Original Article

Publication Productivity of Faculty of Medicine, Mansoura University Indexed in PubMed

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Abstract

Background: Analysis of PubMed publications as an indicator of the research productivity of individual countries, regions, or institutions has recently become a field of interest. **Aim:** The aim was to assess the past trends in PubMed-indexed medical publications from Mansoura Faculty of Medicine and to have an idea about the current situation in medical research. **Materials and Methods:** PubMed was searched for publications affiliated to Mansoura from the end of the calendar year 2012 and earlier. **Results:** Of 2798 papers related to Mansoura, 1756 publications were included in the analysis, and 1042 publications were excluded (false positives). The highest number of publications was in 2011 (10.6%, 187/1756) followed by 2012 (10.2%, 179/1756). There was an increase of the publication rate over 5-years period until it reaches 47.0% (826/1756) during the period from 2008 to 2012. The main high-producing department was Urology and Nephrology, which accounted for 35.9% (631/1756) of the total publications followed by Pediatrics and Parasitology. The median number of authors participated in the researches was four ranging from 1 to 23. Most of the publications were in the form of intervention/clinical trials (38.4%, 662/1756) followed by descriptive/cross-sectional study (38.3%, 659/1756). The median of the impact factor was 1.99 ranging from 0.27 to 53.3. **Conclusion:** The publication productivity of Mansoura Faculty of Medicine showed fluctuating pattern from the end of the calendar year 2012 and earlier. Future prospects for increasing research productivity should be considered to increase the number and quality of publications and academic staff participating in high-quality international researches.

Keywords: Egypt, Publication productivity, PubMed

Introduction

PubMed is a free web literature search service and is the first choice for electronically searching and retrieving biomedical literature. Almost 5 million queries are issued to PubMed each day by users around the globe,[1] who rely on such access to keep abreast of the state of the art and make discoveries in their own fields.[2] Analysis of PubMed publications as an indicator of the research productivity of individual countries, regions or institutions has recently become a field of interest.[3] Evaluation of quality in scientific research is a complex problem. Frequently, systematic review of research outputs by experts in the field is considered as an ideal solution of this problem.[4] The use of more objective scientometric indices in research evaluation emerged in the 1960s and 1970s.[5] These scientometric indicators, among which the most common one is probably the journal impact factor (IF), which was first introduced by Garfield in 1960s, as a measure of the frequency with which the average article in a journal has been cited in a particular year. This indicator, calculated annually by the Thomson Scientific (formerly International Scientific Institute), Philadelphia.[6]

Despite of its obvious advantages including conceptual simplicity, and the fact that it provides a convenient method to assess the impact of journals and articles more immediately than citation itself, the employment of journal IF to evaluate the quality of research has been widely criticized.[7] Among the most critical shortcomings of journal IF is that it strongly varies across different scientific disciplines.[4]

There are no accessible comprehensive nation-wide publications databases through which all Egyptian literature

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can be traced accurately. Egypt contributed about 17% of African articles and 30% of that of the Arab countries in the PubMed.[8,9] Furthermore, Benamer and Bakoush[10] stated that the Kingdom of Saudi Arabia and Egypt produced almost 60% of the research generated by the Arab world.

The contribution of Egypt to the world's biomedical publications in the PubMed increased from 0.09% in 1996 to 0.14% in 2006[11] and over a decade (1992-2002), the quantitative growth of the Egyptian publications was 73%.[12] However, Egyptian current contribution to World's biomedical publications seems low. This may not reflect accurately the total Egyptian publications as many of them may be published into PubMed nonindexed local journals that are available only in a printable form with no internet access. Language barriers may also hinder publishing Egyptian research.[13] One possible reason is the extremely low expenditure on research in Egypt that counts only to approximately 0.25% of the gross domestic product (GDP) compared with 1.5-3% in developed countries.[14] Faced with lots of home-country difficulties, many excellent Egyptian researchers find their way in North America and Western Europe where they are welcomed and find good scientific atmosphere to perform high-end research that counts to these new countries.[15] This brain drain deprives Egypt from the ability to build an advanced scientific community.[13]

Mansoura University was founded in 1962 in Mansoura city, Egypt and is one of the biggest public Egyptian universities. The main campus is located in Mansoura City. The faculty of Medicine comprises 32 departments either clinical or preclinical.[16]

To the best of our knowledge, no reports had quantified the publications of Mansoura Faculty of Medicine.

