

# Impact of critical care medicine publications from intensive care department at King Abdulaziz Medical City, Riyadh in the last two decades

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## ABSTRACT

**Introduction:** The volume and quality of biomedical research publications from an institution are considered adequate indicators of the quality of medical care in that institute. King Abdulaziz Medical City (KAMC), Riyadh, Kingdom of Saudi Arabia (KSA), is one of the oldest and most distinguished medical centers in the country. **Methods:** In this study, we analyzed the number of publications from the Critical Care Unit of the hospital in the past two decades, from 1996 to 2016. The research publications were evaluated on various parameters. Moreover, the impact of their study on global medicine was determined. **Results:** Our results indicate a steady progression in the number of publications from the institute in the past two decades. An average of 17.3 papers was published each year during this time. Out of the 283 publications from KAMC included in this study, the majority of the publications were original articles, 61 were review articles, 66 were multicenter trial studies and 28 were randomized control trials. The citation profile of the publications was good indicating global impact of the studies. **Conclusion:** The global impact of research as evaluated through published manuscripts in KAMC is overall good. This was deduced from both the increase in the number of publications each year and also the quality of papers as evidenced by the citation index of the papers published between 1996 and 2016.

**Keywords:** Critical care medicine, intensive care, publications, research, Saudi Arabia, trial

## Introduction

Kingdom of Saudi Arabia (KSA) is the largest country in the Arabian Peninsula. Approximately the population of the country is more than 34 million.<sup>[1]</sup> The country has made remarkable advances in the field of healthcare and medical research. Saudi

Arabia today plays an important and leading role in the field of medical services in all Arab States. Higher education has expanded considerably and the rate of literacy is 97% for males and 91% for women.<sup>[1]</sup> For long-term and sustainable growth of an economy, innovation and research are essential. The emphasis on education and research by a society are considered important for economic success and progress of a country. There are about 64 universities in all. King Abdulaziz Medical City (KAMC) was established in 1983 in Riyadh by a royal decree and is a distinguished medical center providing healthcare needs with a bed capacity of more than a thousand beds.

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E-mail: aftercom@yahoo.com

Received: 24-03-2020

Revised: 25-04-2020

Accepted: 20-5-2020

Published: 30-07-2020

### Access this article online

#### Quick Response Code:



**Website:**  
www.jfmpc.com

**DOI:**  
10.4103/jfmpc.jfmpc\_440\_20

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**How to cite this article:** Alshimemeri A, Alenezi F, Alyamani L, Alsumari O, Alsulaiman F, Basham K, et al. Impact of critical care medicine publications from intensive care department at King Abdulaziz Medical City, Riyadh in the last two decades. J Family Med Prim Care 2020;9:3669-72.

The number and quality of research publications in medical sciences are considered objective measurements of the standard of medical care and advances of an institution, specialty or a country.<sup>[2]</sup> Generally, the quality of medical care is a direct indicator of the quality of research output in the institution. The volume of scientific research publications and their visibility in the global scientific field are considered key indicators of the advancement in the field by a country. This bibliometric indicator is an essential tool to quantify, judge and study the global effect of research in an institution or a country.<sup>[3]</sup> Improved indices of research in medical sciences also lead to development of the pharmacological sciences. Each country needs to invest in medical research in hospitals because the local, geographical and genetic variations across the globe and different burdens of disease that each part of the world carries. In the past few decades, the KSA has systematically invested in establishment of a large number of universities and institutes of higher research. Spending on research and development has seen a constant increase and collaborations with international universities and institutes has been encouraged.<sup>[4]</sup> Moreover, to increase the enrollment of research students, research grants and rewards have been established. All this has resulted in improved infrastructure in the field of bio-medical research. This is evident from the achievements of the research community of the country.

## Objectives

There is no current publication that has assessed the output of Intensive care Unit (ICU) publications from Saudi Arabia. In this research, we attempted to assess the research output from the critical care unit of the King Abdulaziz Medical City-Riyadh (KAMC-Riyadh). The period taken into account was from the last two decades (i.e., 1996 – 2016). The main objectives of the current study are given below:

- To identify the change or growth in the number of publications per year.
- To identify the different types of research papers published.
- To compare publications affiliated as the first author versus non-first author.
- To compare original articles from review papers.
- To recommend future directions for improvement.

