
A COMPARATIVE BIBLIOMETRIC STUDY OF TWO RENOWNED SCHOLARLY MEDICAL JOURNALS IN NIGERIA: 2001-2010

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ABSTRACT

The research work showed a comparative bibliometric study of two renowned medical journals between 2001 and 2010 in Nigeria. Information/data were transcribed on the cataloguing cards for the generation of databank. Subjects analyses were carried out using Medical subject headings (MESH). Medical tree structure was used to determine the broad spectrum down to the specifics of each concept. Bradford's Mathematical model was used to analyze the data. The study revealed that 1037 research articles were published within the period of study. Nigerian Quarterly Journal of Hospital Medicine (NQJHM) pooled 374 (36.07%) while African Journal of Medicine and Medical Sciences had the highest number of articles published 663 (63.93%). Research activities reached its peak in the last quarter. The results showed that out of 21,093 references cited, NQJHM produced 7234 (34.30%) and AJMMS recorded the highest work 13,859 (65.70%). In terms of yearly distribution 2004 pooled the highest with 2746 (13.02%) and the lowest was in 2002 with 1761 (8.35%). Three authorship collaborations ranked the highest, followed by two authorships. 134 subjects were analyzed in the study. Subject productivity showed that dental sciences pooled the highest with 80 (7.7%) and followed by Acquired Immunodeficiency Syndrome with 48 (4.6%). Lagos State pooled the highest (360), followed by Oyo State (357) all situated in South West of Nigeria.

Key/word: *Bibliometric, Scientometric, Research productivity. Research Distribution, Citation Analysis, and Bradford's Statistical Model, Medical journals.*

Introduction

Research activities are increasing and information generated are rising on daily basis. The aggregate number or volume of these information resources and sources are enormous. The bibliometricians have over the years provided scientific research methodologies to study the trends of research publications. In other words, to determine the volume of intellectual activities, its growth, the structure and inter-relationships which exist amongst the disciplines. Bibliometric came as a substitute for statistical bibliography. Also, other concepts have risen from bibliometric study such as scientometric, infometric and now webometrics.

Bibliometric indicators quantify the intellectual output and it is extensively used to access research performance. The impact of publications can be measured by the number of times

publications have been cited by the other scientists in subsequent work (Anne and Marvin (2010) and Russell (1992). The Wall (2012) also shared the same view and defined bibliometric as the art of measuring the properties of documents and document-related processes. The range of bibliometric technique includes: word frequency analysis, citation analysis, Co-word analysis and simple document counting.

Bibliometric studies also focused on the quality of scientific publications and it is often concentrates on the questions highlighted by Taeda (2010). These questions are:

- What are good results of scientific activities and knowledge?
- Is it possible to qualify the quality of scientific publications?
- In which way do the bibliometric criteria for good scientific publications relate to the development and distribution of knowledge in varying knowledge domain, teaching and research practices?
- Which criteria should be used to define publication channels of good scientific quality?
- Are only publications the important results and indications of scientific activities?
- Is scientific knowledge witnessed and distributed only through scientific publications?
- If publications can be defined as one kind of scientific results, which criteria might be used for defining publication of good scientific quality?
- Which language, and why, should be preferred in producing publications of good scientific quality?
- Is there a difference between national and international criteria for publications of high scientific quality?

Bibliometric research methodology also delves into citation analysis of scholar's published works (Obajemu, Ekere & Ezeani, 2012). Citation study in bibliometric involves examining the pattern of the intellectual works cited. This may include many sources such as textbooks, Journals, monographs, encyclopedia, technical reports, research reports, patents, manuscripts, theses dissertations proceedings, abstracts and indexes. Others include electronic sources such as databases, internet, e-journals, e-books and websites etc.

