

## REVIEW ARTICLE

# Geographical Distribution of Publications in the African Journal of Reproductive Health: An Analysis of 2006 – 2010 papers

T Dahiru\*<sup>1</sup>, AA Aliyu<sup>1</sup> and Hussaini G Dikko<sup>2</sup>

<sup>1</sup>Department of Community Medicine, Ahmadu Bello University, Zaria; <sup>2</sup>Department of Mathematics, Ahmadu Bello University, Zaria

\*For correspondence: Email: tukurdahiru@yahoo.com

## Abstract

Scientific research has been recognized as one of the cornerstones of economic growth and development. Publication of research findings in biomedical journals has grown exponentially in the past few decades globally but the contribution of developing countries is still abysmally low. To evaluate the productivity of Nigerian biomedical community, this study was conducted using the African Journal of Reproductive Health (AJRH) as a benchmark. This was a retrospective review of all articles published in AJRH between 2006 and 2010. Using a proforma all relevant information in the journal were extracted. There were a total of 204 articles produced by 798 authors. In terms of geographical spread of authors within Nigeria Edo, Oyo and Kaduna states are the three leading states, while outside Nigeria, the US is the leading country. More than 81% of the authors are affiliated to either the University or Research Institutions. In six publications, funding came from within Nigeria while in 87 funding was from outside Nigeria (*Afr J Reprod Health 2011; 15[4]:9-13*).

## Résumé

**Répartition géographique des publications dans la Revue africaine de santé de la reproduction : Analyse des articles publiés entre 2006 et 2010.** On reconnaît que la recherche scientifique constitue une des pierres angulaires de la croissance et du développement économique. La publication des résultats de recherche dans les revues biomédicales s'est accrue mondialement de manière exponentielle au cours de ces dernières décennies, mais la contribution des pays en développement demeure encore atrocement basse. Pour évaluer la productivité de la communauté biomédicale nigériane, nous avons mené cette étude en nous servant de la *Revue africaine de santé de la reproduction* (RASR) comme repère de niveau. Il s'agissait d'un passage en revue rétrospectif de tous les articles publiés dans RASR entre 2006 et 2010. Nous avons tiré toutes les informations pertinentes dans la revue à l'aide d'un pro-forma. En tout, il y avait 204 articles produits par 798 auteurs. En ce qui concerne la distribution géographique des auteurs venant du Nigéria, les états d'Edo, d'Oyo et de Kaduna étaient les trois états les plus importants, alors qu'en dehors du Nigéria, les Etats-Unis étaient les plus importants. Plus de 81% des auteurs affiliés soit é des universités soit é des instituts de recherche. Six articles ont été financés à partir du Nigéria alors que 87 ont reçu du financement de l'extérieur du Nigéria (*Afr J Reprod Health 2011; 15[4]: 9-13*).

---

**Keywords:** Publications, Funding, AJRH, Reproductive Health

---

## Introduction

Scientific research has been recognized as one of the cornerstones of economic growth and development in developed countries and is gaining momentum for advancing knowledge and economic development in developing countries<sup>1</sup>. It has also been documented that publication of research findings in biomedical journals has grown exponentially in the past few decades<sup>2</sup>. Several reasons have been put forward to explain this increase some of which include: technological advancement in computer science, increased ease of

communication, the spread of computerized information, the availability of personal computers, and recent advancements in the World Wide Web<sup>3</sup>. Additionally, there has been an increase in support for research through international development assistance.

In several studies, reports have been documented on the participation or contribution of different countries in research in several disciplines<sup>4, 5, 6</sup>. In some of these reports, the contribution of developing countries is very low. An analysis by Soteriades et al involving top 50 biomedical journals between 1995 and 2002 revealed that of the total 107,557 published articles only 239 (0.2%) were from developing

countries<sup>3</sup>. Within Africa, however Uthman and Uthman<sup>8</sup> reported that South Africa, Egypt and Nigeria are the three leading producers of scientific research, in that order. Between 1996 and 2005, Nigerian authors contributed 4795 (12.8%) articles to the quantum of scientific publications in Africa, while her relative growth during this period was 2094.7%<sup>8</sup> as compared to earlier years.

