

# Pain research in Africa: a ten-year bibliometric survey

Tonia C. Onyeka · Felix N. Chukwuneke

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## Abstract

**Purpose** Over the years, a trend for very low numbers of scientific publications from Africa has emerged. There has been no evaluation of pain research publications from this region. This study was conducted to determine the African pain research spectrum over the last 10 years, to identify trends in the number of publications from different countries, to identify currently underexplored areas of pain research, and to stimulate renewed interest in quality pain research in Nigeria and Africa.

**Methods** The English- and non-English-language medical literature on pain from July 2002 to May 2012 was studied using Medline, the Ovid database, and by performing hand searches of relevant references using Google. Publications on pain by Africans and/or non-Africans conducted in Africa on Africans living in Africa within the study period were included. The total number of articles per country, publication types, and impact factors of the respective journals were tabulated to determine the quantity and quality of research in this field.

**Results** Two hundred twenty-eight (228) articles from 25 African countries that were published in 129 different journals were identified. The majority were epidemiological studies (43.9 %), experimental studies (20.2 %), randomized controlled trials (2.2 %), and systematic reviews (1.8 %). Nigeria, South Africa, and Uganda topped the list

of the most-published articles, with 76 (33.3 %), 71 (31.1 %), and 12 (5.3 %), respectively. The total number of journals with impact factors was 81, of which 29 were high-impact-factor journals.

**Conclusion** Pain research publications from Africa should be encouraged. Given the underexplored frontiers of pain research, there is a need to engage in rigorous research in this field to enhance the contribution of the African continent (“the African Voice”) to worldwide advances in this respect.

**Keywords** Pain research · Africa · Bibliometric survey

## Introduction

Health research is vital to identify areas of need and to implement scientific findings in order to achieve good patient outcomes. The United States of America and Europe are currently acknowledged as leaders in biomedical research [1]. On the contrary, over the years, a trend for low numbers of scientific research publications from Africa has emerged. Indeed, African research has recently been described as “moribund” [2]. There is considered to be a significant divide in the amounts of research published by developed and developing countries [3–5]. The term “the 10/90 divide” is used to describe the situation where developing countries have 90 % of the world’s major health problems, but are beneficiaries of only 10 % of its health research resources [6]. Sub-Saharan Africa in particular has produced very low numbers of health research publications during the past decade [7, 8]. Over that period, many African journals have been underfunded, have not published frequently, have had low circulation rates [9], and have published low-quality articles [10]. The fact that

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T. C. Onyeka (✉)  
Department of Anaesthesia/Pain and Palliative Care Unit,  
University of Nigeria Teaching Hospital, UNTH, Ituku-Ozalla,  
Enugu PMB 11029, Nigeria  
e-mail: doctortoniaonyeka@gmail.com

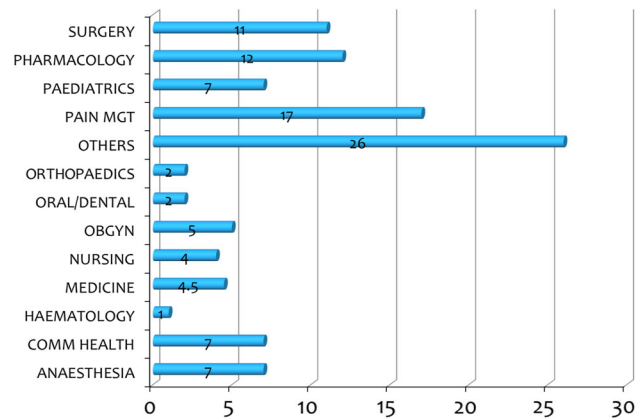
F. N. Chukwuneke  
Department of Oral and Maxillofacial Surgery, University of  
Nigeria Teaching Hospital, Ituku-Ozalla, Enugu, Nigeria

