



## **Systematic Reviews and Meta-Analyses from Sub-Saharan Africa: Library and Information Professionals' Contributions to National Output**

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### **Abstract:**

*This paper assesses the contributions of library and information professionals to the systematic reviews and meta-analysis with at least an author from a Sub-Saharan African country. Systematic review and meta-analysis publications' data with at least an author from an institution in Sub-Saharan African country and was published between 2014 and 2019 was collected from MEDLINE using the PUBMED search interface. Bibliometric analysis of the collected data shows that South Africa, Ethiopia, Nigeria, Kenya and Cameroon were the most productive Sub-Saharan African countries in evidence-based biomedical research. Out of the 2439 articles, 474 referenced the contribution of library and information professionals. Most of the library and information professionals contributing to evidence-based research were from UK, USA, Australia, The Netherlands, and Canada. Only 33% of the library and information professionals with specified addresses were from institutions in Sub-Saharan Africa. Library and information professionals from only seven (South Africa, Ethiopia, Nigeria, Kenya, Uganda, Tanzania, and Mozambique) of the 46 Sub-Saharan African countries contributed to national output on evidence-based biomedical research. The library and information professionals' contributions were small; Uganda (8.28%) and South Africa (6.08%) were the only countries*

*that contributed to more than five per cent of national output on evidence-based biomedical research. The study revealed that library and information professionals from Sub-Saharan Africa were more likely to be consulted in studies with a Sub-Saharan African first author and in studies where all authors were from the Sub-Saharan African region, than studies with first authors from outside the region. The strong influence of the UK, USA, Australia, The Netherlands, and Canada on evidence-based research in Sub-Saharan Africa could be harnessed by national and regional library and information professionals' associations in the region for collaborative capacity building in relevant evidence-based research skills.*

**Keywords:** Evidence-based biomedical research, Sub-Saharan Africa, Library and Information Professionals, systematic reviews, meta-analysis

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## **INTRODUCTION**

Many studies have highlighted the role of library and information professionals in systematic reviews and meta-analysis. Beyond the traditional library and information professionals' role in evidence-based research as expert searchers, methodologists, or information managers (Morris, Boruff, and Gore 2017; Spencer and Eldredge 2018), studies have identified emerging roles which include information management, formulation of research questions, development of search or information retrieval strategy, result collation, and report writing (Morris, Boruff, and Gore 2017). Other studies have identified roles such as project leader, peer reviewer, project manager, literature searcher, reference manager, document supplier, critical appraiser, data extractor, data synthesizer, report writer and disseminator, source selector, and teacher (Grossetta Nardini et al. 2019). Other less documented roles included planning, question formulation, and peer review expert, searcher, organizer, and analyzer (Swinkels, Briddon, and Hall 2006; McGowan and Sampson 2005; Foster 2015). They also identified an eleventh possible role for library and information professionals; that of primary researcher. The authors noted that library and information professionals have evolved from simply acting as evidence locators and 'resource providers' to being quality literature filterers, critical appraisers, educators, disseminators, and even change managers.

Apart from the critical role of library and information professionals in systematic reviews, studies have shown library and information professionals also improve systematic reviews' quality. Systematic reviews in which librarians participated had better quality reported search strategy, and the difference in the search quality vis-à-vis the level of participation of librarians was statistically significant (Rethlefsen et al. 2015). Similarly, it was revealed that librarians positively impacted the reporting practices of standard systematic review methodological elements such as the inclusion of study process flow diagram, the search update date, "the full search strategy, the use of subject-specific and regional bibliographic databases for data collection, and searches of the grey literature" (Meert, Torabi, and Costella 2017). In another study, it was found that librarians' involvement in systematic reviews strongly correlated with the inclusion of a reproducible search (Koffel and Rethlefsen 2016). In a similar study, librarians' participation was found to be significantly associated with the use of recommended search strategies in systematic review standards from the Institute of Medicine, Cochrane Collaboration, and the Agency for Healthcare Research and Quality (Koffel 2015). Librarians' involvement was associated with better compliance with Peer Review of Electronic Search Strategies (PRESS) and the Institute of Medicine's (IOM) standards for systematic reviews standards (Hameed et al.

2020). In these studies, systematic reviews that included librarians as a team member was consistently found to include, execute and report better search designs.

