

# Geographical distribution of biomedical publications from the Gulf Corporation Council countries

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### ABSTRACT

**Objective:** It was our purpose to perform a geographical analysis for the number of biomedical and clinical research publications from the six countries of the Gulf Cooperation Council over the past decade (1990-1999).

**Methods:** Medline was searched with the aid of the Internet provider PubMed. By using the advanced search option, entries were based on the country name for each of the Gulf Cooperation Council countries and the time period considered.

**Results:** The number of Medline-listed biomedical research papers published in the Gulf Cooperation Council countries over the last 10 years totaled 6,960 and increased by 14% over the past decade. The Kingdom of Saudi

Arabia followed by Kuwait was by far the most prolific and accounted for 67 and 16% of publications. The research output from the United Arab Emirates and Oman grew steadily over the past decade, while it appeared to plateau for both Bahrain and Qatar.

**Conclusion:** Taking into account that Gulf Cooperation Council countries have a relatively short history of research, the data show that the Gulf Cooperation Council countries are very prolific in terms of Medline-indexed biomedical research publications.

**Keywords:** Medline, library, publications, biomedical.

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The Arabian Gulf countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates), collectively called countries of the Gulf Cooperation Council (GCC), are a rapidly developing part of the world. Over the past few decades, these countries have seen a significant growth in health care facilities including new educational and research institutions. Medical schools in Bahrain, Kuwait and Saudi Arabia date from the seventies and in Oman and United Arab Emirates (UAE) from the mid eighties. Since the appearance of the first biomedical publication from the GCC countries in the Medline in 1982, very few studies have focussed on the evolution of biomedical research publications in these countries.<sup>1</sup>

The availability through the internet of electronic databases for biomedical publications such as Medline has greatly facilitated bibliographic studies. Monitoring of publication records, citation and impact factor studies have become increasingly popular as they provide a tool to evaluate research performance of institutions, departments or individual faculty. It was our purpose to perform a geographical analysis for the number of biomedical and clinical research publications from the GCC countries over the past 10 years (1990-1999).

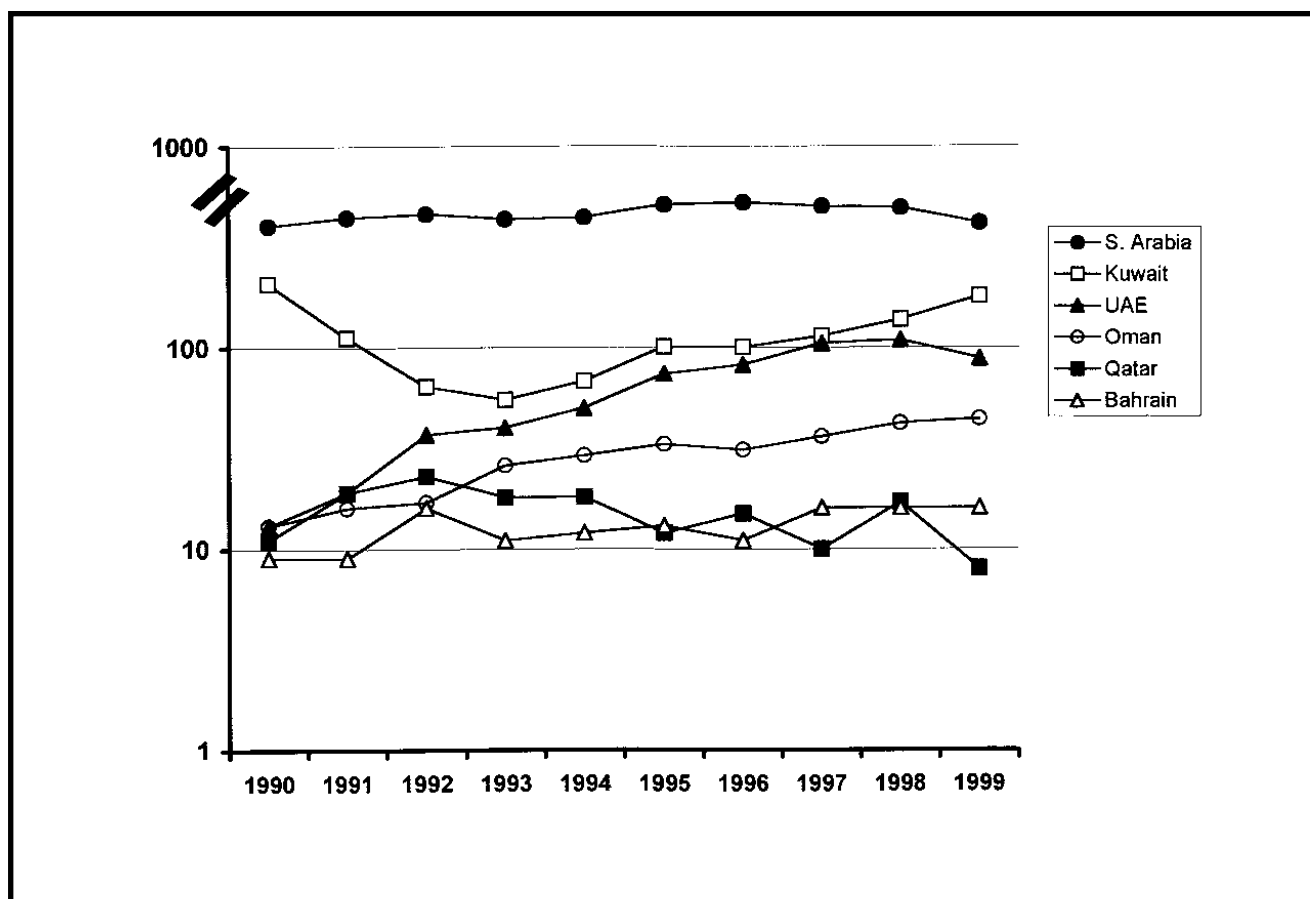
**Methods.** Medline was searched with the aid of the Internet provider PubMed in June 2000 according