some these journals are not indexed in MEDLINE/PubMed has prevented their distribution, visibility, and wide readership in other countries of the world [11]. Indeed, African Index Medicus (<http://indexmedicus.afro.who.int>) and African Journals Online (<http://www.ajol.com>) were created to eliminate this problem [12–14]. Other problems besetting research in Africa include a lack of finances [15, 16], a lack of infrastructure/scientific equipment, limited technical support [11], as well as an overwhelming need for more manpower and training. Others include poor peer networks and a lack of mentorship, poor information access [13], reviewer, publisher, and editor biases [17], fear of publication rejection, a lack of publication culture, and underrepresentation in editorial boards. Poor writing skills [15, 18] as well as poor record keeping by many African institutions have resulted in reviewer bias [15] and, in our opinion, the rejection of retrospective studies from Africa by editors in the developed world because of the unreliable nature of the publication data used. African pain research is not absolved of these problems.

It is estimated that 50–70 % of African cancer patients have chronic pain [19] and are in need of pain relief; the latter being of the utmost importance to patients in five developing countries [20]. Pain research happens to be one of the fastest-growing disciplines within biomedicine. Several journals are known to publish pain and pain-related research. This study was undertaken to determine the spectrum and quality of pain research over the last 10 years across the continent, to discern the amount of pain research done by different countries and regions in Africa, to identify underexplored areas of pain research, and to stimulate renewed interest in quality pain research in Nigeria and Africa.

## Materials and methods

All English and non-English language medical literature on pain published from June 2002 to May 2012 in Africa was reviewed using the following search words and phrases: “analgesic,” “analgesia,” “pain research in Africans,” “antinociceptive,” “local anaesthesia,” “regional anaesthesia,” “epidural analgesia,” “peripheral neuropathy,” “arthritis,” “headache,” “chronic pain,” “acute pain,” “Africa.” Internet searches on MEDLINE/PubMed, the bibliographic database of the National Library of Medicine at the United States (US) National Institutes of Health, and the Ovid database were utilized, while hand searches of relevant references using the Google Scholar and Dogpile search engines were employed. In addition, all related journals in the African-based bibliometric databases grouped under African Journals Online were searched. To be included among the articles evaluated in this