Given that previous studies showed that the prevalence of sub-optimal search strategy introduces bias into evidence gathering (Koffel and Rethlefsen 2016; Golder, Loke, and McIntosh 2008; Sampson and McGowan 2006), librarians' positive impact at improving search quality is important to quality evidence-based research. In light of librarians' role and positive impact on the overall quality of systematic review studies, researchers have called for librarians' inclusion in systematic reviews (Metzendorf 2016). Studies have reported the frequency of involvement of librarians in systematic reviews. A study by (9) showed that 17% of the sampled systematic reviews reported librarians' involvement. Of the randomly sampled study-level meta-analyses in the ten highest-ranked clinical journals, 20% referenced librarians' contribution (Hameed et al. 2020). (Eskrootchi et al. 2020) found that 13.6% of systematic reviews from Iranian researchers reported the inclusion of librarians. A study of systematic reviews published in the twenty highest impact factor paediatrics journals from 2002 to 2011 showed that 44% of the authors indicated a librarian's involvement in conducting the systematic review (Meert, Torabi, and Costella 2017).

In summary, library and information professionals play significant role in the systematic reviews and meta-analysis research. The literature also reveals that library and information professionals in Sub-Saharan Africa worked on systematic reviews and meta-analysis, performing article retrieval, database selection, reference management, draft review, review conceptualization, manuscript writing, technical support, article screening and selection, data extraction, abstract review, and training and teaching (Asubiaro and Elueze 2022). Beyond the categories of roles played by the library and information professionals in Sub-Saharan Africa, this study presents a quantitative analysis of the contributions of the library and information professionals to national output on systematic reviews and meta-analysis in the biomedical research area.

## METHODOLOGY

This study is part of a research project that was funded by the Medical Library Association. Asubiaro and Elueze (2022) is an aspect of the project and contains more details of data collection procedure for this article. Bibliometric data of systematic review and meta-analysis publications with at least one author that has institutional affiliation with a Sub-Saharan African country was retrieved from MEDLINE database using the PubMed search interface. Year of publication was restricted to 2014 to 2019 because the inclusion of author addresses in PubMed data started in 2014<sup>1</sup>. A query (details in the appendix) that included the names of all the 46 Sub-Saharan African countries and publication types systematic review and meta-analysis as delimiters was posed to the MEDLINE database. The query also included meta-analysis and systematic review in the text word search so that studies that mentioned systematic review or meta-analysis in their abstracts, keywords or title could also be captured. The search was done on the 2<sup>nd</sup> of April, 2020 and returned 3171 results. The bibliographic data collected was cleaned by removing duplicates and articles that are not meta-analysis or systematic reviews. Data about country of affiliation of the authors were coded and analyzed. Link strength and network analysis of the bibliometric data was performed with VOSviewer software.

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<sup>1</sup> <https://www.nlm.nih.gov/bsd/mms/medlineelements.html>  
[https://www.nlm.nih.gov/pubs/techbull/so13/brief/so13\\_author\\_affiliations.html](https://www.nlm.nih.gov/pubs/techbull/so13/brief/so13_author_affiliations.html)

The limitation of MEDLINE as a data source for assessing research from Sub-Saharan Africa is acknowledged because of its bias and the under-representation of research of Sub-Saharan Africa. Asubiaro (2021) reported that only 3.51% of journals from Sub-Saharan Africa were indexed in the MEDLINE database. The research showed that EMBASE, another bibliographic database for biomedical research, proved to be a better alternative.

## RESULT

Table 1 contains the number of systematic reviews and meta-analysis with authors from countries in and outside Sub-Saharan Africa. Researchers from South Africa (45.84%) contributed to the highest number of systematic reviews and meta-analysis, two times more than any other Sub-Saharan African country, followed by Ethiopia (18.25%), Nigeria (12.63%), Kenya (8.36%) and Cameroon (6.36%). The following are the top five countries outside Sub-Saharan Africa that contributed: USA, United Kingdom, Australia, Canada and the Netherlands.

Table 1: Contribution from Countries in and outside Sub-Saharan Africa

	Sub-Saharan African Countries	National output (number of publications)	Percentage	Countries outside Sub-Saharan Africa	
1	South Africa	1118	45.84	USA	670
2	Ethiopia	445	18.25	United Kingdom	664
3	Nigeria	308	12.63	Australia	363
4	Kenya	204	8.36	Canada	221
5	Cameroon	156	6.36	The Netherlands	213
6	Ghana	148	6.07	Switzerland	196
7	Uganda	145	5.95	Germany	153
8	Tanzania	114	4.67	France	142
9	Zimbabwe	47	1.93	Belgium	125
10	Malawi	35	1.44	Italy	101
11	Zambia	31	1.27	India	93
12	Mozambique	29	1.19	Brazil	87
13	The Gambia	29	1.19	Sweden	84
14	Rwanda	24	0.98	China	81
15	Burkina Faso	21	0.86	Spain	69
16	Senegal	16	0.66	Norway	58
17	Democratic Republic of Congo	15	0.62	Iran	53
18	Gabon	15	0.62	Japan	48
19	Benin	14	0.57	Denmark	45
20	Cote D'Ivoire	14	0.57	Malaysia	33