However, within Nigeria, little is known about the production of scientific research and the relative contribution of different regions/states, institutions and sectors and the funding availability for research. To evaluate the contributions of these factors this study was conducted using the African Journal of Reproductive Health (*AJRH*) as a reference. The choice of *AJRH* was informed, in our own opinion, because of its frequency/consistency in publication, relatively long history of publication, credibility of publisher, full time editorial staff, and membership of ICMJEs, easy access to previous editions and the availability of a wide range of authors from different parts of the country as well as outside the country. Additional important factor that influenced our decision to choose the journal was its ranking by the Nigerian National Universities Commission (NUC) in 2007 as being the best published journal in the country in all disciplines that meets international standards<sup>9</sup>. However, as a limitation it is narrowed in its area of publication vis-à-vis reproductive health. Thus, articles in other medical disciplines are not captured in this journal.

## Methods

A retrospective survey of all articles published in all issues in *AJRH* between 2006 and 2010 was conducted. A proforma was designed to collect relevant information such as year of publication, volume number, number of authors, type of article, state of domicile of (first) corresponding author if within Nigeria, geographical location of corresponding author, institutional affiliation of the corresponding author, collaboration between Nigerian institutions, collaboration within Nigerian institutions, collaboration with an institution outside Nigeria and availability of funding. Every issue was reviewed and using the proforma, relevant information extracted and entered into the proforma.

For the type of article, these are classified into 4: original research article, review article, short case or report and commentary. For the state of domicile of the corresponding author, this is classified broadly into within Nigeria and outside Nigeria. Nigeria has 36 states with a federal capital territory (FCT) and corresponding author is assigned to any of these

geographical categories. For those outside Nigeria, the classification is as follows: West Africa, North Africa, Central Africa, East Africa, Southern Africa and Outside Africa. Corresponding authors are assigned to any of the following appropriate 9 categories of affiliation: (1)university/research/teaching institution; (2) Federal Ministry of Health or any of its Agencies; (3) State Ministry of Health or any of its Agencies; (4)Local Government Health Department/Health Facility; (5)Private Individual/Researcher/Student; (6) Affiliation similar to the above 5 categories outside Nigeria but within Africa; (7) Affiliation similar to the above 5 categories outside Nigeria and also outside Africa; (8) Affiliation to an international agency (e.g. WHO, UNFPA) or a development partner (e.g. PEPFAR, CDC, USAID); and (9) not indicated. Collaboration between Nigerian institutions/agencies is defined as that involving at least one author participating in the publication from outside the institution of the corresponding author while within Nigerian institutions collaboration involves at least one author from the institution of the corresponding author but from a different unit, division or department. Collaboration outside Nigeria involves a Nigerian institution with a foreign institution or all the institution(s) if the corresponding author is outside Nigeria.

Funding for research for could either come from within Nigeria or outside Nigeria. Funding from individuals, agencies, institutions based outside Nigeria are considered outside funding while those based within Nigeria are considered from within. However, for any of the UN agency providing funding through its office in Nigeria, the funding is considered as within. But for development partners such as Ford Foundation, Mac Arthur Foundation, Bill and Melinda Gates Foundation their funding is considered outside funding. Extracted information was entered and analyzed using SPSSv16.

## Results

There are a total of 204 articles produced by a total of 798 authors. Maximum number of authors is 14 while the minimum is 1 and the mean is 4 authors per article. The distribution of articles by year of publication and other information is given in Table 1.

In terms of geographical spread of authors, Table 2 indicates that Edo, Oyo and Kaduna states are the three leading states in terms publications during the period. Outside Nigeria, the US is the leading country. More than 81% of the authors are affiliated to either the University or Research Institution (Table 3). In six publications, funding came from within Nigeria while in 87 funding was from outside Nigeria (Table 4).