The aims of this study were to assess the past trends in PubMed-indexed medical publications from Mansoura Faculty of Medicine. The outcome of this study gives an idea for the researchers as well as decision makers to the current situation in medical research and the required level they should aim at.

Materials and Methods

Electronic databases provide an excellent estimate of medical publication productivity. PubMed is the most widely used international database for medical research. This study was based on the Mansoura medical research publication data retrieved from the PubMed database from the end of the calendar year 2012 and earlier. Search of PubMed was carried out on April 14, 2013 by writing the following keywords in the search field: Mansourah OR Mansoura OR Mansorah OR Mansoura and medicine and limit the search to the date of December 31, 2012.

The inclusion criteria

(1) Studies which were conducted in and published from Mansoura. This also included regional and international collaborative studies in which researcher (s) from Mansoura were also involved, (2) studies which were conducted in Mansoura but, at the time of publication the author (s) was/were working outside Mansoura, (3) studies which were conducted outside Mansoura but at the time of submission of papers and publication, the author (s) was/were working in Mansoura.

On the contrary, the exclusion criteria included: (1) Studies which were neither conducted in Mansoura nor belonged to any members of Faculty of Medicine, Mansoura University. For example the search with the previous key words yielded such publications that included some authors named "Mansoura", (2) studies not related to medical publications for example, publications belonging to veterinary, dentistry, nursing, and pharmacy faculties, (3) studies published in 2013.

The abstracts of the resulted articles were transferred to Microsoft office Word, 2007.docx under Windows and a comprehensive file was created. The studies were classified either original research articles which included 'Case-Control', 'Case reports', 'Cohort study', 'Descriptive', 'Experimental', 'Letters', and 'Randomized control trials' or 'Review articles'. The articles were examined for their settings whether hospital-based or community-based. Authors of individual articles were numbered and the specialty determined according to that of the first author because they are generally responsible for conception of the study, collecting and analyzing the data, interpreting the results, and writing the paper. The IF of the journals was determined according to Journal Citation Reports 2011 that was published by July 12, 2012. This entire process was conducted by two independent reviewers and the final group of articles to be included in the analysis was determined after an iterative consensus process amongst the reviewers. Furthermore, the total Egyptian medical publications indexed in PubMed was available at http://dan.corlan.net/medline-trend.html.

All the data were then revised and coded. Statistical analysis was performed using SPSS statistical software version 16 (SPSS Inc., Chicago, IL 2007) in the form of numbers and percentages.

Results

Search of PubMed for publications affiliated to Faculty of Medicine, Mansoura University produced 2798 hits. Of the total, 1756 publications were included in the analysis, and 1042 publications were excluded because they were not associated with Mansoura (false positives) or their subject was not medical. The first publication was on 1969.

We found that the highest number of publications was in 2011 (10.6%, 187/1756) followed by 2012 (10.2%, 179/1756) and when compared with the total Egyptian medical publications, there is a fluctuating pattern in both lines until 2006 upwards where sharp increase in the national publications was detected compared to the gradual increase in Mansoura publications

[Figure 1]. Simultaneously, when we grouped the years of publications into periods of 5 years we found that there was an increase of the publication rate over 5-years period till it reached 47.0% (826/1756) at the period from 2008 to 2012.

Regarding the percentage of increment, it showed an accelerated pattern during the period 1983-1992 followed by a sharp decline during the period 1993-1997, then it showed gradual rising pattern during the period 1998-2007 and finally it dropped again from 2008 until the time of the search [Table 1].

The Faculty of Medicine is comprised of 32 departments covering both preclinical and clinical subjects. The main high-producing department was Urology and Nephrology which accounted for 35.9% (631/1756) of the total publications followed by pediatrics (129/1756) and parasitology (124/1756) (7% each) [Table 2].

