

A Pilot Study on Optimization of Equipment Utilization in a Tertiary Care Hospital in India

YOGESH GUPTA¹, ANIL KUMAR GUPTA², LAKSHMI NARAYANA YADDANAPUDI³,
VIPIN KOUSHAL⁴, AJAY DUSEJA⁵, NAVIN PANDEY⁶, MADHUR VERMA⁷

Dear Editor,

In low-resource settings, medical devices are generally unavailable, underutilized or misused [1]. Ventilators are an integral part and a basic necessity in critical care. The demand for ventilators keeps waxing and waning in different departments in a hospital. It is realistically not possible to procure the maximum number of ventilators that will be required by each department. Even if they are procured, maintaining such a large inventory of unutilized ventilators would be a nightmare for any hospital. The same holds true for almost all medical equipments. A World Health Organization (WHO) report states that in most countries there is a lack of adequate repair and maintenance facility, professionally trained staff and logistics support resulting in wastage of limited resources and/or in their ineffective use. Although many international projects provide equipments to improve functioning of hospitals, however, not much attention is directed to the management of these medical equipments [2].

We evaluated utilization patterns including breakdown of ventilators in two different Intensive Care Units (ICUs) in a tertiary care public hospital. ICU 1 had ventilators manufactured by Maquet, Dräger and eVent medical. Maquet and Dräger ventilators were found to be out of warranty as well as Comprehensive Maintenance Contract (CMC) whereas eVent medical ventilators were in the warranty period. The utilization coefficient of ventilators in ICU 1 varied from 100% to 83.9%. ICU 2 had ventilators manufactured by Philips and Dräger. Dräger ventilators were out of warranty but were within CMC whereas Philips ventilators were in the warranty period. The utilization coefficient of ventilators in ICU 2 ranged from 0% to 40.9%. The results clearly showed a significantly higher utilization in ICU 1 as compared to ICU 2.

Lott JP et al., have highlighted that dividing a general ICU into specialty ICUs or building a hospital with several specialty ICUs may be costly. Specialized critical care in segregated units duplicates

administrative costs and competes with efforts to standardize management of critical care in an organization [3]. Many studies have shown that critical care medicine can be delivered in a number of settings [4,5]. Jacobs P and Nosworthy TW identified that ICU care being resource intensive mandates the effective utilization of high-end life saving equipment [6].

But allocation of ventilators to various critical care areas is not based on their real time utilization coefficient. Findings of our study can provide an evidence based rationale for policy making on allocation of these costly resources. Reducing the cost of health care in general and intensive care in particular, is a priority for physicians, hospital administrators, and policy makers. A step in this direction would be sharing of ventilators between departments or keeping a common pool of ventilators to be distributed among departments as per need. Similarly, utilization audit of all equipments including ventilators should be made an integral part of the hospital management.

REFERENCES

- [1] First WHO global forum on medical devices: Context outcomes and future actions. Bangkok, Thailand: World Health organization; September 2010. 76 Pp. Available from: http://www.who.int/medical_devices/gfmd/en/ [Last accessed on June 19th, 2017].
- [2] Medical equipment maintenance programme overview. WHO medical device technical series. Geneva: World Health organization; 2011. 92 Pp. Available from: <http://apps.who.int/medicinedocs/documents/s21566en/s21566en.pdf>. [Last accessed on June 19th, 2017].
- [3] Lott JP, Iwashyna TJ, Christie JD, Asch DA, Kramer AA, Khan JM. Critical illness outcomes in specialty versus general intensive care units. *Am J Respir Crit Care Med*. 2009; 179(8): 680-81.
- [4] National institutes of health consensus development panel. Critical care medicine. *JAMA*. 1983; 250(6):798-804.
- [5] Kahn JM, Angus DC. Reducing the cost of critical care: New challenges, new solutions. *Am J Respir Crit Care Med*. 2006;174(11):1167-68.
- [6] Jacobs P, Nosworthy TW. National estimates of intensive care utilization and costs: Canada and the United States. *Crit Care Med*. 1990;18(11):1282-86.

PARTICULARS OF CONTRIBUTORS:

1. Medical Officer (Hospital Administration), Department of Health and Family Welfare, Government of Himachal Pradesh, Shimla, Himachal Pradesh, India.
2. Professor and Head, Department of Hospital Administration, Post Graduate Institute of Medical Education and Research, Chandigarh, India.
3. Professor, Department of Anesthesia and Critical Care Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh, India.
4. Additional Professor, Department of Hospital Administration, Post Graduate Institute of Medical Education and Research, Chandigarh, India.
5. Additional Professor, Department of Hepatology, Post Graduate Institute of Medical Education and Research, Chandigarh, India.
6. Assistant Professor, Department of Hospital Administration, Post Graduate Institute of Medical Education and Research, Chandigarh, India.
7. Senior Resident, Department of Community Medicine and School of Public Health, Post Graduate Institute of Medical Education and Research, Chandigarh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Madhur Verma,
Room No. 126, Senior Resident, Department of Community Medicine and School of Public Health,
Post Graduate Institute of Medical Education and Research, Chandigarh-160012, India.
E-mail: drmadhurverma@gmail.com

Date of Submission: **Mar 07, 2017**
Date of Peer Review: **Apr 19, 2017**
Date of Acceptance: **Aug 21, 2017**
Date of Publishing: **Nov 01, 2017**

FINANCIAL OR OTHER COMPETING INTERESTS: None.