

Report

Critical care medicine in Saudi Arabia

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طب الرعاية الحرجة في المملكة العربية السعودية

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الخلاصة: لا يزال طب الرعاية الحرجة يتسم بالقصور في العديد من بلدان العالم. وقد حدثت تطورات رئيسية في المملكة العربية السعودية خلال العقدين أو العقود الثلاثة الماضية. وتستهدف هذه الدراسة إلقاء الضوء على الوضع الراهن لممارسة الرعاية الحرجة (بما في ذلك الخدمات المقدمة في موسم الحج)، والتدريب المقدم في المملكة العربية السعودية، وذلك باستخدام أمثلة من مستشفيات الرعاية الأولية والثانوية والثالثية. كما تتناول هذه الدراسة الاحتياجات المستقبلية لطب الرعاية الحرجة.

ABSTRACT Critical care medicine remains underdeveloped in many parts of the world. In Saudi Arabia, there have been major developments in the past 2–3 decades. The purpose of this review is to give an account of the current status of critical care practice (including services provided during the haj season) and training in Saudi Arabia using examples of primary, secondary and tertiary care hospitals. The future needs of the profession are also addressed.

La médecine de réanimation en Arabie saoudite

RÉSUMÉ La médecine de réanimation n'est toujours pas assez développée dans de nombreuses parties du monde. En Arabie saoudite, il y a eu une évolution majeure au cours des 2 ou 3 dernières décennies. L'objet de cette étude est de donner un aperçu de la situation actuelle concernant la pratique des soins intensifs, y compris les services fournis pendant la saison du Hadj (pèlerinage à la Mecque), et la formation en Arabie saoudite à l'aide d'exemples d'hôpitaux de soins primaires, secondaires et tertiaires. Les besoins futurs de la profession sont également abordés.

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Introduction

Although critical care medicine is evolving rapidly, considering the technological advances, the high expense and the need for highly qualified manpower, this field remains underdeveloped in many parts of the world. In Saudi Arabia, critical care medicine has recently witnessed major developments, driven by a number of factors including the growth in the specialty internationally and the local introduction of advanced therapies and surgeries that require a high level of critical care.

There are limited accounts in the literature describing critical care services in countries of the Eastern Mediterranean Region although descriptive reports have been published about critical care in other parts of the world [1–5]. The purpose of this report is to provide some insights into the current status of critical care practice in Saudi Arabia, including critical care services provided during the haj season, and to provide some indication of the prospective needs of the profession.

The organization of critical care services in Saudi Arabia

According to the 1999 statistics, the population of Saudi Arabia is 21 million, with gross domestic product \$US 13 019 per capita, of which 5.3% is spent on health [6]. Up to 79% of the health care expenditure is governmental [7]. The number of hospitals in the country is 314 with 45 729 beds and close to 2 million admissions per year [6]. Statistics about critical care services do not exist. The structure and the function of ICUs vary considerably between hospitals. Table 1 describes services in the ICUs in 3 selected hospitals in the Central Region. These hospitals are examples of the 3 different levels of health care. Primary care hospitals

(exemplified by Rowaidat Al-Ardh Hospital,) have small ICUs with limited equipment. The medical and nursing staff have some ICU background but usually no formal training or certification. Secondary care hospitals (such as Wadi Al-Dawaser Hospital) are found typically in small cities and have larger and better-equipped ICUs. They often have intensivist coverage but most are open, i.e. the care of the patient is delivered by non-ICU physicians. Tertiary care hospitals (such as King Abdulaziz Medical City) typically have multiple specialized, well-equipped ICUs. Most of these ICUs are closed and run by intensivists certified by a North American or European critical care medical board. Nurses are ICU trained, frequently with North American or European qualifications, and nurse:patient ratios are close to 1:1. As a prototype of tertiary care hospitals, King Abdulaziz Medical City also has a unique arrangement in which the medical coverage is provided by a critical care board-certified consultant intensivist on-site 24 hours a day, 7 days a week.

Disease profile and outcomes

National statistics on profiles of ICU admission are lacking so far in Saudi Arabia. In King Abdulaziz Medical City, a prospective ICU admission database has been maintained since 1997. It is the largest ICU database in the region. It incorporates standard measures of severity of illness such as Acute Physiology and Chronic Health Evaluation (APACHE) II [8], Simplified Acute Physiology Score (SAPS) II [9] and Injury Severity Score (ISS) [10,11]. As a measure of quality of care, predicted hospital performance is calculated using several systems, including, in addition to APACHE II and SAPS II, the Mortality Probability Models (MPM) II₀ and II₂₄ [12]. A full description of these systems, includ-

Table 1 Critical care services at 3 selected hospitals from the Central Region in Saudi Arabia

Variable	Hospital		
	Rowaidat Al-Ardh Hospital, Rowaidat Al-Ardh	Wadi Al-Dawaser Hospital, Wadi Al-Dawaser	King Abdulaziz Medical City, Riyadh
Level ^a	Primary	Secondary	Tertiary
No. hospital beds	30	96	800
Type of ICU (No. ICU beds)	General (2)	General (5) Neonatal (7)	Medical-surgical ICU (21) Burns (8) Neonatal (19) Paediatric (6) Paediatric cardiac (6) Coronary care (9) Cardiovascular (9) Adult step-down (8) Liver step-down (2) Intermediate care nursery(28)
Medical director	None	Part-time; no critical care certification	Full-time, critical care certified ^a
Medical staffing	No special ICU medical staff; patients cared for by primary care doctors	3 intensivists	10 full-time, critical care certified consultants ^a
Certified in critical care (%)	0	0	100 ^a
Coverage type	Open unit	Open unit	Closed unit ^a
No. of nurses	3	6	102 ^a
Nursing training	1 month ICU training	ICU experience	70% critical care certified; 30% have minimum of 2 years ICU experience ^a
Respiratory therapy	None	None	Established respiratory care department ^a
No. of ventilators	2	6	100
Daytime cover	Primary doctors	ICU doctors	24-hour cover by on-site consultant; residents and fellows also on-call ^a
Night-time & weekend cover	Hospital on-call registrar	Off-site	

