

## PubMed Medical publications from Libya

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**Abstract:** Medical research and publications are the back-bone for advancing the medical field. We identified the PubMed medical publications that are affiliated with Libya to shed some light on the contribution of this country's medical community to the PubMed database. All publications affiliated with Libya in the PubMed were counted over a five year period ending December 2006. We also used the same method to obtain data on the PubMed medical publications from Tunisia, Morocco and Yemen. Tunisia had the largest number of PubMed publications among the studied countries: 20.4 publications per million population per year and 7.2 publications per year per one billion US\$ GDP. Libya had much fewer publications: 2.4 publications per million population per year and 0.4 publications per one billion US\$ GDP. The citation frequency for Libyan published research was very low compared to Tunisian and Moroccan related research. Conclusion: This preliminary analysis shows that medical research output in Libya is about twenty times less than in other countries with similar backgrounds, and that it needs to be enhanced.

**Key Words:** Africa; Biomedical Publication; Impact factor; Libya; Medline; PubMed.

### Introduction

Due to the importance of scientific publications as an outcome of research, it is worthwhile to audit and evaluate this activity on the national level [1-3]. Libya is a developing country with adequate financial resources. The country has 10 major universities, with more than 3000 medical students in Tripoli alone [4]. To the best of our knowledge, no prior publication has explored the magnitude or the quality of medical publications from Libya.

Improvement of health services in any country is closely linked to the quality of local research [1-3]. Medical research can be classified into three broad sectors: 1) basic science research, 2) translational research and 3) clinical research [5].

Quality research requires good cooperation and coordination between universities and research centres in all three sectors [5-6]. It requires a very strong infrastructure and multidisciplinary cooperation to produce and disseminate the results [7-9].

There is no database in Libya containing reliable data about the quantity and quality of medical research in the different health and medical education institutions. It is also difficult to obtain similar data from other countries within the region for comparison. For that reason, the PubMed is the most accessible source for peer-reviewed data [10].

### Material And Methods

In this study, we explored the number of all biomedical publications indexed in Medline that are affiliated with Libya, Morocco, Tunisia, and Yemen during 2002- 2006. A search of all articles affiliated with the studied countries was conducted in the Medline/PubMed database using the 'Limits' function in the PubMed, and no other limits were used. The PubMed's database was selected as it is the largest database for peer reviewed

biomedical publications in the world [10], and no other data was used. Each of the selected countries has local medical publications, but they were not included in the study due to variability in the quality and the peer review process.

The citation database and Science Citation Index Expanded, available through Thomson web of science databases, were used to count the citations frequency of the publications. Only the citations frequency of original articles was counted. The published letters, news items, abstracts, and reviews were not counted. The impact factor was calculated by dividing the frequency of article's citations at year 2006 by the total number of published articles in the years 2004 and 2005 [11]. We also calculated the mean citation frequency for the best 10 cited articles for each country.

The population of each country and its gross domestic product were obtained from the United Nations secretariat and World Bank group [12,13].

### Statistical method of analysis:

Statistical analysis was performed with SPSS 12.0.1 for Windows (SPSS inc., Chicago, IL, USA). The differences between groups were compared using the non-parametric, chi square ( $\chi^2$ ) test, Mann-Whitney U-test and Kruskal Wallis H-test when appropriate. The p-value of less than 0.05 was considered to be significant.

### Results

Most of the publications were affiliated with Tunisia (1026), which account for 56.16 % of the publications found in this search (Figure 1). On the other hand, there were only 71 publications from Libya during the 5-year period. The number of publications from Morocco was 626 and from Yemen 104.

Examining the data in the format of the number of yearly publications per million inhabitants, we found that Tunisia produced 20.4 publications per million inhabitants per year. Libya produced only 2.4 publications per million inhabitants per year ( $p < 0.001$ , Figure 2). Morocco had yearly production of 3.9 and Yemen 1.04 publications per million inhabitants per year ( $p < 0.001$ , Figure 2).

