

# Critical Care Outreach Team

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## ABSTRACT

**Introduction:** Critical Care Outreach Team is established to timely identify sick patients outside ICU and initiate proper therapy before they deteriorate. This study was performed to evaluate the effect of CCOT in a tertiary center in Nepal.

**Methods:** This is a before-after comparative study conducted in a level II postoperative ward in Nepal. CCOT was established which comprised of an Intensivist, ICU resident and critical care nurse. The outcome of patients three months before and three months after the establishment of CCOT were compared.

**Results:** In pre-CCOT period, there were 582 admissions, among which 538 (92.4%) patients were admitted for postoperative care and 27 (4.63%) patients were critically ill and fifteen were intubated. Among 582 patients, 531 got better and transferred out but 9 of them got readmitted again within 48 hours. In the post-CCOT period, there were 561 admissions, among which 512 (91.2%) were admitted for postoperative care and 22 (3.92%) were critically ill and only 10 of them got intubated and shifted to ICU. Among 561 patients, 491 improved and were transferred out and 7 got readmitted only after 96 hours. Another 10 patients goals of care were discussed and DNI/DNR order instituted and end of life care was given for them who later expired at Postoperative ward.

**Conclusions:** This shows that CCOT intervention outside ICU is important to reduce ICU admissions, decrease early readmission and clarify goals of care prior to ICU.

**Keywords:** critical care outreach team; low resource countries; medical emergency team; rapid response team.

## INTRODUCTION

The concept of critical care outreach services (CCOS), also named critical care outreach team (CCOT), rapid response team (RRT), was developed to address the needs of critically ill patients outside the ICU.

Several studies suggest that there is a failure to identify deteriorating patients and initiate prompt management in the wards resulting in unexpected in-hospital cardiac arrests<sup>1</sup> or mortality in the ICU which is higher than for

those admitted from the operating room or the emergency department.<sup>2</sup> CCOS also aims to empower ward staff to deliver appropriate care by offering them support from critical care-trained nurses who visit the ward. 'Early warning' or 'track and trigger' scores are some of the key elements.<sup>3</sup> In general, the functions of CCOT comprises of early identification of patient at risk, prophylactic intervention, knowledge dissemination and provision of support and coordination between ward/floor and ICU.<sup>4</sup>

The main objective was to compare the effect on patient outcome outside the ICU before and after the CCOT intervention.

## METHODS

This was a before-after study conducted at POW in Tribhuvan University Teaching Hospital, Kathmandu, Nepal that is a Level

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II facility, which caters for not just post-surgical patients, but also functions as an intermediate care unit as well as a step-down from ICU. All the patients admitted in postoperative ward three months before the establishment of CCOT and three months after CCOT intervention were studied and analyzed. Most of the regular postoperative patients that were for major GI surgeries, complicated orthopedic surgeries including hip and spine surgeries, and complicated Obstetric surgeries who required post operative monitoring were considered as regular postoperative care patients whereas when patients had either one or more organ dysfunction and thus required hemodynamic support, hypoxia requiring mechanical ventilation, then they were considered as critically ill. Preformed data collection form was used for data collection and analyzed using SPSS software version 17.0.

## RESULTS

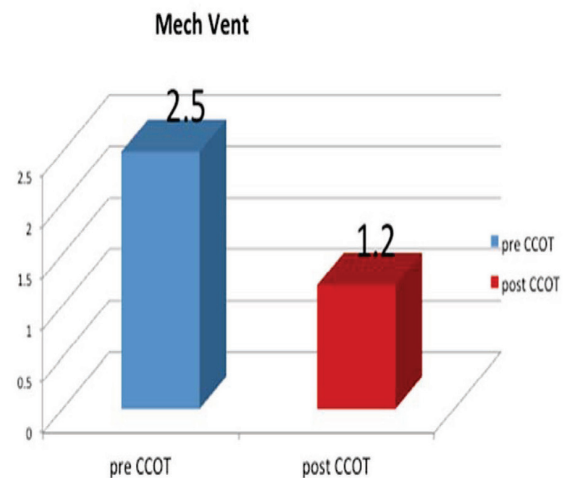
Prior to CCOT intervention period, there were total 582 admissions out of which 538 (92.4%) were for regular postoperative care, and 27 (4.63%) were critically ill. Out of these 27 patients, 15 (2.5%) required intubation. Five hundred and thirty one (531) patients got better and transferred out to the ward but 9 of them got readmitted again to the postoperative ward within 48 hours. Also, there were another 5 patients, who arrested in POW and expired because of various causes.

Whereas, after the CCOT intervention, there were only 561 admissions in the level II POW