## Methods

**Settings and Subjects:** This was an observational study conducted in the critical care unit of KAMC-Riyadh. An extensive Medline search for all publications appeared and indexed in midline regarding critical care publications of KAMC (January 1996-December 2016) was carried out. The inclusion criteria included that the published studies should be related to KAMC, ICU, between January 1996 and December 2016. The exclusion criteria included the studies performed before January 1996 or after December 2016.

### Methods-study design

The critical care unit was chosen as it is a facility that manages critically ill patients representing broad and varied areas of

medicine. Therefore, in its broad aspect of function, it requires ongoing research to deliver the optimal standard of care. The study design of the publications was analyzed by categorizing whether the study was retrospective or prospective, review articles, case reports or randomized control trials.

### Methods-sampling

The publication size was estimated to be more than 200. Consecutive sampling was made for the studies. The data were collected by the co-investigator after obtaining approval from KAMC, Riyadh, Saudi Arabia.

Data collectors assessed all conclusions of their assignments from the principal investigator. The principal investigator sorted the studies and provided an overview of all conclusions.

**Methods - Data Collection methods:** The publications were extracted from the MEDLINE search engine. An extensive PubMed, Medline search of all papers with mention of critical care and KAMC, Riyadh between January 1996 and December 2016 were picked and analyzed for their content.

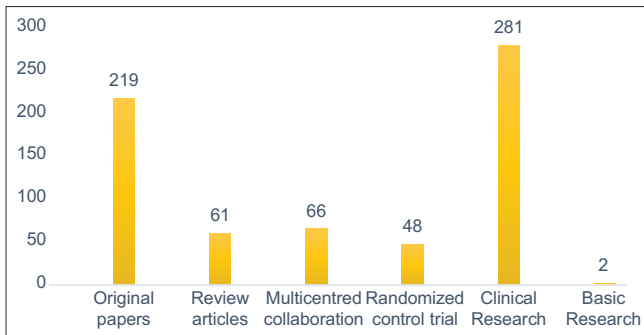
### Methods – Statistical analysis

The findings were analyzed according to the following criteria:

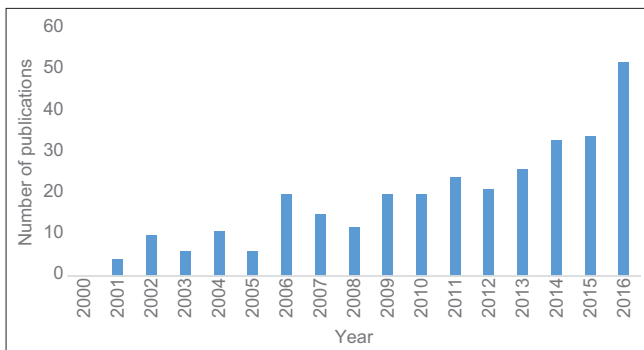
- (1) The type of work (prospective or retrospective; original article, review article or case report; clinical or laboratory based), and
- (2) The volume of publications over the time.

## Results

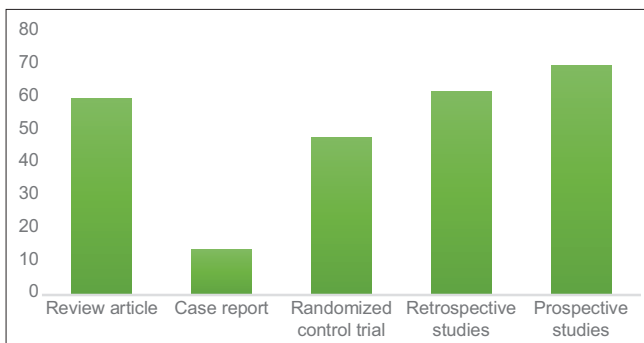
Our study found a total of 283 published papers in MEDLINE that matched our search criteria, that is, were published from the critical care unit of KAMC-Riyadh between January 1996 and December 2016. Of these 283 papers, 219 were original research papers of the authors, while 61 were review articles in different fields. The profile of the different categories of papers is shown in Figure 1. Sixty-six publications were part of a Multicenter Study. Randomized control trials accounted for 48 papers and 12 were case studies of unique cases that were encountered in the critical care unit. Of the 283 total papers included in the study, there were 281 papers from the field of clinical research while only two were in basic sciences [Figure 1]. This is as expected since the institute primarily is a medical centre. An average of 17.3 papers was published from the critical care unit of KAMC, Riyadh per year. Figure 2 gives the year-wise number of publications. A steady increase in the number of publications can be seen each year in the two decades of the study. Interestingly, no publication was reported before 2000, while a maximum of 53 research papers was published in 2016. Figure 3 describes the study design of the publications. A maximum number of published researches can be categorized as prospective studies, followed by retrospective studies and review articles. Randomized control trials and case reports made up for the rest of the study design of the publications.