By counting the number of authors participated in the researches, the median was four ranging from 1 to 23. The majority of the publications had four authors (18.7%, 329/1756). Those who had one author represented by 7.5% only (131/1756) [Table 3]. The mean (standard deviation [SD]) of authors for the overall publications was 4.55 (2.5) and 4.84 (2.4) for publications with more than one author. The mean was nearly equal for cross-sectional study 4.97 (2.6), case-control 4.8 (2.3), and clinical trial 4.40 (2.3) however review achieved the lowest mean 2.92 (2.9).

Most of the publications were original research mainly in the form of intervention/clinical trials (38.4%) (662/1756) followed by descriptive/cross sectional study (38.3%) (659/1756).

Regarding the research setting, researches were conducted mainly on hospital settings (96.1%) (1553/1756) compared with (3.95%) (64/1756) based on community settings [Table 4].

In our study, the median of the IF was 1.99 ranging from 0.27 to 53.3. Nearly, one quarter of the publications has no IF (22.2%) (389/1756). Also, about 40% (689/1756) of the publications were published in journals with IF <2.0. Only about 2% (46/1756) of publications were published in journals with IF >6 [Table 5].

We found that the majority of medical publications of Mansoura University was distributed along 30 years, we compared between the extreme decades, which were (1983-1992 and 2003-2012) and we found that <½ of the publications related to the first decade (43%, 58/135) had no IF, however, more than half of the publications in the second decade (52.8%, 681/1289) have IF between 1 and 3. High IF publications more than nine were only detected in the last decade (0.4%, 4/1289). In the last decade some decrement was observed regarding the prevalence of clinical trials (45.9%, 62/135 vs. 37.3%, 481/1289) and cross-sectional study (40%, 54/135 vs. 36.9%, 475/1289) with increase in the prevalence of case control (6.7%, 9/135 vs. 12.1%, 156/1289), cohort (0% vs. 1.7%, 22/1289) and narrative review (0.7%, 1/135 vs. 6.2%, 80/1289). No observable difference was detected regarding the number of authors and research settings in both decades [Table 6].

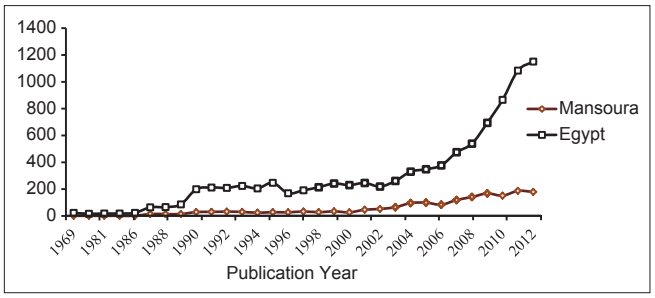

Figure 1: The year distribution of the publications

Table 1: Distribution of the publications on 5-year intervals

5-year distribution	Frequency	Percentage	Percentage of increment
Earlier than 1983	3	0.2	-
1983-87	16	0.9	+433.3
1988-92	119	6.8	+643.7
1993-97	142	8.1	+19.3
1998-2002	187	10.6	+31.7
2003-07	463	26.4	+147.6
2008-12	826	47.0	+78.4

Discussion

The last 20 years have been a period of considerable growth in the number of universities and health science schools especially colleges of medicine and pharmacy in the Arab world.[17] Several attempts have been made to evaluate the current state of scientific publication productivity or scholarship in medical schools in the Arab region.[10,18,19] However, a thorough evaluation of the medical and pharmacy schools in the light of overall country publication has not been described fully.[17]

In this study, we found that 1756 publications were produced by Faculty of Medicine, Mansoura University from the end of the calendar year 2012 and earlier. Other studies conducted in Egypt found that the number of PubMed publications from Egypt during the period 2001-2005 was 1180[10] and Zeeneldin *et al*.[15] found that during the period (1991-2010), there were 16,835 biomedical publications listed in the PubMed with Egyptian affiliations. The differences in these numbers can be explained by the differences of the duration of study, the nature of publications included in the analysis as we restricted our research to medical publications only and not to all biomedical studies, at the same time we limit the research to Mansoura productivity not all Egyptian publications.