## Information professionals' contribution to National Output

The ratio of information professionals' contribution to Sub-Saharan African countries' national output was calculated and presented in Table 3. The result shows library and information professionals did not contribute to systematic reviews and meta-analysis output of highly productive countries such as Cameroun, Ghana, Zimbabwe, Malawi and Zambia. Information professionals contributed to systematic reviews and meta-analysis in only seven Sub-Saharan African countries (South Africa, Ethiopia, Nigeria, Kenya, Uganda, Tanzania, and Mozambique). Library and information professionals contributed to less than 1% of the systematic reviews that were written in Kenya and Tanzania. Library and information professionals in Uganda and South Africa were the most productive among the Sub-Saharan African countries as they contributed more than 5% to national output. Of the 295 specified addresses, most of the library and information professionals (66%) are affiliated with institutions outside the Sub-Saharan African region. Library and information professionals from South African institutions contributed more than others. Library and information professionals from the United Kingdom, United States, Australia, the Netherlands, and Canada in descending are the countries from outside Sub-Saharan African that contributed most to the systematic reviews; apart from South Africa, library and information professionals from these countries contributed most. In Sub-Saharan Africa, library and information professionals from South Africa, Ethiopia, Uganda and Nigeria contributed the most.





**Table 3: Library and Information Professionals' contribution to the National Output of Sub-Saharan African countries**

	Country in Sub-Saharan Africa	Contribution to national output	Other countries	
1	South Africa	6.08%, n=68/1118	UK	43
2	Ethiopia	2.70%, n=12/445	USA	39
3	Nigeria	1.95%, n=8/308	Australia	30
4	Kenya	0.98%, n=2/204	The Netherlands	27
5	Uganda	8.28%, n=12/145	Canada	26
6	Tanzania	0.88%, n=1/114	Switzerland	5
7	Mozambique	3.45%, n=1/29	Germany	4
8			Norway	4
9			Iran	4
10			China	3
11			Belgium	2
12			Denmark	2
13			Sweden	1
14			Japan	1
15			Malaysia	1

## DISCUSSION OF FINDINGS

This study investigated the contributions of library and information professionals to evidence-based biomedical research outputs of Sub-Saharan African countries to understand the depth of the contribution of library and information professionals from the region. Systematic reviews and meta-analysis publications, with at least an author from an institution in Sub-Saharan Africa, that were published between 2014 and 2019 were collected from MEDLINE using the PubMed search engine. The study revealed that the most productive Sub-Saharan African countries in evidence-based biomedical research are South Africa, Ethiopia, Nigeria, Kenya, Cameroun, and Ghana. It appears that Ethiopia and Cameroun ranked better in evidence-based biomedical research than in earlier studies (Confraria and Godinho 2015; Adams et al. 2014). Some of the usual top five most productive Sub-Saharan African countries like Tanzania and Uganda missed the top spots.

This study shows that library and information professionals from only seven (South Africa, Ethiopia, Nigeria, Kenya, Uganda, Tanzania, and Mozambique) of the 46 Sub-Saharan African countries contributed in some capacity to evidence-based biomedical research. Beyond the surface statistics, library and information professionals from only two countries -South Africa and Uganda contributed to more than 5% of national output on evidence-based biomedical research. Library and information professionals from highly ranked countries like Cameroun, Ghana, Zimbabwe, Malawi, and Zambia did not contribute to evidence-based biomedical research in the sampled articles. Library and information professionals from outside the Sub-Saharan African region (66%) contributed twice more

than library and information professionals that are affiliated to an institution in the region (33%). Library and information professionals from western countries such as United Kingdom, United States, Australia, the Netherlands and Canada contributed to a higher number of evidence-based articles than Sub-Saharan countries' library and information professionals, save for South Africa. With the low contribution of library and information professionals from Sub-Saharan Africa to systematic reviews and meta-analysis, it could be inferred that the professionals have a market of prospective patrons in the researchers that are already performing evidence-based biomedical research in the enclaves.