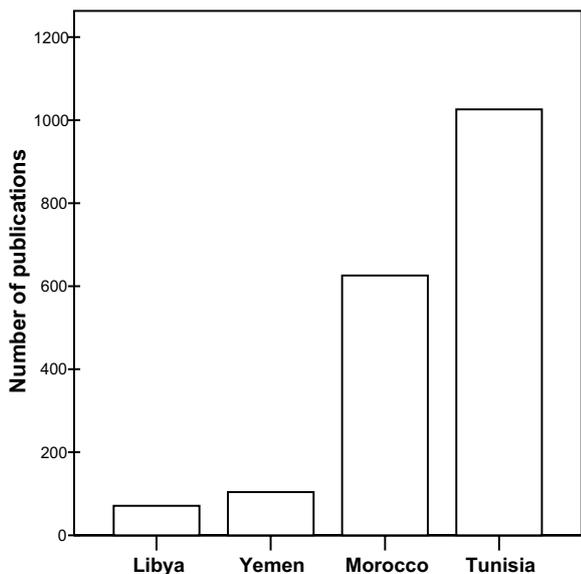


Figure 1: The total number of PubMed publications affiliated with Libya during 2002- 2006: Libya, Morocco, Tunisia, and Yemen.

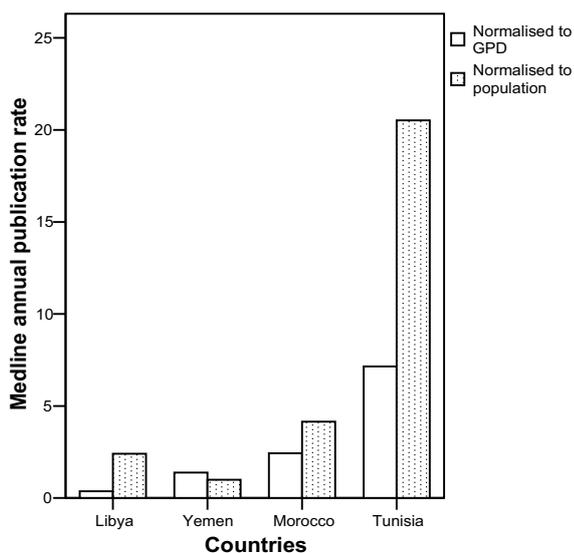


Figure 2: PubMed/Medline annual publication rate in Libya, Morocco, Tunisia, and Yemen, normalised to gross domestic product (GDP in billions US \$) and to population (in millions)

Normalising the number of yearly publications to the country's average gross domestic product (GDP) in US\$, again we found that Libyan publication rate was far behind that of the neighbouring country (Tunisia) by a factor of almost ~ 20 (Figure 2). Libya had only 0.4 publications per one billion US\$ GDP. Tunisia had a publication rate of 7.2 publications per year per one billion US\$ GDP, which is significantly higher than Morocco (2.4), Yemen (1.4), and Libya ( $p < 0.001$ ). Considering the country's biomedical researcher as one group, the 2006 impact factor for Libyan related published manuscripts was 0.55. The impact factors for Tunisia and Morocco related manuscripts were 1.0 and 0.94 respectively. The impact factor for Yemen was 0.15. We obtained similar results when we calculated the mean number of citations for the best 10 cited articles from each country during the same study period. The mean citation frequency for the Libyan most cited ten manuscripts was 3.6 citations per publication. The same calculation for Tunisia, Morocco, and Yemen was 18.6, 13.9, and 4.6 citations/publication respectively ( $p < 0.001$ ).

Of the 71 reports from Libya, 27 publications were from Tripoli, of which 22 were from Al-Fateh medical faculty, (4 case reports, 1 review article and 17 original works). Al-Fateh University has more than 3000 medical students with a teaching staff of 400. This gives an estimated average annual production rate of 1.4 article/100 teachers. Again this is very low compared to reports from Tunisia, 27.3 articles/100 teacher / year [14].