Literature Review

Authors of this work had reviewed number of literature for this research work. Thirumagal (2011) unfolded the concept of bibliometric as the application of mathematical and statistical methods to books and other means of communication. This same author carried out a study on stem cell research from 1999 to 2008. The major focus of this work is to observe authorship patterns, discover the degree of collaboration, measure the quality of research productivity in MEDLINE and studied the linguistic distribution. It also revealed the geographical distribution, the growth rate or production of literature and identified the most frequently cited journals. Zafrunisha (2012) attested to the prowess of this type of study and affirmed that the exponential growth of scientific literature, the interdisciplinary nature of research and trends towards specialization have posed many problems both to the scientists and librarians. Jena (2012) was of the view that research publications are the embodiments of intellectual thought contents expressed in published literature whose key objective is to transmit innovative ideas or information. In the bibliometric study which was carried out, the findings were: average citation per article was 16, average numbers of pages was 8, journal citation predominant 57.4%

Martel (2009) worked on citation analysis of College and Research Libraries comparing yahoo, Google, Google Scholar and Isi web of knowledge with implications for promotion and tenure between 2000 and 2006. Swain (2001) analyzed the growth and development of publication output of library and philosophy and practice between 2004 and 2009. The research work focused on the authorship patterns and degree of authors collaboration, bibliographical form of citations, geographical distributions, distributions by country wise, prolific authors, the age of citations, and publication half-life of books and journal. Kamal, Dillip and Sahoo (2011) studied annals of library and information studies 2002 -2010. They analysed data generated on the following parameters: year-wise distribution of articles, year-wise distribution of articles and citations, bibliographical forms of document, authorship patterns and ranking of authors. Others include length of article, geographical distribution of contributors and chronological distribution of citations.

Obajemu (2001) stated that bibliometric studies are imperative in view of the information explosion in the field of Medicine and Para-medical disciplines and it is expedient to carry out productivity studies in Medicine so as to determine the core information materials that should be acquired and those ones that should be conveniently left out. His study was therefore focused primarily on the periodical reports on communicable diseases between January and December. Other Literature reviewed were Obajemu (2013) which focused on Malaria Research in Nigeria (a scientometric appraisal on research articles), Jean- Francois (2008) who assessed the accuracy of references specifically citing manuscript concerning occupational and environmental medicine, and Xavier's (2009) researched on scientific literature which dealt with internet, video games and cell phones. Others include Bagnell (2009) questions regarding an analysis of bibliometric indicators at National institute of Health Funding, Tukur and Musa (2000), Obajemu and Bolarinwa (2004), Stacey and Jan (2008), and also William and Anne (2011).

Theoretical Framework of Bibliometric

Due regard must be given to the early theorists of bibliometric study. There are laws and models that have come to stay on bibliometric. Theory in essence is a contemplative and rational type of abstract or generalized thinking. It is a generalized explanation of how nature works (Wikipedia, 2013). Therefore, the term theoretical can be used to describe ideas and empirical phenomenal which are not easily measurable in modern science. It is a well-confirmed type of explanation and consistent with scientific methods empirically supported (i.e. Verifiable) and empirically contradicted (i.e. falsified). Therefore, theoretical framework is a foundation or boundaries of study (Michelle. 2013). This research work focused primarily on comparative bibliometrical study of two scholarly medical journals in Nigeria. It assessed their intellectual impact on the world of knowledge especially in the areas of Medicine and its allies. The Journals studied were: (1) African Journal of Medicine and Medical Sciences published by College of Medicine University of Ibadan, Nigeria. The journal has 1116-4077 as ISSN number. The journal is indexed at pubmed, index medicus and African Journal online (Ajol) (2) Nigerian Quarterly Journal of Hospital Medicine whose ISSN number is 0189-2657 is published by College of Medicine of the University of Lagos, Idi-Araba, Lagos, Nigeria. The journal is equally on pubmed, index medicus and African Journal online (Ajol).

Objectives

- To determine the volume of intellectual contributions within the period of study.
- To determine the patterns of research references by the contributors.

- To determine the patterns of authorship collaborations
- To study Subject distributions of articles published
- To determine the geographical distributions of articles published between the periods of study.

Materials and Methods

Data for this study were sourced from the databank generated from the 10 volume 139 issues of African Journal of Medicine and Medical Sciences (AJMMS) and Nigerian Quarterly Journal of Hospital medicine (NQJHM) Information/data concerning this research was transcribed from all the issues of AJMMS and NQJHM on cataloguing template cards. The following parameters designed on the template were: title of the research articles, number of authors indicated in the work, subject, geographical treatment and number of reference cited and the year and month the article was published. Technical reading of each article was done thoroughly so as to carefully determine the subject matter of each article. Titles, abstracts, introduction, body of the work, conclusion and the reference cited were examined. Medical subject heading (MeSH) of 2010 edition was used to determine the appropriate and approved concepts. Also, Medical tree structure was consulted in MeSH to know the family tree of subject analyzed. Usually; a tree structure arrangement is from the broad spectrum to the specifics. Bradford statistical Model was used to analyze the data collected for this study.