Nearly equal productivity, but in shorter duration reported by Ranasinghe *et al*.[20] who found that Sri Lanka's cumulative

medical publication output between years 2000 and 2009 consisted of 1,740 papers. The number of publications increased from 121 in year 2000 to 256 in year 2009. Another study carried in Lebanon found that the medical publication represented 1964 from 2108 biomedical publication during the period from 1985 to 2004.[21] Most of the researches analyze all biomedical publications, for example in Lebanon (total: 3087; mean: 158/year) and the United Arab Emirates (UAE) (total: 1996; mean: 102/year), a clear increasing trend is observed for biomedical research production in both countries during the period from 1988 to 2007, although the increase is more prominent in Lebanon, especially in the last 10 years.[22] Lower productivity was found In Libya, where search of PubMed revealed 417 biomedical papers published between 1988 and 2007 and medical schools contributed 268 papers (64%), teaching hospitals 54 papers (13%), and hospitals not explicitly affiliated to medical schools 26 papers (6%).[23]

In our study, the highest number of publications was in 2011 (10.6%) followed by 2012 (10.2%) and the decrease of publications in 2012 than 2011 may be due to the changes that occur in Egypt after 25th January revolution with some instability either political, safety or even financial, but there was an increase of the publication rate over 5-years period till it reaches 47.0% at the period from 2008 to 2012. The same positive trend was reported in Gulf Countries. Overall, all the Gulf Cooperation Council countries showed a positive trend between 1970 and 2010. Medical research output has been blooming in Qatar, showing a strong positive trend for the

Table 2: The contribution of different specialities according to the speciality of the first author

Specialty	*n*	Percentage
Urology and nephrology	631	35.9
Pediatrics	129	7.3
Parasitology	124	7.1
Clinical pathology	101	5.8
Obstetrics and gynecology	93	5.3
Gastroenterology surgery	76	4.3
Radiology	62	3.5
General surgery	60	3.4
Orthopedics	46	2.6
ENT	45	2.6
Dermatology and andrology	43	2.4
Ophthalmology	42	2.4
Internal medicine	36	2.1
Anesthesia	33	1.9
Hematology and oncology	32	1.8
Community medicine	31	1.8
Surgical oncology	19	1.1
Rheumatology/rehabilitation	18	1.0
Pathology	18	1.0
Cardiothoracic surgery	17	1.0
Biochemistry	15	0.9
Forensic medicine/toxicology	13	0.7
Physiology	13	0.7
Pharmacology	11	0.6
Anatomy and histology	9	0.5
Tropical medicine	9	0.5
Chest	7	0.4
Microbiology	7	0.4
Psychiatry	7	0.4
Neurosurgery	4	0.2
Radiotherapy	3	0.2
Neurology	2	0.1

Table 3: Number of the authors participated in the publications

Number of authors	Frequency	Percentage
1	131	7.5
2	209	11.9
3	298	17.0
4	329	18.7
5-10	756	43.0
>10	33	1.9
Total	1756	100.0
Median (minimum-maximum)	4.00 (1-23)	

Table 4: Research type and setting of the studied publications

Research type	*N*	Percentage
Intervention/clinical trial*	662	37.7
Descriptive/cross section	659	37.5
Analytic/case control	189	10.8
Narrative review	101	5.8
Descriptive/case report and series	85	4.8
Analytic/cohort	22	1.3
Others**	38	2.2
Research setting***		
Hospital	1553	96.05
Community	64	3.95

*Pre- post-intervention study (*n*=276, 15.8%) noncomparative clinical trial (*n*=281, 16%) randomized controlled trial and nonrandomized controlled trial (105, 5.9%), **Reply and comments (*n*=30, 1.7%), author view (*n*=1, 0.1%), systematic review (*n*=1, 0.1%) and predictive models (*n*=6, 0.3%), ***Total *n* equal 1617 after exclusion of review and others