### Discussion

Medical and scientific publications are indications of the quality of medical services and medical education of the country [1-3,6]. Discussions of medical publications from Libya led to our decision to investigate this subject [15-17]. Once we agreed to proceed, we began to search the Medline/PubMed. We felt that Medline/PubMed is the best tool to explore the medical research that is affiliated with Libya because it is the largest database for peer reviewed biomedical material.

Publishing good quality material propagates research and drives continuous research production and exploration of other areas. It is clear that Libya lags behind its neighbouring countries. In particular, comparing the production of Tunisian researchers to the production of their Libyan counterparts shows great disparity, although Libya and Tunisia are very similar in culture, religion, and history.

Apart from the quantity of publications, the quality also seems to be of a higher standard in

Tunisia. Tunisia may be giving greater emphasis to research education and international research collaborations [18-20]. However, the educational system in Libya does not stress medical research in undergraduate and postgraduate studies. Furthermore, universities do not emphasise the quality of research when deciding on academic promotion. Although universities were called research centres, at some stage they went no further than the name and remained only centres of teaching.

It is important to understand the role of science in society; however, building scientific capacity is more important than building new universities or research centres [19, 20]. Critical thinking, transparency, strict rules for expectations, and high quality scientific production are necessary. An open scientific environment and well-constructed paths produce hard working scientists who gain respect nationally and internationally and contribute to the advances of the medical field, as well as to the quality of health services in general.

The production of good quality medical research requires an environment in which all research groups can collaborate effectively to produce scientific data of value to the community they serve and to the medical community at large [21-24]. The university is the giant laboratory where researchers interact and compete for smart graduate students, research funding and the production of quality data. Besides funding, research networks and cooperation between the research centres are the secret behind the number and quality of publications in top research-producing countries in the world.

Building any research group requires distinguished research leaders accredited during their academic career according to their output of good quality original studies. Citation analysis is one established method to collect information on the success of individuals and research groups [25]. It is up to the university to establish a set of criteria for faculty promotion. The very low rate and quality of scientific production reported for Libya in this paper clearly indicates a major deficiency in this country's medical academic institutions.

It will be difficult to improve the research environment in Libya without reformation of the promotion process and the establishment of reasonable criteria for attaining the higher academic positions. There should be two different paths, one for clinical services careers and another for academic careers. Academics should have a career development path that emphasizes production, quality and team building. The academic career is complementary to the clinical career. Medical research requires competent

leadership to advance and contribute to the international research activity. Traditionally, academic careers start with being graduate students working with established researchers. During graduate school the students study background courses for the intended research field as well as other sciences that will be needed for scientific work after graduation, such as statistical methods. The students also learn how to collaborate with other researchers and how to develop an inquisitive mind. Following graduation, some candidates spend years in a postdoctoral fellowship focusing on precise projects in their fields of interest. Such studies help to form the foundation for future research.

This study may be criticised for not including publications from the Jamahiriya Medical Journal, Garyounis Medical Journal, or the most recent Libyan Journal of Medicine. Such exclusion was applied across the board for all the countries studied. The PubMed remains the gold standard indicator for peer reviewed work and the auditing of the scientific output of academic institutions. In addition, publications by Libyans working abroad were not included as these publications would be difficult to identify, as well as being affiliated with the institutions where they were produced. This paper's main goal is to direct attention to the presence of the problem, and to open doors for a scientific discussion among Libyan medical professionals and academics.

### Conclusion

This study highlights the low production rate of scientific medical papers from Libya in international peer reviewed journals as compared to countries such as Tunisia. This reflects negatively on the image of the country's academic institutions, academic system and academic personnel. The results may reflect the attitude and perceived importance of research in the medical academic life in Libya today. The problem highlighted by this paper needs immediate attention and action to help implement a strong role for research and publication in academic life, and the institution of correct criteria for promotion to higher academic positions.

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