RESEARCH ARTICLE

HOW CAN WE IMPROVE OUR CRITICAL CARE SERVICES?

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ABSTRACT

The "optimisation of recovery" is the therapeutic mission of critical care medicine. The goal is not merely "survival". The mortality rate or its reduction alone is not a robust indicator of the country's quality of critical care service. The morbidity matters most. We review here the basic principles of critical care associated with its historical milestones and measures undertaken by communities worldwide to enhance cost-effectiveness by adopting suitable education models that cater to the escalating demand.

KEYWORDS

critical care, optimisation of recovery, medicine

1. INTRODUCTION

The "optimisation of recovery" is the therapeutic mission of critical care medicine. The goal is not merely "survival". Therefore, the mortality rate or its reduction alone is not a robust indicator of the country's quality of critical care service. The morbidity matters most. We review here the basic principles of critical care associated with its historical milestones and measures undertaken by communities worldwide to enhance cost-effectiveness by adopting suitable education models that cater to the escalating demand.

2. REVIEW

Any organ injury that leads to organ failure results in 'critical' illness irrespective of the cause. If we do not or are unable to support the failing organ function adequately, the situation becomes lethal. The quest to improve survival and the overall outcomes led to the development of Critical Care as a speciality. Critical illnesses denote a status in which the individual has exhausted virtually all his/her compensatory capacity. Therefore critical care has become a health care delivery process that encompasses highly skilled providers on-site 24/7, critical care specialist doctors and nurses, physiotherapists, pharmacists, and ancillary staff. They provide immediate and continued assistance to rectify mishaps in vital functions and restore its support. Delays in recognition or rectification of mishaps can be lethal. Thus, Critical Care Medicine is the 'bridge' that sustains life until organ failure self resolves, or definitive treatment takes control or both until the returning organ functions are sufficiently robust to allow independence. The care is, therefore, multidisciplinary and complex.

Critical care embodies more than a collection of therapies. Therefore, Critical Care Medicine needs an organisational framework designed to balance conflicting treatments whilst promoting the safe and efficient

application of appropriate and individualised care without delay and errors. The referring specialists should continuously work with critical care specialists to resolve the original insult and its implications during this 'borrowed' time in life. In most cases, natural recovery is expected. The denominators of good critical care practice include clinical effectiveness and many other aspects of care such as patient and staff safety, care process experience and service environment, including family access (Cappellini et al. 2014).

In most developed countries, critical care specialists undergo an independent, comprehensive competency-based clinical training program with residential skill acquisition on the job. Skills training under pressure and benefits patients too, as trainee competencies at the intermediate level contribute to the quality of care delivered and improve patient outcomes (Yamashita et al., 2013). Training of such teams can be simulation-based (Frengley et al., 2011). Lack of a clear career pathway, supportive education, and poor work patterns demoralise dedicated trainee doctors and nurses, leading to burnout syndrome (Cogin et al., 2016). Some desert their jobs, causing a significant negative impact on critical care service development (Salas et al., 2009; Moss et al., 2016).

Unfortunately, some developing countries, particularly in Asia, have wasted time debating whether critical care is a 'supra' or a 'sub' speciality, without realising the importance of promoting skill training of doctors and nurses in sufficient numbers using the multidisciplinary resources available (De Lange et al., 2002; Arabi et al., 2016). Such dedicated multidisciplinary training is fundamental for establishing true critical care specialists. Remote ICU systems or doctors providing surveillance alone using telemedicine cannot substitute the necessity of competent and vigilant doctors and nurses at the bedside (Goran, 2010). The recognition and rectification of the abnormalities in a critically ill individual is urgent and paramount to improving outcomes.

The key to accepting critical care as a speciality in a country also lies with

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the practising critical care clinicians themselves. Their knowledge, skills, attitude, and ability to lead a team with mutual respect to the clinical opinions of respective colleagues directly involved are essential. Thus, specialised training is essential and long understood (Brilli et al., 2001). Further, a commitment for equality in serving the patients in need based on an ethical rationing process is a must for its sustainability, especially in resource-limited settings with the shortage of ICU beds. Today, the roles of the critical care specialist extend beyond the walls of the intensive care unit. The therapy goals have moved to improve the survival of patients to minimise their need for admission or re-admission to intensive care and reduce the duration of stay in ICU through safe, effective, timely and efficient supportive care. These practices should follow the modern principles of patient-centred care that directly involve the patient and relatives in the process (Kitson et al., 2013).