Results

TABLE 1: Quarterly Distribution of the Articles Published Between 2001-2010

YEAR	MARCH			JUNE			SEPTEMBER			DECEMBER			Total
	NQJHM	AJMMS	QTY	NQJHM	AJMMS	QTY	NQJHM	AJMMS	QTY	NQJHM	AJMMS	QTY	
2001	NP	NP	-	N P	34	34	NP	18	18	19	33	52	104
2002	NP	21	21	N P	19	19	NP	21	21	17	20	37	98
2003	NP	21	21	N P	20	20	NP	20	20	20	21	41	102
2004	26	18	44	20	18	38	NP	17	17	22	19	41	140
2005	10	18	28	13	17	30	9	19	28	8	15	23	109
2006	7	17	24	10	15	25	7	15	22	7	15	22	93
2007	10	12	22	10	15	25	7	16	23	10	15	25	95
2008	11	13	24	18	15	33	12	15	27	12	14	26	110
2009	13	14	27	9	15	24	11	14	25	10	9	19	95
2010	11	10	21	10	10	20	10	12	22	15	13	28	91
TOTAL	88	144	232	90	178	268	56	167	223	140	174	314	1037

Where:

NP = Not Published

NQJHM = Nigerian Quarterly Journal Hospital Medicine
 AJMMS = African Journal of Medicine and Medical Sciences
 QTA = Quarterly Total of Articles

Results showed that a total of 1037 scientific research articles were produced in NQJHM and AJMMS. NQJHM produced 374 (36.07%) articles while AJMMS had the highest number of articles published within the period.

The figure showed 663 (63.93%). Also discovered in the study was the fact that research activities reached its peak in the last quarter. The figure produced was 314 (30.27%) of the total pooled whilst the least articles produced in terms of quarterly distributions was July – September with 223 (21.50%).

Table 2: Distribution of references cited in NQJHM and AJMMS between 2001 and 2010

YEAR	NO OF REF: IN EACH ISSUE								TOTAL	CUM TOTAL
	MARCH		JUNE		SEPTEMBER		DECEMBER			
	NQJHM	AJMMS	NQJHM	AJMMS	NQJHM	AJMMS	NQJHM	AJMMS		
2001	NP	NP	NP	582	NP	389	215	653	1839	1839
2002	NP	367	NP	379	NP	402	266	347	1761	3600
2003	NP	375	NP	462	NP	401	347	457	2042	5642
2004	487	352	346	402	NP	330	421	408	2746	8388
2005	224	393	238	364	173	371	172	280	2215	10603
2006	185	354	179	313	150	254	111	336	1882	12485
2007	268	284	193	337	119	320	286	329	2136	14621
2008	234	270	263	320	218	336	259	309	2209	16830
2009	325	353	192	311	184	429	179	207	2180	19010
2010	221	238	251	233	228	330	300	282	2083	21093
TOTAL	1944	2986	1662	3703	1072	3562	2556	3608	21093	

Where NP = Not Published

Findings in table 2 were: 21,093 was the total number of references cited in NQJHM and AJMMS within the period. NQJHM pooled 7234 (34.30%) and AJMMS recorded the highest with 13,859 (65.70%) of the yearly distributions, 2004 pooled the highest with 2746 (13.02%) and the least year in terms of references cited was 2002 with 1761 (8.35%).

TABLE 3: Authorship Patterns of Distribution of Articles Published in NQJHM & AJMMS between 2001 and 2010

NO OF AUTHORS	NO OF ARTICLES		TOTAL	% OF ARTICLES	CUM OF ARTICLES	CUM % OF ARTICLES
	NQJHM	AJMMS				
ONE	46	82	128	12.34	128	12.34
TWO	97	152	249	24.01	377	36.35
THREE	91	169	260	25.07	637	61.42
FOUR	82	120	202	19.48	839	80.09
FIVE	31	66	97	9.35	936	90.25
SIX	20	31	51	4.92	987	95.17
SEVEN	4	20	24	2.31	1011	97.48
EIGHT	1	15	16	1.54	1027	99.02
NINE	2	3	5	0.49	1032	99.51
TEN	-	2	2	0.19	1034	99.7
ELEVEN	-	1	1	0.10	1035	99.8
TWELVE	-	1	1	0.10	1036	99.9
THIRTEEN	-	1	1	0.10	1037	100
TOTAL	374	663	1037			

The results in tables 3 showed the pattern of authorship collaborations. Three authorship collaborations ranked the highest with 260 (25.07%), followed by two authorship collaboration with 249 (23.82%) and from authorship with 202 (19.49%) of articles produced.