**Figure 1:** Distribution of the total 283 publications during 1996-2016 into various types



**Figure 2:** Year-wise breakdown of the total number of publications in the past two decades from KAMC



**Figure 3:** The study design of the papers published from KAMC during 1996-2016

## Discussion

To understand the depth of research and its effect at a global level, analysis of bibliometric indicators are considered essential. These indicators take into account the number of publications and their visibility in global science. Measuring the research output is also important for deciding future strategies and plan of action.<sup>[4]</sup> Our results on the critical care unit of KAMC showed that there was a significant increase in number of publications each year. For example, in 2010, the total number of publications was 20 papers, but in 2016, the number of publications increased to 53 papers. With regards of the type of studies, it was found that 66 papers were Multicenter, and 48 were Randomized Controlled Trial. Most of the publications were from the field of Medicine, Public Health and Oncology. Out of the total 283 publications

included in the study, a high number of 219 were found to be those documenting the original work and research in the KAMC. Thus, it can be summarized that the quality of medical research in the institute is optimum as proven by publication of its work in peer reviewed journals. Maximum collaborations were with United States of America (USA) followed by United Kingdom (UK), Egypt and Canada. Some of the papers published from the critical care unit were also included in international guidelines.<sup>[5,6]</sup> A number of publications have discussed the quality of biomedical research and productivity in the country and most of these reported a similar trend, these include trials and original research papers,<sup>[7-12]</sup> as well as reviews.<sup>[13-16]</sup> A high number of randomized control trials were also published. The citation index of the publications was also found to be high. Two recent international multicenter, randomized control trials have been published very recently in New England Journal of Medicine which the Critical Care Unit of KAMC, Riyadh is also a partner. In the first such study, the aim was to study the effect of intermittent adjunctive pneumatic compression that reduces deep vein thrombosis in critically ill patients compared to pharmacologic thromboprophylaxis therapy alone. The study found that adjunctive intermittent pneumatic compression did not result in the lowered incidence of deep vein thrombosis.<sup>[17]</sup> Another recent multicenter randomized control trial, of which KAMC was also a part was published in New England Journal of Medicine. The study aimed to study the effect of hydrocortisone in patients with septic shock. In this international trial of 3800 patients, the authors found that hydrocortisone therapy did not result in the improvement of mortality in patients.<sup>[18]</sup> The above two papers prove that the center is a part of prestigious and impactful international collaborations. Overall, the quality and quantity of research in KAMC, Riyadh has improved in the past two decades and is following its distinguished stature as the top destination for medical treatment and research. Also, with regards to the medical field, in general, such studies are important to evaluate the current status of medical practise locally and compare it with the international practise. Moreover, there is an increase demand and cost for healthcare services especially in the intensive care; thus it is important to invest in other fields such as primary care to reduce both demand and cost. The incentives taken up by the country to enhance biomedical research output is now visible. The main limitation that the authors report of this study is inadequate data as to the exact citation value of the papers included in the study as well as the fact that there were no publications before the year 2000, according the ICU department.

## Conclusions and Recommendations

There is a direct relationship between the quality of medical care of an institution and its research quality and quantity. This is further installed in valuing that clinical research is a direct guide to improve the global standard of care and not only in an institution basis. This study aimed to analyze the different areas of research that KAMC, Riyadh intensive care unit published in the last two decades, emphasizing on the number of the annual publications, the quality and impact of these publications, using the journal

citation index and introduction in international guidelines, and the types of research designs used. This observational method of analyzing publications of an institute can be used to compare the areas heavily researched with areas that need further research and will guide future research ideas. It is recommended to conduct more studies analyzing research publications in different areas of medicine, such as family medicine. There should be continuous evaluation of the ongoing research and its impact. Meaningful research that bears on the quality of medical treatment in the institution should be given preference. Further studies required to analyze the funds and strategy, training and planning of the institute to further bolster the research environment.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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