Table 5: Description of the impact factor of the studied publications

Impact factor	*N*	Percentage
No impact factor	389	22.2
<1	218	12.4
1-<2	471	26.8
2-<3	383	21.8
3-<4	213	12.1
4-<5	36	2.1
5-<6	12	0.7
6-<7	9	0.5
7-<8	6	0.3
8-<9	14	0.8
9-<10	2	0.1
≥10	3	0.2
Median (minimum-maximum)	1.99 (0.27-53.3)	

Table 6: Comparison of the publications characteristics in two different decades

Publication characteristics	1983-1992		2003-2012	
	N (total=135)	Percentage	*N* (total=1289)	Percentage
Impact factor				
No impact factor	58	43.0	241	18.7
<1	8	5.9	174	13.5
1-<2	17	12.6	396	30.7
2-<3	20	14.8	285	22.1
3-<4	26	19.3	133	10.3
4-<5	2	1.5	27	2.1
5-<6	0	0.0	8	0.6
6-<7	1	0.7	8	0.6
7-<8	2	1.5	3	0.2
8-<9	1	0.7	10	0.8
9-<10	0	0.0	2	0.2
≥10	0	0.0	2	0.2
Number of authors				
1	9	6.7	89	6.9
2	10	7.4	159	12.3
3	23	17.0	215	16.7
4	39	28.9	229	17.8
5-10	54	40.0	569	44.1
>10	0	0.0	28	2.2
Research type				
Intervention/ clinical trial	62	45.9	481	37.3
Descriptive/ cross section	54	40.0	475	36.9
Analytic/case control	9	6.7	156	12.1
Narrative review	1	0.7	80	6.2
Descriptive/ case report and series	6	4.4	55	4.3
Analytic/ cohort	0	0.0	22	1.7
Others	3	2.2	20	1.6
Research setting*				
Hospital	131	97.8	1169	96.7
Community	3	2.2	40	3.3
Total	134	100	1209	100

*Their *n* after exclusion of review and others

period 2000-2010.[24] Furthermore, the trend of publication with time for the college of medicine in King Saud University showed an exponential increase in the number of publications within the time period 2005-2010; and a linear increase trend was found for colleges of medicine in Assiut (Egypt) and Khartoum (Sudan) universities.[17] However the percentage of increment showed a fluctuating pattern. It showed an accelerated pattern during the period 1983-1992 followed by a sharp decline during the period 1993-1997, then it showed gradual rising pattern during the period 1998-2007 and finally it dropped again from 2008 till the time of the search. Furthermore in Libya, the number of publications was highest during 1988-1992 (n = 117; 34% of total). Thereafter, the publication rate declined continuously: 85 papers (24%) were published in 1993-1997, 84 papers (24%) in 1998-2002, and 62 papers (18%) in 2003-2007 and the overall trend in publication volume for Libya as a whole was estimated by regression analysis as a decline of 3% annually (95% confidence interval: 3.9-1.4%) ($r^2 = 0.51$, $P < 0.001$).[10] Oman had a significant increase in the number of publications in the period 1990-2005; however, the trend has plateaued in the last five years. A similar observation was noted in both Saudi Arabia and the United Arab Emirates for the last 10 years. In Kuwait, there was a negative trend in the early and mid-1990s, probably due to the second Gulf war.[24]