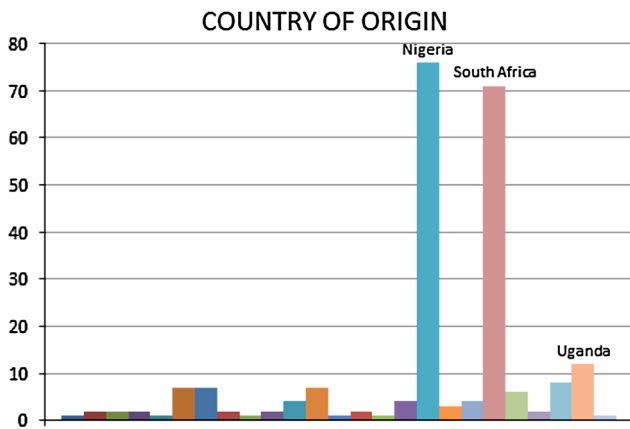


**Fig. 1** Distribution of pain publications categorized by journal specialty

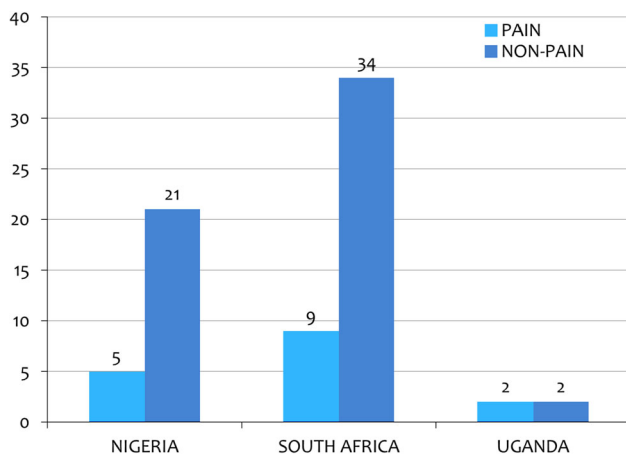
bibliometric review, the associated study must have been conducted in Africa and on Africans, irrespective of whether the authors were African or not; for articles affiliated with multiple countries, the article was included if the research was conducted either in part or in full in Africa and on Africans. Hence, research publications on pain with an African or non-African as first author that were conducted in Africa and on Africans living anywhere in Africa within the study period were included, while publications in which its subjects were Africans living overseas, review articles, and letters to the editor were excluded. Journals that primarily publish pain research, those with title names relating to or including terms such as “pain,” “analgesia,” “anaesthesia,” or “headache” as well as those with pain research within its aims and the scope of the publication were categorized as pain journals, while others that did not primarily publish pain research, did not have pain research within their scope of publication, or had no terms within the journal name relating to pain (e.g., *Annals of African Medicine*, *International Journal of Gynaecology and Obstetrics*) were termed “non-pain” journals. The total number of articles per country, article or publication types, sample sizes, and impact factors of the respective journals were tabulated to define the quantity and quality of research. Data obtained were analyzed using descriptive statistics.

## Results

Two hundred twenty-eight (228) articles from 25 African countries that were published in 129 different journals were identified using the inclusion criteria. These journal articles, which were predominantly written in English, were analyzed according to the following criteria: year of publication, country of origin, journal categories, research



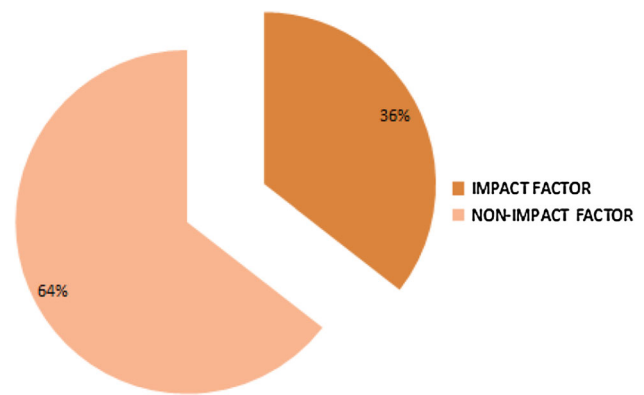
**Fig. 2** Geographic distribution of pain publications by country of origin



**Fig. 3** Comparative overview of number of publications in pain versus non-pain journals according to country

article type/study design, research subject type, and journal impact factor. These pain articles were published in a wide array of biomedical journals (Fig. 1). Of these, 16 were pain/pain-related journals, of which 6 had an impact factor of >2.

The spectrum of pain research topics covered included pediatric pain management (6%), obstetric analgesia (5.3%), pain protocol (0.4%), dental/oral pain (2.2%), pain scale validation (3.1%), headaches (4%), pain prevalence (9.7%), pain knowledge, attitude and practice studies (8.8%), neuropathic pain (7.5%), acute pain (1.8%) and postoperative pain (3.1%), chronic pain (4.8%), opioids (3.1%), translational pain research (20.2%), and miscellaneous pain research (20.2%). In terms of study design, epidemiological studies (43.9%) were in the majority, followed by basic/experimental studies (20.2%), clinical studies (17.1%), randomized controlled trials (2.2%), and systematic reviews (1.8%).



**Fig. 4** Relative proportions of articles with impact factor status and articles with non-impact-factor status

**Table 1** Average impact factor per year for articles from Nigeria, South Africa, and Uganda

Year	Nigeria	South Africa	Uganda
2002	1.899	0	0
2003	1.791	3.099	0
2004	2.466	1.810	0
2005	0	1.696	1.443
2006	0.485	1.458	0.521
2007	1.270	2.492	2.640
2008	1.751	3.131	0
2009	1.881	3.331	0
2010	1.769	2.148	2.640
2011	1.383	2.806	0
2012	0	2.489	3.606
Average	1.467	2.359	1.085

There were 34 (14.9%) other publications that did not fall into any of these pre-defined categories.