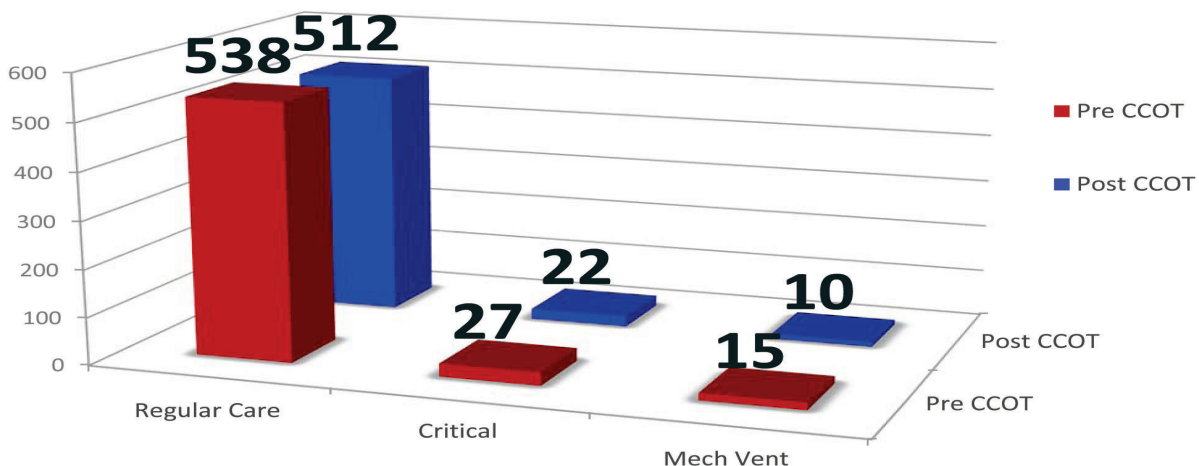
out of which 512 (91.2%) were admitted for regular care, whereas 22 (3.92%) were critically ill but were managed by CCOT, and only 10 (1.7%) got intubated in POW and later shifted to Level III ICU.

Among 561, 491 patients improved and were transferred to ward and 7 patients got readmitted only after 96 hours. There were no readmissions within 48 hours.

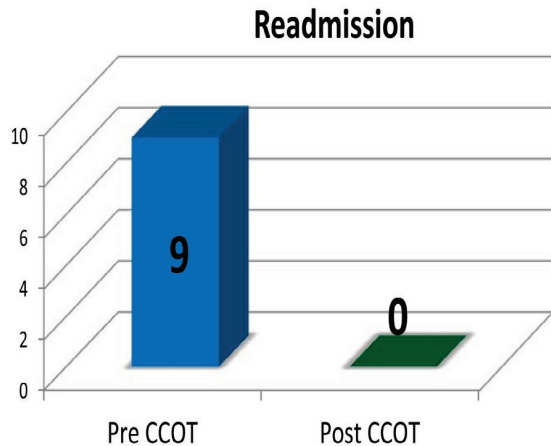
Apart from the 22 critically ill patients, another 10 patients' goals of care were discussed and family wanted DNI/DNR and thus end of life care was given in the POW itself.



**Figure 2. Mechanically Ventilated Patient in Pre and Post CCOT intervention (percentage).**



**Figure 1. Type of patients in Level II POW in Pre and Post CCOT intervention.**



**Figure 3. Number of readmission within 48 hours in Pre and Post CCOT period.**

## DISCUSSION

The results of this before-after study evaluating the effect of critical care outreach program suggest that CCOS was associated with an increase in the number of admissions of critically ill patients in the level II ICU but there were reductions in the number of patients requiring mechanical ventilation as well as readmission rate.

The increase in the number of critically ill patients admitted to the level II ICU may be attributed to identification of deteriorating patients in the ward early enough to be able to be managed in a level II ICU and not requiring a higher level of ICU care. The reduction in the number of mechanically ventilated patients also suggest that those admitted were less severely ill, though direct comparison of severity scores have not been performed. Better and appropriate care in timely manner may have resulted in fewer rates of readmissions as well. The results are comparable to a prior study, which reported a decrease in readmission to critical care by 6.4%.<sup>5</sup>

Till date, CCOS has not been started in Nepal and in other resource limited countries and thus literature about CCOS is scarce. Most prior studies have measured the efficacy of CCOS mainly in terms of cardiac arrests and in-hospital mortality. Our study could not assess such outcome variables because there are other level II ICUs as well apart from the POW, which are not supervised by

the CCOT. Many patients who deteriorate are also admitted to these other ICUs. CCOT intervention thus could not have altered the overall in-hospital mortality or cardiac arrest events.

Several studies that have evaluated the efficacy of CCOS in terms of in-hospital mortality or cardiac arrests have reported benefit from such intervention. These results have been strengthened by analyses from two systematic reviews, which also report CCOS to be effective in improving patient outcome.<sup>6,7</sup> However, the studies included in these meta-analyses were mostly observational and there was heterogeneity in the type of CCOT involved. In fact there are only two randomized trials currently available in the medical literature, both unblinded, but with conflicting results.<sup>8,9</sup>

Though a before-and-after design offers better evidence about intervention effectiveness than other non-experimental studies, such a study is not without limitations. Common problems that may hamper internal validity include a history threat that occurs due to changes in various aspects of management that might take place as a matter of development process. However, we could not identify major changes in overall patient management protocols that could have resulted in a difference. Other biases such as regression-to-the-mean and Hawthorne effect, however, cannot be ruled out.

The potential harm of CCOS may be “deskilling” of ward staff because of over-dependence on CCOT and probably the cost of establishing and maintaining such services (that may offset the savings in ICU).<sup>10</sup> However, in our institution there was utilization of resources already present, and no extra cost could be attributed to CCOS.

In conclusion, this pilot study contributes to the support of CCOT in a resource poor country and recommends for further larger study to establish the benefit of CCOT in reducing ICU admissions, managing end of life care issues outside ICU and reducing readmissions to step down units.

## CONCLUSIONS

This shows that CCOT intervention outside ICU is important to reduce ICU admissions,

decrease early readmission and clarify goals of care prior to ICU.

**CONFLICT OF INTEREST:** None.

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