In our research work, the main high-producing department was Urology and Nephrology (35.9%) followed by pediatrics and parasitology (7% each). The high publication productivity rate of Urology and Nephrology Center (UNC) is due to the fact that UNC is a WHO collaboration center with excellent research infrastructure and international research cooperation. In Sri Lanka, the major medical specialties investigated during 2000-2009 were microbiology (n = 201), gynecology and obstetrics (n = 189), parasitology (n = 150), psychology (n = 150) and surgery (n = 139).[20] In Lebanon, the highest publication productivity was that of the departments of internal medicine (10.0%) and anesthesiology (5.9%), whereas in UAE was that of the Departments of Pediatrics (7.0%) and obstetrics and gynecology (4.6%).[22] In Libya, there are about 144 departments in the nine medical schools. Only nine departments produced 10 or more papers in the 20-year study period; seven of these departments are affiliated to the Benghazi medical school (Departments of Pharmacology, Pediatrics, Biochemistry, Pediatric Surgery, Laboratory Medicine, Pathology, and Neurology). The other two high-producing departments are the Department of Microbiology in Al-Fateh Medical University, Tripoli and the Department of Radiology of the Misurata Teaching Hospital. These nine departments together produced 173 papers, accounting for almost half (49%) of all papers affiliated to medical schools and hospitals. Sixty-nine (52%) departments produced no papers. They concluded that the differences observed between the departments did not and do not lie in the departments *per se*, but in individuals. In other words, the principal factor driving publication rates for a given department is likely whether it has one or more highly motivated individuals. Beyond motivation, another factor might be involved, namely differences in the research atmosphere scientists and doctors were exposed to during their years of specialization.[23]

In our study, most of the publication was original research mainly in the form of intervention/clinical trials (38.4%) followed by descriptive/cross sectional study (38.3%). In Lebanon, many biomedical articles appeared as case reports (30.9%) followed by review articles (16.1%),

comparative studies (11.1%), and clinical trials (7.2%). In the UAE, most of the articles appeared as case reports (14.9%) and comparative studies (12.9%) followed by review articles (7.1%) and clinical trials (4.8%).[22] Afifi[11] have reported that, Egypt produced 6423 PubMed-indexed articles during the period (1996-2005), of them review articles and clinical trial articles constituted 3.4% and 6.9%, respectively. For KSA during the same period, 6305 articles were produced. However, the percentage of review articles was higher and clinical trials articles were lower (7.6%, 5% respectively). Review articles and clinical trials constituted 12% and 5% respectively of the overall PubMed publications for the whole world during the same period.[11] He reported that, producing less review articles in Egypt could be explained by the poor access to the full articles for most of the researchers. In Sri Lanka, majority of the medical research articles published in the journals during 2000-2009 were descriptive studies (*n* = 611, 35.1%), letters (*n* - 345, 19.8%) and case reports (*n* = 311, 17.9%). There were only 37 randomized controlled trials (2.1%) and 35 preclinical trials (animal studies) (2.0%), whereas 115 articles were systematic reviews (6.6%).[20]

In our study, we found that the journal IF ranged from 0.27 to 53.3 with a median of 1.99. Nearly one quarter of the publications has no IF (22.1%) but higher percent reported by Benamer *et al*.[23] in Libya where over two fifths of the papers (141; 41%) were published in journals with no IF, also about 40% of the publications were published in journals with IF <2.0 and this was in agreement with Benamer *et al*.[23] Only about 2% of publications were published in journals with IFs >6 in contrast to what reported by Benamer *et al*.[23] who found that only two papers were published in journals with IFs >5.0, from this he concluded that the rule is publication in journals without a calculated IF or with a low IF, and that publication in high impact-factor journals is almost nonexistent.[23] The same was found in Lebanon and UAE, where a very minute proportion of biomedical papers appeared in high IF journals. They explained that by the limitation of scientific research in the region to case reports with minimal evidence-based analysis and they could be published only in very specialized international journals of relatively low IFs. Furthermore, regional journals, mostly not indexed in major databases, offer a very safe refuge for a majority of authors who do not want to be restricted with paper size or to be subject to the expensive economies of international publications.[22] Benamer and Bakoush[10] compared the biomedical research performance in the Arab world with that in nonArab Middle Eastern countries. They showed that Arab countries are lagging behind in the number of original biomedical research publications, publications in top medical journals, citation frequencies (6-year IF and h-index), and also when the number of publications is normalized to population, GDP, and GDP/capita. Tadmouri and Bissar-Tadmouri[25] suggested that the regional conflicts have been a major reason for the stagnation of medical publications in Arab countries. However, the other Middle Eastern countries have also been exposed to considerable instability and regional conflicts. Lack of freedom, democracy and funding, as well as brain drain and the difficulty of publishing research of local interest in high impact journals, all contribute to the low performance of biomedical research in the Arab world.[26,27] All these factors have to be taken into consideration if the governments of the Arab countries wish to improve the status of their biomedical research.[10] Tijssen[28] stated that the main reason for the decline of Africa's contribution to global knowledge production is the lack of the resources in many African countries, and willingness to invest in infrastructure and modern equipment to retain workers at Universities, research laboratories and health institutions.[29]

