Vital signs in hospitals at night. Dying to sleep?

Monitoring vital signs is a crucial aspect of care for patients in hospital wards. Early signs of deterioration can be detected, providing the first step in the "chain of prevention" of serious consequences including cardiac arrest and death. Vital signs, including blood pressure, pulse respirations and temperature, are the basis of early warning scores, indicating the importance of consistent monitoring and timely escalation and intervention. But there is evidence that nurses’ compliance with protocols and guidelines that indicate the need for frequent monitoring can be poor, especially at night. In this digest we explore evidence to understand the extent of the problem of observations at night, the possible consequences, the causes, and solutions that have been suggested to increase compliance with observation schedules.

What is the problem?
The National Institute for Health and Clinical Excellence (NICE) recommends that observations should be monitored at least every 12 hours, with the frequency increasing if abnormal physiology is detected. [1] Evidence shows that inadequate responses to deterioration remain the most common cause of critical incidents reported to a National Database in the UK. [2] In particular, concerns exist that delayed detection and escalation due to current nursing approaches to patient monitoring [3] undermines the effectiveness of innovations aimed at improving detection, particularly at night. In 2007 the NPSA reported that staff 'rarely carry out routine observations during the night' and that 'observations are seen as tasks with a low priority'. [4]

How big is the problem?
A study in a Scottish teaching hospital found nearly all early warning charts for patients causing clinical concern overnight were incomplete, with 64% omitting one or more observations. [5] In a large study from a single centre in Southern England, the frequency and documentation of observations were less consistent with the hospital protocol at night. [6] Only 13% of the 950,000 vital signs records were taken between the hours of 23:00 hr. and 05:59 hr. Observations were rarely taken during these hours for low acuity patients. Even for patients whose last early warning score between 20:00 hr. and 23:59 hr. indicated a requirement for hourly or more frequent observations, only 57% had an observation recorded between midnight and 05:59 hr. Compliance was much higher during the day, although still far from optimal. [7] Frequency of observations during night shifts for patients discharged from intensive care was significantly lower than during the daytime in a Dutch University Hospital, although results are not stratified by patient acuity. The introduction of a standardised nursing observation protocol did not have an effect on the frequency of observations at night [7].

Impact on patient outcomes
Effectively detecting and acting on patient deterioration are complex issues. [8] Vital signs observation is a key part of the ‘chain of prevention’ required to avoid cardiac arrest and death. [9] A Patient Safety Observatory report into potentially preventable deaths in acute general hospitals identified 64 incidents related to vital signs observations, including failure to take basic observations. Two thirds of these incidents occurred in the evening or overnight. [10] A retrospective record review in a Belgium tertiary hospital found that deaths with lower frequency of vital signs recording were more likely to be classified as potentially preventable.

Factors contributing to differences in observations between shifts
While a range of issues such as staffing levels, use of intuition, relationships with medical staff, and nurse education have been implicated in nurses’ compliance with observations in general, there is little research focusing specifically on time of day. [3] Issues concerning missed vital signs observations at night are reported to relate to nurses’ views regarding the importance of patient rest and the negative effects of sleep disruption. A US study of adult medical wards suggested that a patient's acuity was not always taken into consideration when observations were undertaken at night, with 45% of observations conducted on patients with low risk early warning scores. [11] In the UK, vital signs observations were clustered, with peaks...
in observation frequency occurring at 06:00-07:00 hrs. and 21:00-22:00 hrs irrespective of the level of assessed risk, suggesting that the timing of observation was driven by ward routines. [6]

**Interventions to improve observations**

Risk stratification of patients at the beginning of the night shift to identify patients at risk has been suggested as a strategy to increase compliance of vital signs measurements.[7] Use of electronic vital signs devices with early warning protocols has been shown to reduce mortality. [12] Implementation of Modified Early Warning Score charts has been associated to increased compliance of measurements. [13] However, studies have shown that compliance remains lower at night compared to day shifts, even when standardised protocols have been implemented. [7]

**Conclusions**

- Studies from hospitals in the UK and elsewhere suggest compliance with vital signs observations at night is low
- While the optimal timing and frequency of observations for all patients remains unclear, failure to perform observations at night occurs even for patients with severely deranged physiology
- The reasons for poor compliance with monitoring protocols are unclear, but nurses appear to prioritise patient rest over monitoring
- The balance of risks and benefits is unclear but the risks from missed observations can be high
- Systematic approaches including the use of monitoring protocols improves overall compliance, but the deficit at night remains
- Factors specifically affecting observations at night need to be better understood

**Review methods**

We undertook a scoping review aimed at identifying the incidence of the problem and major contributing factors to missed observations at night.

A search strategy was built using the key terms ("vital sign"* and (observation* OR monitoring) and night*) and run on OVID Medline, the Cochrane Library, the York Centre for Reviews and Dissemination and Scopus. From a total of 321 references screened, 7 studies offered evidence to the questions.

**References**


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