## Discussion

The findings of this study brings to the fore the contributions of geographical location, institutional affiliation, collaboration as well as availability of funding to scientific research and publication in Nigeria. To the best of the author's knowledge this is the first study exploring these factors within the Nigerian biomedical community.

**Table 1:** Characteristics of articles published in AJRH between 2006 and 2010

Number of articles published annually		
Year	Frequency	Percent
2006	32	15.7
2007	38	18.6
2008	41	20.1
2009	50	24.5
2010	43	21.1
Total	204	100.0
Type of Article		
1	179	87.7
2	7	3.4
3	14	6.9
4	4	2.0
Total	204	100.0
Number of authors per article		
1	19	9.3
2	55	27.0
3	32	15.7
4	31	15.2
5	22	10.8
6	22	10.8
7+	23	11.4
Total	204	100.0
Mean =3.91, Max = 14, Min =1, Sum of authors = 798		
Geographical location of corresponding author		
Within Nigeria	100	49.0
Outside Nigeria	103	50.5
Total	203*	99.5

\*Location of corresponding author not indicated in one article

The findings of this study are glaring: less than half of the authors are from Nigeria, overwhelming majority of the authors are from university/research institutions; within Nigeria, states from the southern part of the country produce more knowledge compared to their northern peers and only six out of 93 funded researches are funded by agencies within Nigeria.

Within Nigeria, Edo and Oyo states took the lead in publication; majority of the authors are affiliated to Universities of Benin and Ibadan. It could be that proximity of these authors to the editorial team of the Journal is the reason for their articles being published

with speed or perhaps it may be that their articles have the required ingredients. Further scrutiny of funding availability indicates that six of the nineteen articles published by authors from Oyo State received funding but there was none for authors from Edo State. Thus, funding could not explain the disproportionate publications by authors from Edo State. Outside Nigeria, the US leads other countries in publications.

**Table 2:** Distribution of geographical location of corresponding authors within and outside Nigeria

Geographical location	Frequency	Percent
<b>Within Nigeria</b>		
Edo	24	11.8
Oyo	19	9.3
Kaduna	10	4.9
Enugu	7	3.4
Plateau	6	2.9
Lagos	5	2.5
Ebonyi	4	2.0
Imo	4	2.0
Kano	4	2.0
<b>Outside Nigeria</b>		
USA	24	11.8
RSA	6	2.9
UK	6	2.9
Ghana	5	2.5
Ethiopia	5	2.5
Cameroon	4	2.0
Sweden	4	2.0
Uganda	4	2.0

**Table 3:** Distribution of affiliation of corresponding author

Affiliation**	Frequency	Percent
1	167	81.9
2	1	0.5
3	0	0
4	1	0.5
5	2	1.0
6	5	2.5
7	1	0.5
8	19	9.3
99¶	8	3.9
Total	204	100.0

\*\*Number codes as described in the methodology section

¶Affiliation not indicated in 8 articles

An important ingredient which is crucial in research and production of knowledge is collaboration. Despite its importance, this study shows very little collaboration both internally and externally. Between Nigerian institutions, only in 19% of the publications there was collaboration; within Nigerian institutions only 16% of the authors collaborated. Collaboration with institutions

outside Nigeria produced 42% of the publications. Perhaps, Nigerian institutions lack capacity at both institutional and individual level to collaborate and offer synergistic advantage to produce knowledge.