We found that the median number of authors participated in the publications was four ranging from 1 to 23. This is similar to what was reported by Afifi[11] in the research for the Egyptian biomedical publications in PubMed during the period 1996-2005 where the number of authors ranged between 1 and 20 authors. However those who had one author represented by 7.5% only contrary to 20.5% in Afifi[11] (2007) study. The mean (SD) of authors for the overall publications was 4.55 (2.5) and 4.84 (2.4) for publications with more than one author. Lower means reported by Afifi[11] 3.41 (2.1), and was 4.03 (1.9) respectively. The average number of authors differed significantly according to the type of the study, the mean in our study was nearly equal for cross-sectional study (4.97 ± 2.6), case control (4.8 ± 2.3) and clinical trial (4.40 ± 2.3), however review articles achieved the lowest mean (2.92 ± 2.9), this go with what reported by Afifi[11] where it was 1.96 in review articles and 4.12 in clinical trials. The increasing number of authors per article in these study types may be due to the increasing complexity of research, the multidisciplinary nature of research especially in clinical trials.

Study strengths

- PubMed is not only a simple search engine for biomedical citations, but also a powerful tool to conduct certain statistical analyses[30]
- To the best of our knowledge, this is the first report analyzing the research productivity of Mansoura faculty of medicine from the end of the calendar year 2012 and earlier
- With an overwhelming and rapidly increasing amount of biomedical publications in PubMed, there is a need for effective and efficient literature mining and knowledge discovery that can help health professionals to gather and make use of the knowledge encoded in text documents[31] to determine the progress in number of publications and its relevance to the increasing number of health publications worldwide.

Study limitations

- Our study did not discuss the qualitative aspect of the publications nor their impact on medical practice and benefits to the community

- We did not discuss co-authorship collaboration between our faculty and other Arab countries and the international collaborations
- Some studies have indicated that raw counts of publications can be misleading and that counts should be normalized.[8] We should allow for weighted comparison among the countries of origin through the following; calculate the ratio of the number of publications from a certain country to the number of inhabitants in that country and the ratio between number of publications and GDP
- We searched only Medline database and this database suffer many limitations
  - This database consists largely of English-language journals therefore possibly contributing to selection bias due to language barriers
  - PubMed does not represent all scientific and biomedical journals published. Journals of local nature may not be indexed but their value should not be neglected, also PubMed only indexes the address of the first author. Gaillard[32] argues that some 65% of African research papers are published in local journals that are not listed in the inter-national citation databases
  - Many research publications by African researchers, especially those focused on domestic or regional African issues and problems, are not assessable through modern technology facilities
  - We have focused in this report on the number of publications and IFs as measures of research output. However, there are other variables that also describe research productivity such as citation index, h-index, conference presentations, grants, the number of publications in the top medical journals, etc., that should be studied in the future.

Conclusion

The scientific publication activity of our faculty is considered useful data to determine our current ranking and to perform more efforts to achieve a higher ranking among Arab and international universities.

Policy implications

Results of this study have several policies implications:

- Consideration should be given to providing resources or allocating funds in the faculty budget to promote the expertise of authors, reviewers, and editors
- Developing computerized knowledge management systems to more accurately track research output by faculty staff members
- Our research would encourage local and global collaboration and partnership with other faculties and research institutions from around the world through providing full picture of our research efforts and their role in community development.

Recommendations

- Promotion of community-based studies
- Development of an electronic system to include research published in local journals, which will give a full picture of research productivity
- Further research on barriers for conduction and publication of high quality research is necessary
- Nation-wide journal evaluation of research productivity of all Faculties of Medicine could promote competition in research publication.

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