Good critical care service is also fundamental to assist other specialities institute high-end therapies in a country to uplift its service standards. For example, it is futile to embark on an organ transplant programme to save the lives of patients with severe heart or liver disease unless the critical care setup is sufficiently robust to deal with their perioperative supportive care needs. The ability to adapt and self-manage determines a country's 'health' status (Huber et al., 2011). Critical care training is capacity building in this context, and critical care education is a must (Geiling et al., 2014).

It is also prudent that critical care specialists are committed full-time to the critical care service and not overlook this as a sub-speciality whilst catering full-time to a significant speciality elsewhere such as anaesthesia or internal medicine (Brilli et al., 2001). Dual speciality commitment that embraces the 'open ICU' concept is outdated (Multz et al., 1998). There is a need to move away from this outdated model of dual commitment, a practice prevalent in developing countries. Such hybrid models that place variable emphasis on accountability and responsibility have dampened critical care advancement. The reason is that the resulting inexperience, incompetence, inaction and errors all add to increase demand and add burden for the same service making available resources stretch further, reducing its efficacy and popularity. For example, delayed detection of an obstructed airway leading to a peri-arrest in a critically ill patient may demand many more weeks of additional care, long periods of rehabilitation and ultimately a poor-quality outcome with permanent residual damage.

Therefore, critically ill patients need close monitoring, with alarms to alert staff instantly if something goes wrong. The rectification of these issues should be instant as they have no compensatory capacity, resulting in disastrous outcomes. Therefore, there is a need for specially trained nurses and doctors to be residents at the bedside all the time, both day and night, in critical care areas. Doctors and nurses with basic qualifications may not be able to expedite this standard of care needed to save lives. Thus, nurses and doctors need additional competence-based comprehensive training before managing critically ill patients. If we do not have this degree of competence available at the bedside, it is none other but patients who would sometimes suffer at the cost of their own lives.

Critical care is not a modern concept. Egyptians had documented procedures resembling tracheostomies as early as 1500 BC. Hippocrates had commenced organ support by cannulating the airway (Szmuk et al., 2008). During the Crimean War in the 1850s, Florence Nightingale separated wounded soldiers depending on the severity of their injuries to enhance resource utilisation and care, making a revolutionary step (Munro, 2010). Dr Ibsen, an anaesthetic doctor, installed manual ventilator support and respiratory care via a tracheostomy that made critical polio victims survive during the Copenhagen epidemic in 1952 (Munro, 2010). This innovation saved lives and established the world's first intensive care unit (ICU) in 1953 (Berthelsen and Cronqvist, 2003). The recognition of the need for multidisciplinary inputs during the following decades. Therefore, multidisciplinary or intercollegiate boards were established to upgrade and streamline their training pathways (Soni and Wyncoll, 1999; Bion and Evans 2011). Today, critical care has grown into a speciality in its own right.

The fundamental focus was on competence-based training (Fletcher and Cuthbertson 2010; Myburgh, 2017). Moving towards such training is the ownership of all health care professionals in a country (Frenk et al., 2010). Critical care medicine has evolved on the principle that patients with serious illnesses are better managed when grouped to a separate area and treated by a dedicated team of healthcare providers. This collaboration has promoted resource sharing, both supplies, facilities and workforce. Most countries in the developed world installed dedicated critical care training programs that produced critical care, competent doctors and

nurses, as a foundation promoting the efficient and cost-effective 'closed' intensive care practice (Brilli et al., 2001; Multz et al., 1998).

It has not stopped there. The role of intensive care has also rapidly expanded over the last 20 years, expanding critical care staff involvement within the ICU and on general wards before and after discharge (Bamgbade, 2002). "Critical care without walls" was the theory applied to this idea, whereby critical care trained doctors and nurses offered their help and expertise to those who are acutely unwell on the ward, promoting 'team care' as the optimal model and 'prevention' as the mission (Mercer and Robinson 2010; Hillman 2002; Pronovost et al., 2006). The purpose was to recognise deteriorating patients and institute therapies early or support the continued recovery of previously critically ill patients and share critical care expertise and experience. Today, they play an all-important preventative role in managing critical illness. Early recognition and management of deteriorating patients reduces individual patient morbidity and mortality and reduces the unnecessary burden on health systems and is the most effective form of critical care therapy to ensure the best outcomes (Molina et al., 2014; Santamaria et al., 2010).

Multidisciplinary teams, consisting of experienced staff trained in intensive care, provide this critical care outreach service, including the installation of early warning systems (EWS) (McGaughey et al., 2007; Rowe and Fletcher, 2010). The National Institute for Clinical Excellence (NICE) recommended that all hospitals should have a physiological "track and trigger" system, with multiple or aggregated weighted Scoring systems that allow a graded response. The evidence to support the best EWS model is still evolving (McGaughey et al., 2007). In this era of ever-increasing demand far exceeding the facilities available, perhaps, our focus should move to identify those patients who are likely to benefit from critical care rather than those who are likely to die (Fletcher and Cuthbertson, 2010). Such rationing processes will have to be built locally considering the prevailing diversity in disease patterns, resources and cultural aspirations even within the same country.