Nigeria, South Africa, and Uganda topped the list of most-published pain articles within the study period, with 76 (33.3%), 71 (31.1%), and 12 (5.3%), respectively (Fig. 2). Most articles were published in non-pain journals (Fig. 3). The total number of journals with impact factors was 81, of which 29 were high-impact factor journals (impact factor >2) (Fig. 4). Articles with impact factors made up 36% of all articles, with South Africa producing the highest proportion of such articles (67.9%) as well as the highest average impact factor (Table 1), followed by Nigeria (39.6%) and Uganda (12.4%).

### Discussion

Our survey showed that the distribution of pain research articles is skewed towards the “big two” nations of Nigeria

and South Africa. This may be attributed to the observation by Uthman and Uthman [1] that the better the economic ranking of a country, the higher the number of biomedical publications it generates. It also confirms the observation by Goehl and Flanagan [21] and Uthman and Uthman [1] that, as well as global inequalities in health and biomedical research, there are also disparities among countries within Africa with regards to health research. Uganda ranked third, but we believe that Uganda would approach the big two if the results were to be adjusted for population size or gross domestic product. Publications not written in English were relatively scarce, and were all written in French. However, pain publications written in other African languages (Portuguese, Arabic, Swahili, etc.) were not found. We believe that this may be due to the indexing of largely English-language journals in MEDLINE/PubMed. Many local African journals which can have pain publications written in native languages are not indexed in MEDLINE/PubMed. This is considered a limitation of this study. This may also explain why Egypt, which ranked among the top three African countries in terms of the number of biomedical publications generated (alongside South Africa and Nigeria) according to a study of MEDLINE-indexed African publications by Uthman and Uthman [1], did not feature prominently here. While the presence of publications written in languages other than English seems to suggest that language is not a barrier to pain research, it has been proposed that the fact that English is not the first language in many countries could contribute greatly to the poor writing skills of authors from these countries [15].

We attribute the trend for an increasing rate of pain publications in recent years to the influx of open access journals as well as the electronic online manuscript submission system, which is easy for authors, reviewers, and editors alike to use. This is a view shared by other authors who have conducted similar research into biomedical publications [1, 22]. The trend for an increase in the rate of pain publications in Africa over the study period was steady aside from a sudden drop in 2010 and 2011. We believe that this was due to the global economic recession and its probable effect on funding/grants for pain research. Kirigia et al. [23] have reported the effects of the global financial crisis on health sector funding. The pain research contributions of other nations were low, which may be due to factors such as a low human development index in medical specialties, poor research methods, poor writing style, and poor academic infrastructure. The wide array of medical subspecialty journal categories under which these studies were published confirm the multidisciplinary nature of pain.

South African publications had the highest mean impact factor (IF). Impact factor is an index based on the frequency with which a journal's articles are cited in scientific

publications. In 1955, Dr. Eugene Garfield produced the concept of the impact factor while trying to determine “the significance of a work and its impact on the literature and thinking of the period” [24]. The IF gives a sense of whether the research published in a journal is being read and referenced. This concept of journal IF is a controversial issue. Many arguments have been made in the past with regards to its usefulness for qualifying research work. Some schools of thought believe that IF is a function of an individual journal's reputation and not the quality of individual articles [25]. Others think that it is subjective and is easily manipulated by authors, editors, and publishers alike [26]. While it is far from being the perfect tool for measuring the quality of research articles, it is currently touted as a reasonable indicator of journal quality [27].

