


Day and Time of Admission to ICU Affects Patient Outcome: An Illogical Belief?

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Intensive care units (ICUs) are specialized service units where critically ill patients get admitted any time of the day or week. The critical condition of these patients warrants immediate delivery of medical and/or surgical services to ensure favorable patient outcomes. The healthcare delivery may vary during a 24-hour and 7-day week period due to lack of availability of services.

Hospital organizational structure across the globe is such that the weekdays and office hours are well equipped for optimal healthcare delivery and the nights and weekends (off hours) are affected by lean ICU staffing and the non-availability of some hospital services.¹ The imbalance in delivery of services with respect to the day and time of ICU admission leading to delays in diagnosis, resuscitation, treatment, or postponements in investigations or procedures on critically ill patients, adversely affecting their ICU and hospital outcome. This phenomenon has been aptly termed as the “night effect” and “weekend effect” depending on the hour or day of the week.^{2–4} This effect although evident in smaller hospitals, unfortunately, exists even in tertiary care referral hospitals.

Contrary to this belief, the evidence has so far been controversial with respect to the association between the day and time of ICU admission and outcome.

Several studies have demonstrated the association between increased ICU and hospital mortality when patients were admitted to the ICU during the off hours.^{5–8} An explanation for increased mortality in patients admitted during off hours was increased severity of illness leading to untimely admission to the ICU. The association of increased mortality for patients admitted during off hours was noted in these studies even after correction for severity of illness.

An equal number of studies have shown no association between time of admission and ICU outcome.^{9–11} This could be explained by the possibility of organizational structure and functioning of these ICUs, or the definitions used for office and off hours, differences in casemix or severity of illness, and sample size.

It is interesting to note that some studies have shown better outcomes for patients admitted during off hours to the ICU.¹² Several explanations have been proposed for this observation. Nurses and doctors have more administrative, documentation, academic, or training responsibilities during office hours, hampering dedicated and sufficient time for patient care. An increase in a number of procedures during office hours leads to more activities and disturbances in the continuity of patient care.

The retrospective observational study by Bhattacharyya et al.¹³ was conducted in a tertiary care hospital from Kolkata, on 3029 patients who were admitted between the years 2015 and 2018. The authors described off or after hours as between 8 p.m. and

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7:59 a.m. and weekend as Sunday. The authors explicitly describe their working pattern, manpower and availability of services during the off hours, although these were not considered for the analysis. This information would be helpful for future comparative studies. Timing and day of ICU admission were assessed for ICU and hospital mortality prediction. There were a good number of patients admitted during the afterhours in the study, and more patients were admitted during the weekdays as compared to weekends. It is interesting to note that the authors found no association between time and day of admission with ICU and hospital mortality. Mortality was noted to be higher in patients who were admitted to the ICU after 24 hours of hospital admission, relating to improper triaging or resuscitation in the emergency.

Tertiary care hospitals ideally should not have the weekend effect or night effect on patient outcomes. If it does exist, then the most common reason would be due to inadequacy of ICU manpower. The expertise of the manpower would also be an important component affecting patient outcomes. Evidence has shown a positive association between trained intensivists-driven ICUs and patient outcomes.^{14,15} But with rules on stringent working hours and having an intensivist for a 24/7 period, would be difficult for most hospitals to achieve. On a different note, an earlier randomized controlled study showed no difference in mortality with night-time physician staffing in the ICU.¹⁶ The shortage of nighttime intensivists can be circumvented if the attending resident doctors are well trained to manage during the off hours with telephonic or emergency onsite support from the intensivists. The nurse-patient ratio, experience of the nurses, and availability of other supporting staff would also contribute to the patient outcomes.¹⁷ Well-established evidence-based protocols can simplify decision-making at the bedside and reduce the need for doctor intervention and have shown to improve patient outcomes.¹⁸

Variations in healthcare delivery over 24/7 and 365 days of each hospital, especially in ICU and emergency services need to be studied as a quality indicator. There may be several reasons beyond manpower, affecting patient outcomes that need to be analyzed and shared for future reference. This will also enable hospital administrators to plan and allocate adequate resources for ICU and emergency services to ensure the delivery of quality care any time of the day, week, or year.

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