

Reference:

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TITLE:

AN AUDIT OF INTENSIVE CARE SERVICES IN SRI LANKA

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ABSTRACT

Objective

To survey the facilities, functioning characteristics, bed strength, manpower, operational practices and the distribution of the Intensive Care Units of Government Hospitals in Sri Lanka

Design

A cross sectional observational study

Method

Direct interview of the sister or the nurse in charge of each unit via telephone using a structured questionnaire.

Setting

Department of Anaesthesiology, Faculty of Medicine, University of Peradeniya

Study population

All intensive care units of the government hospitals in Sri Lanka

Measurements

Bed strength, facilities, functioning characteristics, manpower and equipment

Results

52 intensive care units were identified in the island. Two units were not contactable by telephone. One refused to participate. Of the 49 ICUs studied 28 (57.1%) were located in Teaching hospitals, 6 (12.2%) in provincial hospitals 13 (26.5%) in base hospitals and 2 (4.1%) in special hospitals. 25 (51%) of the 49 ICU's were multidisciplinary, 3 (6.1%) general medical, 4 (8.2%) general surgical and the remainder were of medical, surgical and paediatric subspecialties. The minimum acceptable standard of a ventilator: bed ratio of 1:1 was seen in 28 (57%) and a nurse: bed ratio of 1:1 was seen in 37 (75.5%) intensive care units. A 24-hour resident medical officer was available in 46 (93.9%) of the 49 ICUs studied. ICUs are mostly located in larger cities. The lowest ICU coverage i.e. one ICU for approximately 1.2 million population was seen in the Uva Province.

Conclusions

ICUs in Sri Lanka are mainly located in teaching hospitals. The standards and management strategies vary widely.

INTRODUCTION

Intensive Care has emerged as a distinct specialty in the world over the last 3-4 decades (1). The original concept of the nursing legend Florence Nightingale of rounding up all seriously ill patients in hospital matured to become recovery units for postoperative care in early 1950's. The importance of mechanical ventilation was mostly realized in the polio epidemic in Copenhagen in 1952 where the mortality rates reduced from 90% to 40% following its introduction (2). This gradually led to the recognition of the importance of close monitoring and vital function support in the treatment of life threatening diseases. i.e. the benefits of intensive care.

The information on intensive care services in Sri Lanka is scarce. Several studies have looked into disease patterns and regional patterns (3) but this has not been extended to the whole island. Comparative studies in other countries have looked into services provided and improvements in outcome (4). The adequacy of medical and nursing staff (2) (5) therapeutic interventions and clinical outcome among patients (6) (7) have been studied extensively to provide recommendations.

Intensive Care is not only a medically important arena but is also a politically sensitive issue especially because of the costs involved for its maintenance and the public demand for this service. Although, it is recommended that 15% of total bed strength of hospitals should be equipped for critical care, most countries have provision for only 1-2% of their total bed strength for critical care. In Sri Lanka, the bed availability is substantially low, perhaps below 1% and there is no governing body or a planning institute that scrutinizes the standards of such units. The quality of care is directly related to manpower and equipment as shown by previously mentioned studies. A critical self-analysis of intensive care services in our country is therefore needed before considering management changes to improve patient outcome. This was the objective of our study.

METHODOLOGY

We surveyed all labelled intensive care units in this country in the context of their facilities and functioning characteristics. A structured data form was utilized to obtain relevant information from the sister or nurse in charge of each unit over a telephone interview. All ICUs in government hospitals were traced by tracking patient transfer pattern from one hospital to another. Each province was covered including north and east. Non-functional or closed units were excluded. Data collection was completed within a 2-week period in November 2002 and was analyzed using SPSS computer software.

The facilities available were calculated based and compared on accepted minimum standards for intensive care in general (8). For example, a nurse: bed ratio of 1:1 was calculated as such if there were 4 nurses allocated for the ICU for each bed as this was the requirement for one nurse to be able to cover one bed 24 hours a day, 7 days a week. The distribution of ICUs in the nine provinces of the island was analyzed and their service burden was expressed as a ratio against population. The population statistics were obtained from the 2001 Sri Lanka population census.

RESULTS

A total of fifty-two units were identified in the island. Two units were not contactable over the telephone during the study period and one unit refused to provide information. Of the 49 ICUs studied 28 (57.1%) were located in Teaching hospitals, 6 (12.2%) in provincial hospitals, 13 (26.5%) in base hospitals and 2 (4.1%) in special hospitals (figure 1). The mean bed strength of an ICU was 5.78 (SD 3.5).

25 (51%) of the 49 centers were multidisciplinary, 3 (6.1%) were general medical, 4 (8.2%) general surgical and the remaining units were that of medical, surgical and pediatric subspecialties (figure 2). Anesthesiologists constituted the consultants in charge in 27 (55.1%), Physicians and Pediatricians were in charge of 6 units (12.2 %) each. Combined specialty administration was seen in another 6 (12.2%) units and in the remaining 4 units the specialty in charge was unclear.