Underexplored areas of African pain research that were identified in the course of this study are numerous, and include the need for more randomized controlled trials, systematic reviews, and meta-analyses, studies into the development of pain protocols, and those focusing on postoperative pain management. Other such underdeveloped research areas include acute pain management, research into headaches, and oral/dental pain. There is also a great need for pain research sponsorship, training in research and publication, as well as research mentorship. The perennial problem of the “brain drain” or “brain loss” [28] has had negative consequences for African research, with the best academics leaving their countries for greener research and economic pastures. With programs like the Wellcome Trust's African Institutions Initiative (launched in 2009) and a \$34 million program from the US National Institutes of Health funding ten research and training centers located in low- or middle-income countries [29], sustainable capacity building for health research has been established, as African researchers are now being encouraged to remain in Africa to carry out quality research work with the aim of improving healthcare outcomes in their communities. Uthman and Uthman [1] and Rohra [15] suggest the use of African researchers in diaspora as peer reviewers and members of the editorial teams of local and international journals, respectively, to promote “brain circulation” and enhance quality research output. Partnerships between African journals and leading biomedical journals in the developed world, such as the African Journal Partnership Project created in 2004 [21], will go a long way to enhancing the quality of the research performed on the continent.

While examining African scientific research from a scientometric perspective, Tijssen [9] points to a decline in the publication of African research in international journals. Factors militating against the successful conduct of research work in Africa sometimes go beyond the problems previously mentioned. The wide gulf between biomedical

researchers and policy makers in these nations has a key role to play [8]. Research is not a priority for many governments in low-resource settings because of its perceived expensive nature [21]. Corruption has also been noted to be a major player in preventing poorer countries from being on a par in a research context with richer ones [30]. The authors believe that corruption and greed in governance prevent lawmakers from investing in a worthy cause such as pain research. In Egypt, just 0.4 % of the national budget goes into scientific research [31]. In Nigeria, where barely 1.5 % of the annual budget is reserved for health, academia is driven by the craze of “publish or perish” [32]. The latter results in the production of a great deal of effective research work that drives the promotion fever, but which is unfortunately not utilized to improve health care outcomes for Nigerian citizens [8].

## Conclusion

Gaps in health research will always produce new and potentiate existing problems in healthcare. Intensifying awareness of pain and its consequences among healthcare providers and the general public makes it easier to demonstrate the importance of and the need for research into pain. Academic and health institutions in Africa should work towards improving their pain research capacities [e.g., in terms of human resources, infrastructure (internet, e-databases)]. Despite the global turmoil in the financial sector, African nations should be encouraged to develop pain research funding agencies to facilitate research output and encourage the involvement of the private sector, where a significant amount of unpublished research is carried out [9]. Proper record keeping/documentation and computerization of all medical data and research work on pain and pain management, including gray literature [33, 34], should be practiced by all health institutions.

Journal impact factor is an important consideration, but more emphasis should be placed on the production of high-quality pain research. The establishment of local, national, or regional pain institutes/centers of excellence will go a long way to promoting a culture of pain research. A multidisciplinary approach to pain research that involves encouraging pain research across all medical specialties would be of great value. Likewise, the promotion of strong and enduring collaborations between nations in the developed and developing world should be encouraged. Efforts should also be made to ensure that all knowledge obtained from pain research is maximally and effectively utilized within the appropriate study population.

There has been a gradually increasing trend over the last 10 years in the number of pain-related publications from

Africa. Based on this survey, it appears that Nigeria produces the most research publications related to pain, while South Africa achieves the publication of the most pain and pain-related studies in impact-factor journals. While we acknowledge that publication quantity has no direct bearing on research quality or research impact, we hope in future to explore the quality of pain publications from the continent. There are still a lot of underexplored frontiers in pain research, which contribute to Africa’s enormous research needs. There is a need to engage in rigorous pain research to enhance the contribution of the African continent (“the African Voice”) [6] to worldwide advances in this field.

**Conflict of interest** Tonia C. Onyeka and Felix N. Chukwunke declare that they have no conflicts of interest.

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