Achieving best practice in routine observation of hospital patients

**AUTHOR** Tracey Stevenson, RGN, RSCN, DipHe, is practice development nurse, education centre, Dorset County Hospital, West Dorset General Hospitals NHS Trust.


This article reviews the evidence supporting best practice when undertaking patient observations in a district general hospital. Correct monitoring of the patients’ progress is essential in the detection of adverse events and can potentially prevent admission to intensive care or high dependency units.

For the purposes of this literature review the term observations will be used for the measurement of temperature, pulse, blood pressure, respirations, and pulse oximetry. It is recognised that in some instances the literature uses the term vital signs as an alternative to observations. There is also some variation in the investigations included in these ‘umbrella’ terms. The objective of evidence-based practice in the case of observations is to promote the monitoring of the patient’s progress, thus ensuring the prompt detection of adverse events or delays in recovery.

The literature available on the subject indicates that monitoring a patient’s observations and acting on abnormal results could potentially prevent admissions to intensive care and high dependency units.

**Blood pressure monitoring**

McAlister and Straus (2001) discuss the importance of accurate blood pressure measurement. If a reading consistently underestimates the diastolic pressure by 5mmHg, it could result in two-thirds of hypertensive patients being denied potentially life-saving and certainly morbidity-preventing treatment. Consistently overestimating diastolic pressure by 5mmHg could more than double the number of people diagnosed as hypertensive.

The positioning of patients and how this affects blood pressure readings is discussed in the literature. Hemingway et al (2003) discovered that brachial artery blood pressure readings are 10 per cent higher if taken when the arm is straight rather than bent at the elbow. Appropriate cuff choice is evidenced to have accuracy implications. Kaplan and Rose (2003) emphasise that the use of an appropriate cuff size. The length of the bladder should be at least 75–80 per cent of the circumference of the upper arm and the width should be more than 50 per cent of the length of the upper arm.

Lawes (2001) measured the blood pressure of 51 patients using an electronic device compared with a mercury sphygmomanometer. The left arm was used for all measurements. In three cases the electronic device was unable to record a measurement. In the remaining 48 patients, the mean difference indicated that the electronic device recorded higher than the sphygmonanometer by 13.2mmHg for systolic readings and 11.9mmHg for diastolic readings. It is recognised that this comparison has limited validity, as only one electronic device was used and no mention was made regarding the calibration of the mercury device.

O’Brien et al (2001) also looked at the automated devices designed for use in specialised areas of hospitals such as operating theatres and intensive care units, where accuracy should be a priority. Only five of the hundreds of devices available have been validated and only two met the criteria for recommendation. The authors state that one particular device has had many reports of inaccuracy but is still one of the most popular automated devices used in clinical practice and hypertension research. They hypothesise that hospitals are prepared to accept the word of manufacturers about the accuracy and performance of their products and to ignore warnings from the scientific literature about their shortcomings.

Studies have compared upper arm blood pressure readings with wrist pressure readings and concluded that upper arm measurements are more accurate (Heise et al, 2000). They also concluded that wrist devices tend to overestimate diastolic values.

The evidence on the recommended equipment used for the measurement of blood pressure finds manual readings to be the most accurate. Murray and Ireland (2001) state that although mercury sphygmomanometers are the ‘gold standard’, aneroid devices can be used provided they are recalibrated every six months.

**Temperature monitoring**

Smith (2003) states that patient-specific temperature trending needs to be consistent by site. Also, documentation should include site, time, and day. Temperature site was explored by Erickson (1980) who identified the left or right posterior or sublingual pocket of the oral cavity as the best practice for thermometer placement.

Heidenreich and Giuffe (1990) stated that there is no clinical advantage in using a longer reading time than three minutes for temperature measurement. Knies (2003) explains that readings can be affected if the patient eats, drinks, chews gum, or smokes within 15 minutes of the reading. Readings can also be affected if the patient does not keep the thermometer properly in place under the tongue, is an oral breather, or talks during the reading.