^aThese data refer to the medical-surgical ICU.

ing 1 assessing their validity in a Saudi Arabian ICU, can be found in a number of reports, [8,12,13]. Table 2 gives details of admissions at King Abdulaziz Medical City during the period March 1999–February 2003. Among the medical admissions, complications of cirrhosis represent a relatively

common reason for admission, with high mortality [13]. Trauma is another serious problem in Saudi Arabia as the incidence of motor vehicle accidents is among the highest in the world [14].

Cost of critical care

Exact figures for the costs of caring for the critically ill do not exist in Saudi Arabia: most developed ICUs are government-owned and cost is not calculated for individual patients. However, estimates give an average of US\$ 1200–1500/day.

The multicultural environment

While there is active training of national professionals in the field of critical care, the process is outpaced by the very high demands. To alleviate the shortage, professionals have been recruited from different countries, leading to a multicultural team. For example, in the ICU at King Abdulaziz Medical City, the medical staff is from 5 different nationalities and the nursing staff from 13 different nationalities. This mixture poses challenges to the delivery of critical care related to language barriers and cultural and educational differences. On the other hand, it provides an excellent environment for exchanging experiences.

Critical care services during the haj season

Saudi Arabia hosts the annual Islamic Pilgrimage (haj) in Mecca. The nearly 2 million pilgrims come from more than 100 countries [7]. Provision of health care has to meet the needs of a very large number of people gathering at one time in specific places. In addition, overcrowding increases the risk for casualties from trauma and communicable diseases. Heatstroke is a specific concern when haj occurs during the summer as the temperature may exceed 50 °C (the date of haj follows the lunar

Table 2 Admission details, King Abdulaziz Medical City ICU (tertiary care), March 1999–February 2003

Variable	Value
No. of admissions	2936
Mean age [years (SD)]	50 (24)
Sex [No. (%)]	
Male	1769 (60)
Female	1167 (40)
Type of admission [No. (%)]	
Medical	1713 (60)
Post-operative	674 (23)
Trauma	479 (17)
Chronic underlying disease (%)	
Cirrhosis	12
Cardiovascular	5
Respiratory	
Renal	6
Immunosuppression	9
APACHE II, mean (SD)	21 (10)
SAPS II, mean (SD)	41 (20)
ISS, trauma patients, mean (SD)	29 (13)
ICU mortality ^a (%)	21
Hospital mortality ^a [% (95% CI)]	31 (29–33)
Predicted mortality ^a (%)	
MPM II0	33
SAPS II	32
APACHE II	36
MPM II24	37

^aMortality figures are given after excluding burns, re-admissions and brain dead patients.

SD = standard deviation; CI = confidence interval.

APACHE II = acute physiology and chronic health evaluation II score.

SAPS II = simplified acute physiology score II.

MPM = mortality probability model.

ISS = injury severity score.

calendar and therefore moves 11 days backwards on the Gregorian calendar every year).

To meet these challenges, the government mobilizes large resources to these areas during the haj season. The Ministry of Health has 14 permanent hospitals and 7 seasonal hospitals in the haj area, with a total of 5185 beds [7]. Other government sectors, such as the National Guard and the Armed Forces have additional facilities. In these hospitals, ICUs are well represented—up to 30% of hospital beds—reflecting the great demand for this service. To meet the increased needs, health care professionals are mobilized from all over the country and others are recruited from abroad. All ICUs during the haj are run as closed units with 24-hour on-site intensivist coverage. For the management of heatstroke, hospitals are equipped with special cooling units (Mecca body-cooling units). Based on the available statistics from 1990–1999, the incidence of heatstroke peaked at 1174 cases in 1 day, the day of Arafat of 1412 AH (June 10, 1992), compared with 9 cases in 1419 AH (March 26, 1999) [6].

Professional organization, training and research

So far, there is no national organization for critical care in Saudi Arabia. However, citywide ICU clubs have been established to serve as professional forums to discuss clinical cases and local research.

Active steps are being taken in training physicians in critical care through

government scholarships to countries where the discipline is more developed and through the establishment of local fellowship programmes, 3 of which are currently operating in the capital, Riyadh.

In addition, training courses such as Advanced Cardiac Life Support, Advanced Trauma Life Support, the Fundamental Critical Care Support course, and others are given regularly throughout the country.

More emphasis is being placed on critical care research. Heatstroke research emerging from Saudi Arabia is well represented in the medical literature [15–17]. Other areas of research include mortality prediction outcome studies [18,19], end-of-life issues [20–22] and resource utilization [23,24].

The way forward

Critical care in Saudi Arabia has the elements needed for success. In fact, the performance of some of the tertiary care ICUs parallels that of similar units in industrialized countries. However, there is still more to be done. Forming a professional national critical care organization is urgently needed to establish practice standards. Research is fundamental in the process of development. Continuous education of those working in remote areas is essential to ensure that their practice is up to standard. It is the duty of qualified intensivists to spread their experience and raise the level of practice, a responsibility that should never be underestimated.

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