A predominant team management of patients was seen in 40 (81.6%) stations. A ventilator:bed ratio of 1:1 or more was seen in 26 (53%) units and a nurse:bed ratio of 1:1 or more was seen in 37 (75.5 %) units. In the remaining units there were no sufficient number of ventilators to cover for each bed and one nurse supervised more than one bed at a time. A 24-hour resident medical officer was available in 46 (93.9%) units. A blood gas analyzer was available in 35 units (71%) and a defibrillator in 45 (92%) units. A pulse oximeter for each bed was available in 18 units i.e. pulse oximeter: bed ratio of 1:1 or above in 37% ICUs. A bedside ECG monitor was available for each bed in 30 (61%) of the ICUs.

The locations of ICUs were plotted by district on the Sri Lankan map (Figure 3). The most number of ICUs were located in the main cities of the country i.e. Colombo, Kandy and Galle respectively. However, lowest population burden per ICU was noted in Western and North Central provinces whereas the highest population burden per ICU was noted in the Uva and Sabaragamuwa provinces (Table 1).

DISCUSSION

The findings in this audit demonstrate for the first time the status of critical care facilities in Sri Lanka and more importantly the areas needing improvement. We found that the distribution of ICUs are in parallel with other health care facilities in the country and are concentrated mostly around Colombo, Galle and Kandy cities thus creating a situation for long and difficult transfer of patients requiring critical care services from the peripheries. Most ICUs were located in teaching hospitals, with the “luxury” of several specialized ICUs in each hospital. These units often had an input from multiple specialties and easy access for advanced investigations such as CT scanning or nuclear imaging. Historically the two most important milestones in critical care that made a significant impact on morbidity and mortality i.e. 24 hours resident medical officer and a nurse:bed ratio of 1:1, was unfortunately not a feature seen in all our ICUs. The minimum monitoring standards today require an oximeter, ECG monitor at the bedside of each patient even in a high dependency unit (9). Unfortunately only one third of our labeled ICUs had facilities to fulfill this need. This implies that in the remaining ICUs monitoring equipment was shared between patients inevitably leading to interruptions in continuous monitoring and increasing the risk of cross infection.

The average bed strength of our ICUs falls well within the recommend range of 4-8 (10). The bed occupancy however was not assessed in this study and it is recommended to be approximately 70% with the capability of accommodating 95% of emergency requests for admission. Most of the ICUs in Sri Lanka are multidisciplinary stations (51%) managing medical, surgical, obstetrics and gynecology and pediatric patients. Units dedicated to one major discipline were less common and were mainly managed by a team comprising of primary care consultant physician, surgeon and/or anesthesiologists. One third of our ICUs were highly specialized for neurosurgical, neurological, coronary, cardio thoracic and neonatal care. Although current evidence support 'closed' versus 'open' ICUs in the context of better outcomes for patients (11) (12), 'open' policies were operational in the majority of our intensive care units. An open ICU has unlimited access to multiple doctors who are free to admit and manage their patients. A closed ICU has admission, discharge and referral policies under the control of intensivists. Improved cost benefits are likely with a closed ICU, and patient outcome may be better, especially if the intensivists have full clinical responsibilities (8). Our inability to host closed ICU's in this country is a simple reflection of the non-availability of a sufficient number of medical and nursing specialists in intensive care.

Ventilator: bed ratio was 1:1 in the majority of stations and only 10% of units had 1 ventilator for more than 2 beds. These units were mainly coronary care and pediatric (including neonatal) units. Pulse oximeter: bed ratio of 1:1 was seen only in 40% of units and in others the number available was less than the number of beds creating a need for inevitable sharing with increased risk of cross infection and interruptions for continuous monitoring.

There was one ICU for 20,000 populations in the Western province whereas in Uva one ICU had to cater for 6 times that population i.e. for 1.2 million. Thus, there is an obvious misdistribution of Intensive Care services in the country.

CONCLUSION

ICU's in Sri Lanka are mainly located in teaching hospitals. There is a clear variability in the standards and operational practices island wide and also a misdistribution of services. Some of the labeled ICUs do not meet even the standards of a high dependency unit. A regulator for the maintenance of standards is essential.