The type of thermometer used can affect the readings.
When recording the patient’s respirations, Chesnutt and Prendergast (2004) highlight the importance of symptoms that are indicative of respiratory obstruction. These include wheezing, coughing, dyspnea, and sputum.

Pulse oximetry

The literature on pulse oximetry highlights the need for education. Howell (2002) suggests that staff have limited education, if any, in the correct use of the pulse oximeter, the knowledge behind how it works, and the factors that may affect the readings. Bowes et al (1989) explain that some factors such as transducer movement, peripheral vasocostriction, hypotension, anaemia, changes in systemic vascular resistance, the presence of intravascular dyes, and nail polish adversely affect the accuracy of pulse oximeter readings.

Stoddart et al (1997) goes further adding that electromagnetic interference and the effects of bright lights on the sensor cause the semiconductor detector to overload. Stoddard et al also explain that there are some physiological limitations to the accuracy of pulse oximetry, such as carboxyhaemoglobin and methaemoglobin, which cannot bind oxygen and may cause misleading readings, but that hyperbilirubinaemia has been shown not to affect the accuracy of readings in adults. Howell (2002) says pulse oximetry probes should never be placed on a finger of the arm that has a blood pressure cuff. Cardiac arrhythmias and dirty probes can cause inaccuracies, and any dried blood should be removed from the skin before probe placement.

Stoddart et al (1997) claim that pulse oximetry measurements are all reasonably accurate but this accuracy is reduced when oxygen saturation falls below about 85 per cent. The Medical Devices Agency (2001) states that the position of the saturation probe should be changed at the very least four-hourly to prevent tissue necrosis. However, Olivei and Meucci (2003) conclude in their study that pulse oximetry is not a sensitive technique for detecting apnoea episodes, especially in patients receiving supplemental oxygen.

Monitoring pulse

Berry et al (2003) have examined the research concerning pulse recording and found that recording the pulse for 15 seconds then multiplying this by four is acceptable. However, if there are any irregularities, a full minute should be used. Berry et al (2003) state that in the case of atrial fibrillation as well as a radial pulse recording, listening to a heart rate apically using a stethoscope for a full minute has been indicated to be most accurate. Also, using the apical method is recommended for monitoring the pulse rate of babies.

Conclusion

Berry et al (2003) emphasise that organisations should promote a standardised method for all observations to improve accuracy. This literature review has produced findings that can be used to influence practice (Box 1). The policy will also need to focus on education so that people are made aware of best practice.

In the literature there is controversy over the use of tympanic thermometers. Knies (2003) states that there are three major factors that can affect the accuracy of tympanic measurements: the size of the ear canal; the technique of the reader; and metabolic occurrences that affect the strength of the signal.

Monitoring respiration

The evidence concerning respiratory rate measurements was the next area explored. Wilhelm et al (2001) state that respiration is a physiological function situated strategically at the interface of mind and body. It is capable of operating automatically – its usual mode – but it can be brought under voluntary control at least briefly.

Benham (2003) explains that a decrease in the depth of a breath and/or a decrease in respiratory rate can be signs of respiratory deterioration. A respiratory rate of less than eight breaths per minute indicates severe respiratory depression. Berry et al (2003) suggest that for accuracy the respiratory rate needs to be measured for a full 60 seconds. However, they state that measuring respiratory rate apically using a stethoscope is the most accurate form of measurement with babies.

Chesnutt and Prendergast (2004) explain that there are other issues to consider when recording respiratory rate such as alterations in the rhythm of breathing. Alterations can include the rapid, shallow breathing seen in restrictive lung disease, which can be a precursor to respiratory failure. Other alterations include Kussmaul breathing, seen in metabolic acidosis, which is rapid, large-volume breathing indicating intense stimulation of the respiratory centre, and Cheyne-Stokes respiration – a rhythmic waxing and waning of both breathing rate and tidal volumes that include regular periods of apnoea. Other considerations should include observing the use of accessory muscles, which may signify pulmonary impairment, or asymmetric chest expansion, which can indicate unilateral volume loss.