There is a need for further research to determine why library and information professionals in the Sub-Saharan region contribute insignificantly to evidence-based biomedical research. Perhaps there are training gaps that need to be filled for medical and health information professionals in the Sub-Saharan Africa region, as noted in earlier studies (Sears et al. 2019; Kinengyere et al. 2020). There appears there is no training on evidence-based research in Sub-Saharan Africa for Health and Medical librarians. Alternatively, the LIS curriculum of information schools in Sub-Saharan Africa needs to include content that will give students the skills to contribute to evidence-based research.

Considering the pattern of contributions of the library and information professionals to national output, two major patterns emerged differently from the analysis. First, the contribution of South Africa was outstandingly different from other parts of Sub-Saharan Africa. This is not a surprise, given that South Africa is the usual best performer in research, including LIS, in Africa (Onyanha 2018; Asubiaro 2019). However, it begs for an answer to why library and information professionals in South Africa were able to contribute so much to evidence-based biomedical research. Perhaps, they have better training for library and information professionals and LIS curriculum. Another pattern that stuck out was the library and information professionals that contributed from Uganda were all as authors, this is an indication of influence and impact.

## **CONCLUSION AND RECOMMENDATION**

Our study shows that library and information professionals and researchers from the United Kingdom, United States of America, Australia, Canada and the Netherlands contributed more to evidence-based research in the region than the Sub-Saharan African countries apart from South Africa. We recommend library and information professionals (individuals and associations) collaborate with relevant evidence-based organizations such as the Medical Library Association (MLA), University of Adelaide's Joanna Briggs Institute, Campbell collaboration resource centre Cochrane evidence-based institute in these countries- United Kingdom, United States of America, Australia, Canada and the Netherlands (with a history of collaborating with Sub-Saharan Africa on evidence-based biomedical research) for capacity building.

### **Limitations of the Study**

Lastly, methods sections of the full texts of the retrieved titles were searched for library and information specialists by the authors; while the accuracy of this method is undoubtedly excellent, this method is tedious for large datasets such as the one used in this study and could be subject to human errors.

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## Appendix

Step #1: *Nigeria*[Affiliation] OR *South Africa*[Affiliation] OR *Ghana*[Affiliation] OR *Tanzania*[Affiliation] OR *Kenya*[Affiliation] OR *Rwanda*[Affiliation] OR *Botswana*[Affiliation] OR *Cameroun*[Affiliation] OR *Senegal*[Affiliation] OR *Angola*[Affiliation] OR *Uganda*[Affiliation] OR *Mali*[Affiliation] OR *Sierra Leone*[Affiliation] OR *Ivory Coast*[Affiliation] OR *Ethiopia*[Affiliation] OR *Lesotho*[Affiliation] OR *Zambia*[Affiliation] OR *Zimbabwe*[Affiliation] OR *Namibia*[Affiliation] OR *Guinea*[Affiliation] OR *Mauritius*[Affiliation] OR *Mozambique*[Affiliation] OR *Niger*[Affiliation] OR *Seychelles*[Affiliation] OR *Burkina Faso*[Affiliation] OR *Burundi*[Affiliation] OR *Cape Verde*[Affiliation] OR *Cameroon*[Affiliation] OR *Central African Republic*[Affiliation] OR *Chad*[Affiliation] OR *Comoros*[Affiliation] OR *Democratic Republic of Congo*[Affiliation] OR *DR Congo*[Affiliation] OR *Djibouti*[Affiliation] OR

*Cote D'ivoire[Affiliation] OR Congo[Affiliation] OR Equatorial Guinea[Affiliation] OR Eritrea[Affiliation] OR Gabon[Affiliation] OR Guinea-Bissau[Affiliation] OR Madagascar[Affiliation] OR Congo Republic[Affiliation] OR Sao Tome and Principe[Affiliation] OR Swaziland[Affiliation] OR Togo[Affiliation] OR Benin[Affiliation] OR Liberia[Affiliation] OR Namibia[Affiliation] OR Gambia[Affiliation] OR (Cent Afr Republ[Affiliation]) OR (Equat Guinea[Affiliation]) OR (Papua N Guinea[Affiliation]) OR (Sao Tome E Prin[Affiliation]) OR Principe[Affiliation] OR Sao Tome E Principe[Affiliation]*

Step #2: Set Filter to: *Meta-Analysis[ptyp] OR systematic[sb]*

Step #3: Text word search *systematic review[Text Word] OR meta-analysis[Text Word] OR meta analysis[Text Word]*

Step #4: Set publication date to: *"2014/01/01"[PDAT] : "2019/12/31"[PDAT]*

Query=(Step #1) AND (Step #2 OR Step #3) AND (Step #4)