely due to the availability of sufficient funds (15).
- *Institutional:* Governments should provide the career structure for trained scientists and for those wishing to pursue medical research, as biomedical scientists are doing administrative jobs, rather than pursuing the research. They are, therefore, non-productive in their research (15).
- *Financial:* Adequate research funds and personal remuneration be made available, and a fixed gross domestic product (GDP) expenditure be spent on research. The remuneration of scientists should be handsome, preferably at par with the scientists from developed countries. Only then would they be able to spend adequate time on the research work and provide better research outcomes at the global level. The African governments need to realize that medical research plays a crucial role in the overall economic and social development. Hence, due attention is required for increased research fund allocation to priority areas of their healthcare issues (15).
- *Educational:* Teaching and training of basic research must be included in the curricula for medical and allied health professions. Adequate emphasis should be given to the

role of medical research in career development (15).

- *Job selection and promotion:* It is suggested that for the selection and promotion of jobs, a certain number of publications by the candidate be made mandatory, to encourage them to do research and publish it.
- *Journals:* The number of journals being published in Africa is very minimal and many more journals in each medical and surgical specialities be increased, to help the African researchers to publish their research.
- *Research collaboration:* More international and national collaboration would also enhance the quality of research and publications.

The need to strengthen health research in Africa has been realized, and a conducive environment is to be created for it. Nabyonga-Orem et al. (16) in research found that only 18 of the 35 African countries had legislation to regulate health research. The authors suggested some useful solutions for research governance, as follows:

- Embrace new developments in science.
- Strong coordination for comprehensiveness and complementarity in research development and generation of evidence.
- Ensure representation of relevant expertise for the ethics and scientific review.
- Promote collaborative research.

We believe that there is great potential for the development and growth of scientific research in Africa by Africans and it is our sincere hope that all stakeholders will play their role in making this a reality.

### Study Limitations

We acknowledge that since we have used the published data from the SCImago website, which uses only Scopus data, there might have been certain omissions of publications and journals that are not listed in Scopus, but may be listed in other databases such as Web of Science, Google Scholar, and so on. In addition, many

of the African authors might have published their research in non-indexed or predatory journals.

### Conclusion

We have noticed an increased research output from Africa in OSM during 1996–2022, especially in the past decade. However, only three nations have contributed more than three-fourth of these publications. There is a scarcity of indexed journals in the surgical disciplines, arising from Africa.

### Author contributions

RV: Concept, literature search, data extraction and analysis, manuscript writing, editing, and final approval.

AV: Literature search, data extraction and analysis, manuscript writing, editing and final approval.

JK: Concept, literature search, manuscript writing, editing and final approval.

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