

Distributing pulse oximeter: An initiative for improving patient safety and care

INTRODUCTION

Advancements in various surgical techniques may be attributed to advances in the field of anaesthesia, and more so on account of better monitoring techniques.^[1-3] In the last 50 years, there has been a significant reduction in anaesthesia-related morbidity and mortality. Patients undergoing surgery in low-income group countries still have 2- to 3-fold increased mortality risk in comparison with high-income group countries.^[4]

The World Health Organization (WHO) brought global oximeter project according to which pulse oximeter use is mandatory in health-care areas.^[5] The WHO introduced a new global standard for perioperative care in the year 2008 including the words ‘... pulse oximeter attached and working’.^[6]

The Indian Society of Anaesthesiologists (ISA) recommends that it is mandatory for oxygenation to be monitored by pulse oximetry, which displays both saturation and heart rate.^[7]

During the deliberations in the 58th Annual Conference of ISA in December 2010, it was brought to our notice that non-availability of pulse oximeters in remote areas was adversely affecting anaesthesia-related outcomes. Therefore, after successful completion of the conference, the organising committee decided to address this issue by providing pulse oximeters to members of the ISA, who were not using a pulse oximeter due to lack of its availability.

METHODS

In the period between January 2012 and December 2014, a pulse oximeter requisition form was mailed to all the members of the ISA via Indian Postal Services ($n = 11,530$). In response, we received a total of 1416 applications requesting delivery of a free pulse oximeter. All the requests were thoroughly reviewed by the organising committee based on the following criteria:

1. Anaesthesiologists were working in areas where a pulse oximeter was not available

2. Willingness of the anaesthesiologists to regularly use the pulse oximeter if made available and provide regular feedback.

The organising committee approved 1064 requests and thereafter a pulse oximeter was dispatched (free of cost) to all these members via registered post [Figure 1].

The pulse oximeter provided was portable fingertip probe type [Figure 2]. An undertaking was taken from the members that they would use the pulse oximeter to enhance patients’ safety. All pulse oximeter receivers would maintain a logbook of pulse oximeter use, share the information and provide us with feedback at timely intervals.

RESULTS

Availability of pulse oximeter changed the anaesthesia practice of anaesthesiologists as they started using this pulse oximeter not only for intraoperative monitoring but also for post-operative monitoring of these patients [Table 1]. Further, they started using the pulse oximeter outside the confines of the operation theatres, e.g., for upper or lower gastrointestinal endoscopy, radiotherapy and biopsy procedures under sedation performed in the outpatient department (190 uses). They also started using the pulse oximeter during the pre-anaesthetic check-up to record baseline oxygen

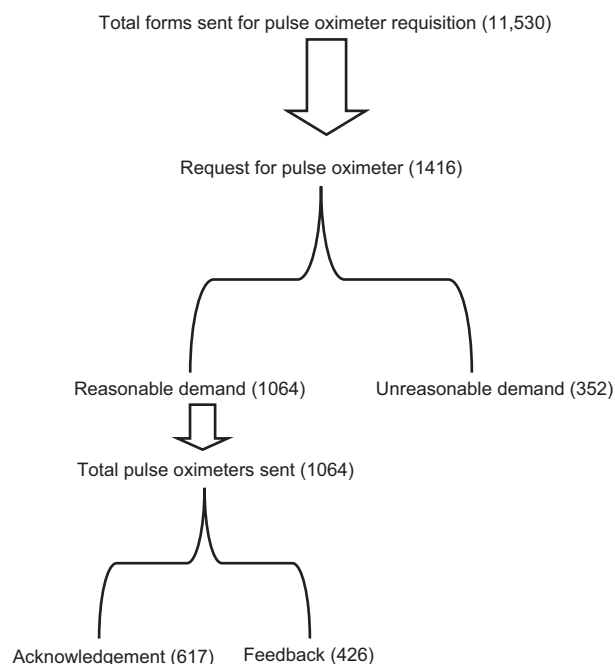


Figure 1: Flow diagram showing process of distribution of pulse oximeter its acknowledgment and feedback process



Figure 2: Picture of pulse oximeter which was distributed

Table 1: Critical events identified with the help of portable pulse oximeter

Pulse oximeter usage	Events
Hypoxia identification in perioperative period	287
Replacement for conventional monitor in operating rooms	206
Monitored anaesthesia care and short procedures outside operating room	190
In pre-anaesthetic check-up clinics	109

saturation, particularly in patients with compromised cardiopulmonary reserve (109 uses).

A total 287 incidents of hypoxia identification were reported with the use of pulse oximeter during anaesthesia administration.

DISCUSSION

Kotur^[8] stated that in some parts of India, 'the anaesthesiologist is expected to work with a bottle of ether and use the same two hands for monitoring pulse and blood pressure'.^[2,8] In resource-limited countries, around 77,000 operating rooms are still in need of pulse oximeters. The numbers of pulse oximeters required may be as high as 100,000 if other clinical areas are also taken into consideration.^[9]

Our pulse oximeter distribution programme among anaesthesiologists augmented the WHO surgical safety checklist launched in June 2008; this list is simple and can be completed in <2 min; one of the important parts of the checklist is to ensure that a proper functioning pulse oximeter is attached to the patient.^[10] Our pulse oximeter distribution programme helped in identification of 287 events of hypoxia in perioperative period, which prompted prompt preventive and remedial actions and thus prevented further complications of hypoxia.

Our portable pulse oximeter was used as replacement for conventional monitor when either conventional monitor was malfunctioning or even absent. As many as 206 reported events were collected from feedback forms. Finch *et al.* evaluated effect of large-scale donation of pulse oximeters to non-physician anaesthesiologists in Uganda and found that oximetry and hypoxia management test scores improved after training and continued to improve at the follow-up visit.^[11] Funk *et al.* estimated global operating theatre distribution and pulse oximetry supply from 54 countries and found that around 77,700 theatres worldwide were not equipped with pulse oximeters.^[12] They also estimated that around 32 million operations are undertaken every year without a pulse oximeter and major chunk was from third world countries. Hence, there is a major disparity between the number of surgical procedures and essential monitoring equipment, and the pulse oximeter, which is a basic monitor in developed countries, is still a luxury in developing and third world countries. The pulse oximeter was also useful in monitored anaesthesia care and short procedures outside operating room (190 reported feedbacks till now).

The limitation of our work was lack of proper feedback by the users as many failed to respond. Second, only ISA members were enrolled for this study. Our work was more of a medical philanthropy and it can further be reinforced by a much greater and larger distribution of portable pulse oximeter to the nook and corners of India with a better long term follow-up. We have used "freebies concept" in distribution of pulse oximeters and after review of the feed back forms we felt the need of percolation of this data to other members of the society too.

CONCLUSION

We are of the opinion that there is a definite need for more medical philanthropy, especially in making pulse oximeter available in every nook and corner of India for saving precious human life during anaesthesia.

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Conflicts of interest

There are no conflicts of interest.

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