**Table 4:** Type of collaborations involved

Type of Collaboration	Frequency	Percent
Between Nigerian Institutions	38	18.6
Within Nigerian Institutions	33	16.2
With outside Institution/ Institutions outside Nigeria	87	42.6

**Table 5:** Sources of funding and funding agencies within and outside Nigeria

Source of funding	Frequency	Percent
<b>Within Nigeria</b>		
CRD,BUK	1	0.5
dRPC	1	0.5
NACA	1	0.5
MDG Office	1	0.5
WHO	1	0.5
Zankli Medical Center	1	0.5
<b>Total</b>	<b>6</b>	<b>3.0</b>
<b>Outside Nigeria</b>		
NIH (PRPH)	7	3.4
Gates/Rockefeller/NICHHD	6	2.9
Mac Arthur Foundation	5	2.5
SIDA/SAREC	5	2.5
Ford Foundation	3	1.5
Bill and Melinda Gates	2	1.0
DfID	2	1.0
Others	57	27.9
<b>Total</b>	<b>87</b>	<b>42.7</b>

Funding is another critical factor in research. From this study, it is very clear that internal funding for research is extremely poor; only six publications are consequence of internally funded. Among the articles that are consequence of funding, overwhelming 94% were funded by external agencies. It is important to note that Nigeria has 27 federal universities, 34 private universities and 51 federal health institutions with an institute for medical research. Despite these numbers, funding for research shown in this study did not come from any of these federal agencies. The universities and the Nigerian Institute of Medical Research (NIMR) are supposed to provide leadership in research and knowledge dissemination. Appalling finding from this study is that both the Nigerian Agency for the Control of HIV/AIDS (NACA) and the MDG Office funded only one research each leading to publication (Table 5). These two organizations together with WHO are by their existence required to provide funds for research to solve new and challenging health problems. Operations

research is supposed to respond to new challenges of service delivery and quality issues but this response has not been forthcoming from these agencies. Thus, while funding was not forthcoming from within, external organizations provided the funds. This is evidenced by the finding in this inquiry that 7 out of the 10 publications by authors from Ahmadu Bello University Teaching Hospital are funded by funds provided (by National Institutes of Health) through a collaboration with University of California at Berkeley under the auspices of Population and Reproductive Health Partnership (PRHP).

### Limitations

This study suffers from limitations such as: (1) selection bias; there are several local journals in the country and selecting only one and for that a specialist journal in reproductive health we feel that this has introduced a bias in the range of factors that can affect publication of scientific knowledge; articles published in other journals are not included. A general medical journal would have overcome this bias but as we have indicated in the introduction we do not have access to such journals' previous 5 years publications; (2) as has been pointed out by Kremer JAM, simple counts of the number of publications are only crude estimates of research productivity of a country/region. However, there is no superior practical way of assessing research productivity besides simple article counts.

### References

1. Saravia NG, Miranda JF. Plumbing the brain drain. *Bull World Health Org* 2004; 82:608 – 615.
2. Rahman M, Fukui T. Biomedical publications: global profile and trend. *Public Health* 2003; 117:274 – 280.
3. Soteriades ES, Rosmarakis ES, Parasdakakis K, Falagas ME. Research contribution of different world regions in the top 50 biomedical journals (1995 – 2002). *FASEB J* 2005; 20:29 – 34.
4. Mela GS, Martinoli C, Poggi E, Derchi CE. Radiological research in Europe: a bibliometric study. *Eur Radiol* 2003; 13: 657 – 662.
5. Ugolini D, Mela GS. Oncological research overview in the European Union: A 5-year survey. *Eur J Cancer* 2003; 39: 1888 – 1894.
6. Keiser J, Utzinger J, Tanner M, Singer BH. Representation of authors and editors from countries with different human development indexes in the leading literature on tropical medicine: survey of current evidence. *Br Med Journ* 2004; 328: 1229 1232.
7. Rosmarakis ES, Vergadis PI, Soteriades ES, Paraschakis K, Papastamaki PA, Falagas ME. Estimates of global cardiovascular diseases research. *Int J Cardiol* 2005; 100: 443 - 449
8. Uthman OA and Uthman MB. Geography of African biomedical publications: An analysis of 1996 – 2005 *PubMed papers*. *Int Journ Health Geographics* 2007, 6: 46.

9. Okojie JA, Okebukola P, Adedipe NO. Catalogue, assessment and ranking of scholarly journals published in Nigerian

higher educational system. National Universities Commission (Macmillan Nig Publishers), 2007.