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Station Type

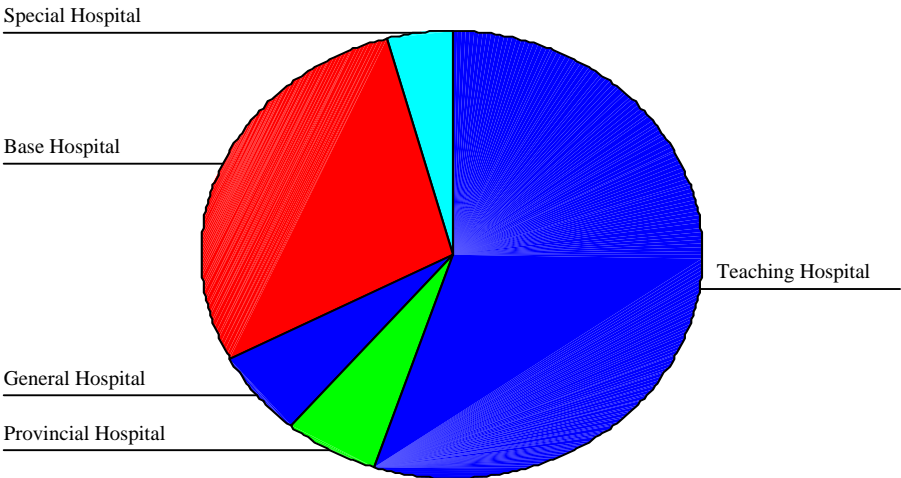


Figure 1 The category of hospitals in which intensive care units were hosted (Teaching hospitals are tertiary referral centers, general hospitals are regional referral units, provincial and base hospitals are at local level and special hospital cater for designated subspecialties.)

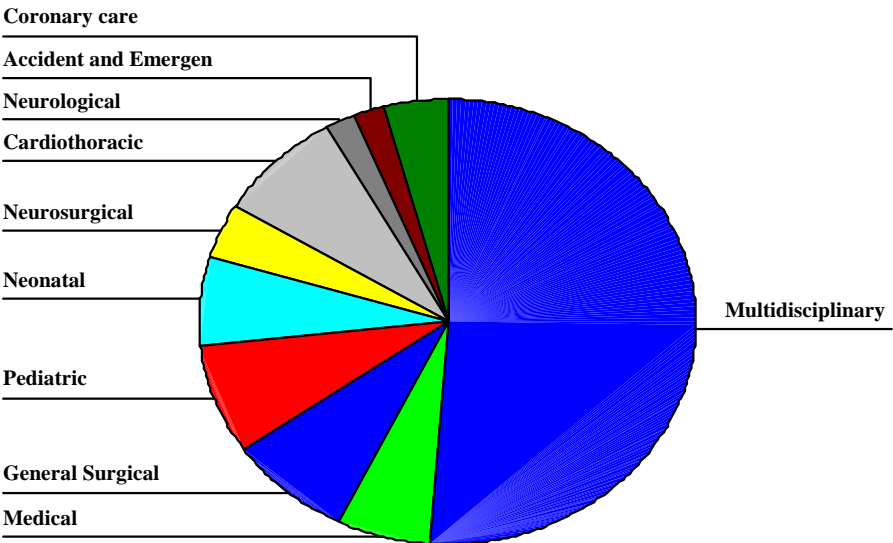


Figure 2 The type of Intensive care unit

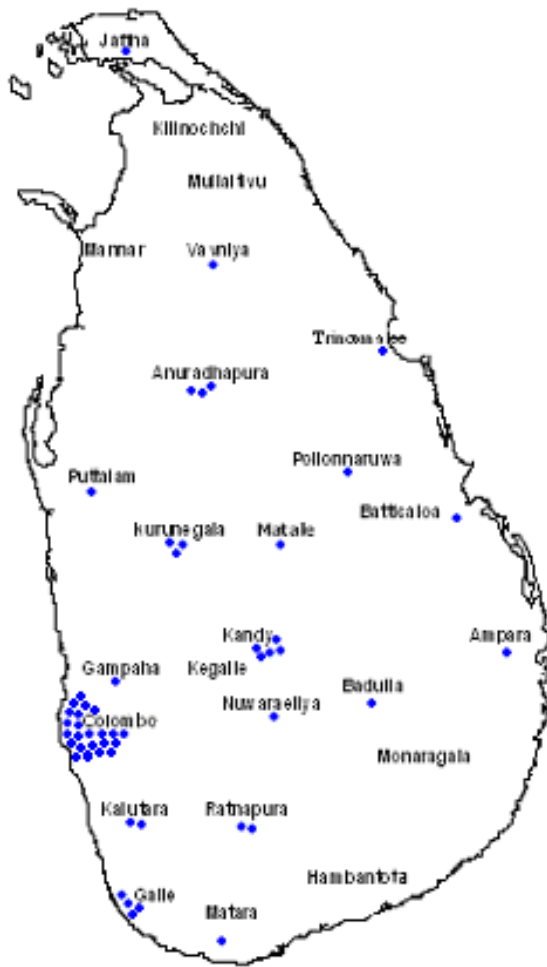


Figure 3 The locations of ICUs by district: each dot represents one ICU

Table 1 The distribution of ICUs in Sri Lanka by province and the population burden per ICU in each district

Province	Population	No of ICUs	Population/ ICU Ratio
Western	5,361,185	26	206199
North Central	1,105,663	4	276415
Central	2,414,973	7	344996
North Western	2,157,711	5	431542
Southern	2,277,145	5	455429
Northern	1,040,963	2	520481
Eastern	1,415,949	2	707974
Sabaragamuwa	1,787,938	2	893969
Uva	1,170,728	1	1170728