TABLE 4: Ranked order of productivity of subjects Distribution of Articles to the Minimum of 15 Frequencies

SUBJECT	NO. OF ARTICLES		RANKED TOTAL	% OF ARTICLES	CUM OF ARTICLES
	NQJHM	AJMMS			
Dentistry	33	47	80	7.7	80
Acquired Immunodeficiency Syndrome	15	33	48	4.6	128
Pharmacy/Pharmaceutical Sciences	22	22	44	4.2	172
Animal Experimentation	12	31	43	4.1	215
Malaria	5	28	33	3.2	248

Surgery	7	23	30	2.9	278
Diabetes, Mellitus	10	19	29	2.8	307
Materia Medica	18	10	28	2.7	335
Neoplasms	6	18	24	2.3	359
Oto-rhino-laryncology (Ear, Nose & Throat)	8	15	23	2.2	382
Radiology/Radiation	6	15	21	2.0	403
Eye Diseases	5	15	20	1.9	423
Tuberculosis	4	16	20	1.9	443
Paediatrics	7	12	19	1.8	462
Paediatrics	7	12	19	1.8	481
Hypertension	6	12	18	1.7	499
Microbiology	3	13	16	1.5	515
Pregnancy	6	10	16	1.5	531
Psychiatry/Psychology	4	11	15	1.4	546
Orthopaedics	4	11	15	1.4	561
Gyneacology	6	9	15	1.4	576

Table 4 showed the ranked order of subjects of the articles analyzed. Articles on Dental Sciences produced the highest with 80 (7.7%) NQJHM produced 33 whilst AJMMS recorded 47 articles. Next to dentistry was Acquired Immunodeficiency Syndrome/Human Immuned Virus which pooled 48 articles of which NQJHM produced 15 articles while AJMMS accounted for 33 articles. Table 4 clearly indicated these subjects in decreasing order of subject productively to the minimum of 6 frequencies of articles.

TABLE 5: Bradford's Statistical Model on subject Distribution of Articles produced in NQJHM & AJMMS between 2001 and 2010

No. of Articles A	No. of Subjects B	Cum of Subject C	AX B D	Cum of Articles E	Log of Cum of Subjects F
80	1	1	80	80	0
48	1	2	48	128	0.30
44	1	3	44	172	0.48
43	1	4	43	215	0.60
33	1	5	33	248	0.70
30	1	6	30	278	0.78
29	1	7	29	307	0.85
28	1	8	28	335	0.90
24	1	9	24	359	0.95
23	1	10	23	382	1
21	1	11	21	403	1.04
20	2	13	40	443	1.11
19	2	15	38	481	1.18
18	1	16	18	499	1.20
16	2	18	32	532	1.26
15	3	21	45	577	1.32

14	3	24	42	619	1.38
13	4	28	52	671	1.45
12	3	31	36	707	1.49
11	3	34	33	740	1.53
10	1	35	10	750	1.54
9	2	37	18	768	1.57
8	1	38	8	776	1.58
6	1	39	6	782	1.59
5	8	47	40	822	1.67
4	20	67	80	902	1.83
3	25	92	75	977	1.96
2	18	110	36	1013	2.04
1	24	134 SS = 134	24	1037 AA	

Where SS indicated total number of subjects determined in the study. Also, AA showed total number of articles produced.

Table 6: Ranked order of Geographical spread of Articles published in NQJHM and AJMMS to the Minimum of 10 Frequencies.