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**Figure 1** - Total number of Medline publications from the six GCC countries over the past decade (1990-1999). (Note the logarithmic scale of the vertical axis).

to a previously described method.<sup>2,3</sup> Briefly, Medline searches were carried out by first selecting the advanced-search option and then entering 'affiliation' field (e.g. Qatar), then the 'Publication Date' field was added to the query. This was carried out for each GCC country over the period between January 1990 through December 1999. To evaluate the precision of our method, independent complementary Medline searches were carried out using as entries the names of all institutions (universities, major hospitals, ministries, etc.) of each of the GCC countries over the same period (1990-1999). There was a 99% match between both methods, indicating that our research method was reliable. All entries were reviewed to avoid duplications and spelling mistakes and errors in affiliation were taken into consideration.

**Results.** The number of Medline-listed biomedical research papers published in the GCC countries over the last ten years totaled 6,960. There was a 14% increase in number of publications over the past ten years. Figure 1 shows the evolution in

total number of Medline-listed biomedical research publications from the six GCC countries over the past decade. Saudi Arabia produced 67% of total biomedical publications generated by the GCC countries, followed by Kuwait accounting for 16%; UAE, 9%; Sultanate of Oman, 4%; and Qatar and Bahrain each 2%. Hence in terms of number of publications, Saudi Arabia was by far the most prolific of the six GCC countries. Taking into account minor fluctuations, its number of publications remained fairly constant over the last 10 years, and averaged 466/year. The research output from Kuwait declined dramatically in the early nineties presumably as a result of the invasion. However a major upsurge was observed over the last five years. While the number of publications in the UAE and the Sultanate of Oman grew steadily over the past decade, the output from both Bahrain and Qatar seemed to reach a plateau.

**Discussion.** On-line electronic databases for biomedical publications have become one of the major tools in bibliographic research. In our study,

Medline was preferred as a bibliographic database because it is an easily accessible database, which shows large overlap with other databases (e.g. Current Contents) for Journals targeted by researchers and clinicians in the Middle East. As previously reported, Medline was used as the single and only database. Consequently, the total number of publications were probably under-recorded by about 15%.<sup>1</sup> Another important limitation of Medline is the fact that the search occurs with respect to the first author's affiliation, and not the countries for the affiliations of all authors of a multiauthored publication. Therefore, publications originating from collaboration between institutions of the GCC and non-GCC countries, and in which the latter is the first author, are missed by Medline. In addition, no affiliation is given in Medline to "Editorials" and "Letters" (e.g. including "Research Letters" in the *Lancet*). Finally, Medline database focuses on biomedical literature and therefore does not include journals from other sciences. Furthermore, it should be emphasized that many research papers originating from the GCC countries are published in reputable peer-reviewed English-language Journals of the Middle East, which unlike their Western counterparts, are not listed in Medline. We did not evaluate these locally published journals. Despite all this, the same limitations apply for all and comparison can therefore be made on that basis.

Saudi Arabia has an established record in medical education, basic and clinical research, which explains its high research output over the past decade. In 1990, Kuwait accounted for 32% of total number of publications of the six GCC countries. In the early nineties unfortunate events had a negative impact on the publication output but an impressive upsurge in the number of publications seems to indicate that it will regain its previous level. The UAE and Sultanate of Oman have a relatively short history of biomedical research, which most likely explains the steady growth in the number of publications. Taking into account the great efforts undertaken in these two countries to stimulate research, a persistent growth in research output over the coming years is to be expected. In Qatar, the publications come

predominately from one major health center, probably accounting for the steady state in number of publications.

As pointed out before, the counts of biomedical publications reflect neither the quality of the research nor its value to the community.<sup>4</sup> A useful tool in the evaluation of quality of research is citation analysis, which refers to the number of times a particular article is cited in the biomedical literature.<sup>5</sup> However as one may realize it takes several years before a citation analysis can be provided by young institutions. Similarly, study of the impact factor of biomedical journals also provides a measure of quality. The journal impact factor provided by the Institute for Scientific Information is a ratio between citations and recent citable published items, calculated by dividing the number of all current citations of items published in a journal during the preceding two years by the number of articles published in those two years by that journal.<sup>6</sup> An evaluation of these parameters was however beyond the scope of this study.

In conclusion, taking into account that GCC countries have a relatively short history of research, the data show that the GCC countries are very prolific in terms of Medline-indexed biomedical research publications.

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