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ORIGINAL ARTICLE

Vascular surgery research in the Gulf Cooperation Council countries

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Summary *Objectives:* To evaluate the quantity and quality of published vascular surgery research articles from the Gulf Cooperation Council (GCC) countries so as to identify areas for improvement.
Design: Descriptive study.
Materials: Published MEDLINE articles on vascular surgery from the GCC countries (1960–2010).
Methods: Critical analysis of the articles.
Results: A total of 146 articles were studied, majority of which were case series/case reports (55.5%); 33% of the articles were prospective. The first author was from a university in 67.1% of the articles. Only one randomized controlled trial was found. The median (range) impact factor of the journals was 1.16 (0.16–12.64). Kuwait had the highest number of publications/country, standardized/100,000 inhabitants. There were 11 experimental studies, which were all from Kuwait. More statistically significant, experimental vascular surgery papers were published prior to 1993 (11/30 compared with 0/111 afterward, $p < 0.0001$; Fisher exact test). The GCC countries had the lowest vascular surgery research output compared with Turkey, Hong Kong, Singapore, and Japan when standardized by the population. The *h* index of the GCC countries' vascular research publications was the lowest (19) compared with the other four countries (29–97). Furthermore, the average citation of the GCC countries (5.81) was similar to Turkey (5.66), but less than Hong Kong (17.38), Singapore (12.79), and Japan (11.75).
Conclusion: The quality and quantity of vascular surgery research in the GCC countries should be improved to answer important local questions related to vascular diseases. This needs better strategic planning and more collaboration between various institutions.

Conflicts of interest: The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

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1. Introduction

Most Gulf Cooperation Council (GCC) countries have a strong developing economy and a high gross domestic product.[1] This was associated with improvements in the standards of health care. The GCC countries are United Arab Emirates (UAE), Saudi Arabia, Kuwait, Qatar, Bahrain, and Oman. The total population of the GCC countries has increased from 7.8 million in 1970 to 39.2 million in 2010.[2] With continued growth in the population, and improved health care, the percentage of the aging population is on the rise. Therefore, the GCC countries will experience an increasing burden of cardiovascular disease similar to Western countries.

In addition, the Intervention Diabetic Federation placed the GCC countries among the top 10 countries in the world having a high prevalence of diabetes. Moreover, the prevalence of obesity in the GCC countries is more than 60%.[3] The prevalence of renal failure and hypertension is also increasing. Therefore, health care providers and planners should anticipate an increase in the burden of vascular diseases in the GCC countries in the coming decades.

Local data on these diseases are important for having a successful strategic plan for management and prevention. We cannot achieve that without knowing which areas have been studied and what the quality of the vascular surgery research performed is. This will enable us to identify areas of deficiency that needed to be acted on. Furthermore, methods of improving the quality of vascular research have to be identified. We aimed in this study to analyze the areas of vascular surgery research conducted in the GCC countries and their quality as well as to identify research areas that need to be augmented.

2. Methods

A MEDLINE search of the PubMed website on vascular surgery publications from the GCC countries covering the period between 1960 and 2010 was performed in June 2011.[4] General terms used for the search were "vascular", "vessel" and "surgery", and specific GCC country names were entered. Of the 491 citations, a total of 363 relevant abstracts were retrieved, and all were reviewed manually. Papers related to cardiac surgery were excluded. A total of 154 articles were related to vascular surgery. Papers were obtained through the National Medical Library of the Faculty of Medicine and Health Sciences, UAE University. Eleven of these could not be retrieved and were studied from the abstracts.

The articles were critically analyzed and classified according to a prepared protocol developed specifically for the study. This protocol included journal of publication, country name, MEDLINE category, first authors' affiliation, year of publication, journal impact factor in 2010,[5] study design of publication, methods of data collection, area of study, area of vascular surgery, and reason(s) for exclusion of an article.

The contents of the articles were studied. Data were reviewed and analyzed by the first author (A.J.). Controversial and unclear issues were discussed between the authors and a consensus was reached to fill the form. Eight articles were excluded (Appendix 1)—seven papers had data from other countries and one paper was judged to be a Salami publication. Therefore, a total of 146 papers were analyzed. Data were coded and entered into a database.

2.1. Comparison with other Asian countries

The SCI (Web of Knowledge, all databases) was used to search for the average citation and *h* index of vascular surgery articles of the GCC countries in July 2013.[6] The *h* index is defined as the number of items, *h*, which have at least *h* citations.[7] The search included the GCC country name in different forms [e.g., UAE, Saudi Arabia (KSA)] in the affiliation section. The period was defined by the date of publication. Data of individual countries were retrieved from the citation report of the search.

The search output of all GCC countries combined together was compared with another four Asian countries, which are known to be active in medical research. These included Turkey, Singapore, Hong Kong, and Japan.

2.2. Statistical analysis

The number of publications of a specific country was standardized by the country population of 2007.[1,8] Nonparametric Fisher's exact test was used to compare categorical data of two independent groups because of the small number of the cells in the two-by-two tables.[9] A p value < 0.05 was considered significant. The following standard formula was used to calculate the 95% confidence interval (95% CI) of percentages:

$$95\%\ \mathrm{CI} = p \pm 1.96 \times \text{square root of}(pq/n)$$

where p is the studied percentage, q is the alternate percentage, and n is the sample size ($n = 146$).[10] Data were analyzed with PASW Statistics 19 (SPSS Inc., Chicago, IL, USA).

3. Results

A total of 58.2% of the articles were published during the past 10 years (Fig. 1). Kuwait had the highest number of published articles/100,000 populations followed by Qatar and Saudi Arabia (Table 1). The median (range) impact factor of these articles was 1.16 (range: 0.16—12.64) in those journals having citation reports. Majority were case series or case reports (55.5%) followed by case—control studies (9.6%) and cohort studies (9.6%). Only one randomized controlled trial was found (Table 2). Data collection was prospective in only 48 articles (32.9%). The majority was categorized by MEDLINE as original articles (69.9%), followed by case reports (21.9%; Table 3). The first author was affiliated to a university in 98 articles (67.1%), to a community hospital in 38 articles (26%), and to a military hospital in 10 articles (6.8%).

Table 4 shows the different areas of vascular research. Basic science was the leading area (18.5%), followed by diseases of the aorta (17.8%), vascular trauma (12.3%), and renal vascular access (12.3%). Table 5 shows the type of publication. The majority were treatment papers (54.1%). There were 11 (7.5%) experimental studies, which were all