Intensive care units, rapid response teams and patient at risk services do not develop simply by appointing a director, placing a placard on the door, and expecting staff to have the necessary skills and training to provide quality acute care. Recognising this need, highly focussed critical care subspecialties and their training pathways have emerged beyond the core competencies. Critical care sub-specialties have emerged (CoBaTr et al., 2006). Dedicated critical care services for cardiology, neuroscience, hepatology, nephrology, paediatrics etc now exist and the lack of it is criticised (Morrow et al., 2012; Kaplan and Shaw 2011; Mirski et al., 2001; Bernal et al., 2008; Ronco, 2004; LaRovere et al., 2013). Effective quality service requires a concerted effort to develop health professionals' knowledge, skills and attitudes to recognise and manage critically ill patients.

There are many approaches to the six-year postgraduate critical care training programs through interventions targeted at low resource settings (Bevan et al., 2014; Haniffa et al., 2017). Full fellowship or postgraduate university training pathways are complex to develop and maintain, and therefore beyond the ability of an individual unit to organise. Thus, critical care training, especially in developing countries, should be in the national domain, collaborating between educational institutions. Short course education programs such as the Basic Assessment and Support in Intensive Care (BASIC) courses can be organised (Douglas et al., 2010). BASIC courses are a pragmatic way to enhance multidisciplinary intensive acute care education and have been run successfully in Sri Lanka for the last decade. The absence of a license fee for the BASIC curriculum makes the course financially viable, and the train of the trainers' process encourages local sustainability.

There are also other insidious threats. Evidence suggests that even ICUs staffed by trained intensivists can provide low-quality care. Therefore, simply having intensivist physicians alone is not sufficient to ensure the delivery of high-quality care. In the United States, intensive care is governed by three different speciality boards that oversee six distinct training pathways, with little consensus about the required core competencies and necessary duration of training. The same issue has hampered core-competency training in developing countries like Sri Lanka due to a lack of collaboration between colleges and societies. Unfortunately, these issues challenge the current conceptions of a "well-run" ICU, leaving hospital administrators and policymakers with insufficient guidance on best organising critical care (Costa and Kahn, 2016).

Education reduces patient harm (Neily et al., 2010). There is evidence in the Asian environment that an intensive care fellowship program is associated with lower hospital mortality in sepsis (Phua et al., 2011).

Education programs for intensive care need to be appropriate for the resources available, be cost-efficient, preferably with minimal capital outlay, be locally deliverable and sustainable. However, opting not to provide specific education and providing intensive care results in ineffective and expensive care without improvement in meaningful patient outcomes (Phua et al., 2011). Conversely, in Asia, intensive care units that incorporated a fellowship-training program had better compliance with sepsis, associated with improved outcomes.

There are compelling arguments for creating critical care implementation task forces that can develop guidelines, facilitate implementation in the daily routine, and regularly monitor adherence with recommendations to sustain the changes. There is also a need to ensure healthcare costs and staff workload outweigh the benefits. Computerised decision-making support systems can help implement guidelines despite human resistance to change (Li Bassi et al., 2013). Implementing guidelines is not a prerogative of a single speciality. Regular audits are essential to finding the optimal model of care that would provide the best outcome for the patients as local culture, practices, resource availability, and the stage of workforce development vary between countries. Simple national audits and re-audits published in a local journal may convince governments to make political provisions necessary to develop critical care services (Yatawatte et al., 2004; Fernando et al., 2012). Such studies identify deficits and defects in standards and promote remedies (Briggs et al., 2006; Fernando et al., 2012).

3. CONCLUSION

The mission in critical care is to improve the survival of patients, minimise their need for admission to intensive care, minimise morbidity and minimise the duration of stay in intensive care through safe, effective and efficient supportive care without aggravating organ damage. Therefore, the focus is patient-centred and geared to fulfil the patient's needs at the earliest opportunity and ensure their return to everyday life with no residual damage. Nurses and doctors need additional competence-based comprehensive training before managing critically ill patients. Their training programs should target doctors, nurses, and other allied health staff catering to critical care services. If we do not have this degree of competence available at the bedside, none other but patients will suffer. Losing a family's breadwinner this way from a preventable cause is a tragedy, needless to say, the unbearable loss to the family and the country as a whole. Education is the key. That is why we need to ensure that critical care education is improved to the highest possible standard in our countries. .

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