AREAS COVERED	NO OF ARTICLES		TOTAL	% OF ARTICLES
	NQJHM	AJMMS		
Lagos State	311	49	360	34.7
Oyo State	20	337	357	34.4
Kwara State	13	44	57	5.5
Osun State	6	34	40	3.8
Edo State	18	14	32	3.1
Ogun State	14	15	29	2.8
River State	3	10	13	1.2
Saudi Arabia	0	13	13	1.2
Plateau State	1	11	12	1.1
South West, Nigeria	2	10	12	1.1
Kaduna State	2	9	11	1.0
United Kingdom	4	6	10	0.9
Kano State	3	7	10	0.9
Enugu	3	7	10	0.9

Table 6 showed geographical spread of articles published in NQJHM and AJMMS. Lagos State pooled the highest with 360 (34.7%) articles. NQJHM had 311 and AJMMS recorded only 49. Also

next to Lagos was Oyo State which pooled 357 (34.4%) articles AJMMS accounted for 337 and NQJHM recorded the least (20) articles.

Discussion

The researcher carried a comparative bibliometric study on two renowned medical journals in Nigeria. These journals were Nigerian Quarterly Journal of Hospital Medicine (NQJHM) and African Journal Medicine and Medical Sciences. These journals have international outlook. The journals studied covered a period of ten years (2001 – 2010). The study looked into various facets such as growth, direction of growth, interrelationships of subjects, collaborations of authorship, regional distributions of research activities and citations for the research works.

The two Medical journals studied produced 1037 articles. NQJHM produced 374 (36.07%) Whilst AJMMS published 663 (63.93%) research articles. In terms of quarterly distribution, October-December recorded the highest with 314 (30.27%), followed by second quarter (April – June) which had 268 (25.84%) research articles published. The least quarter was July to September which produced 223 (21.50%).

Also investigated in the study was the structure of references cited in these research works. Researchers are expected to consult adequate number of information sources and resources be it primary or secondary such as journals, textbooks, monographs, theses/dissertations, abstracts/indexes, bibliographies manuals, and atlases. Others may include handbooks, encyclopaedia patent, technical reports, research reports, conference papers online and electronic formats so as to build a solid bedrock for the research. The aggregate number of references cited from various sources and format stood of 21093. NQJHM pooled 7234 (34.30%) and AJMMS produced 13,859 (65.70%). The yearly distributions showed that year 2004 had the highest number of citations with 2746 (13.02%), followed by 2005 which had 2215 (10.50%), 2209 (10.47) in 2008 and the least was in 2002 which recorded 1761 (8.35%).

The research work also examined the degrees of Collaboration of the researchers. Due to inter-dependency or interdisciplinary nature of Medical Sciences and its allies, the researchers in this study highly collaborated to the maximum of 13 authors. This was further established in the similar research work conducted by Obajemu et al (2013) on Malaria Research in Nigeria a scientometric analysis. Three authorship Collaborations was the highest with 260 (25.07%), Two authorship 249 (23.82%), Four authorship 202 (19.48%). Others were One authorship 128 (12.34%), Five 97 (9.35%), Six authorship 51 (5.01%) etc. The work analyzed the subjects and ranked them in decreasing order of frequency. The top Ten subjects were dentistry 80 (7.7%), Acquired Immunodeficiency Syndrome 48 (4.6%), Pharmacy/Pharmaceutical Sciences 44 (4.2%), Animal experimentation 43 (4.1%), malaria 33 (3.2%). Other include Surgery 30 (2.9%), Diabetes, Mellitus 29 (2.8%), Materia Medica 28 (2.7%), Neoplasms 24 (2.3%) and Oto-rhino-laryngology (ear/nose/throat) 23 (2.2%). Bradford's statistical table produced 134 subjects. In other words, the subjects analyzed or determined in the study was 134.

Finally, Lagos State pooled the highest with 360 (34.7%) of articles. NQJHM produced 311 while AJMMS recorded 49 articles. Oyo State ranked second with 357 (34.4%) of articles AJMMS pooled the highest with 337.. articles while NQJHM produced 20 articles.

This work had investigated research productivity of medical scientists published in AJMMS and NQJHM journals between 2001 and 2010. The yearly and quarterly distributions of articles published were demonstrated statistically. Also, citation analysis of the articles in those journals was equally analyzed and discussed. Authorship patterns of collaboration, geographical and subject spread of the articles were determined and ranked in decreases order of frequency.

This research has thus unraveled the directions of publication, the areas so much concentrated and those areas less concentrated. Lastly, the research finding revealed a gradual declining in research activities in AJMMS. Obviously, the study of this nature helps to know the strengths and weaknesses of a research outfit, promotes quality research and collection development.

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