PULSE OXIMETRY AS THE FIFTH VITAL SIGN

UHC/AACN Nurse Residency Program Annual Meeting 2011
St. Francis Hospital   |   Columbus, Georgia

INTRODUCTION
“Pulse Oximetry as the Fifth Vital Sign” was chosen as a Nurse Residency evidence-based project due to application to the diagnosis and evaluation of cardiopulmonary disorders.

GUIDELINES FOR VITAL SIGNS
There are four vital signs which are standard in most medical settings:
- Body Temperature
- Pulse Rate (or Heart Rate)
- Blood Pressure
- Respiratory Rate

Nurse Residents Proposed Measurement of Patient’s Oxygen Saturation as a Fifth Vital Sign Based on Standards of Care.

INDICATIONS FOR USE
- The Joint Commission cited a need for pulse oximetry in locations other than the operating room.
- According to evidence, pulse oximetry works as non-invasive, real-time method to estimate arterial oxygen saturation and/or heart rate.

EASE OF SpO2 SCIENTIFIC CALCULATION
- The process includes placement of a probe on the fingertip or earlobe.
- The method is based on differential absorption of oxyhemoglobin to light at different wavelengths requiring pulsatile flow.
- Comparison of infrared light provides clinicians with SpO2 calculations.

RESOURCEFUL TOOL
- It is easy to use requiring no special training and can be applied easily, quickly and inexpensively.
- It is small, lightweight, portable, requiring little space.
- It can be used in any age or type of patient, in multiple settings.

PULSE OXIMETRY IN ADULTS
- Valdez-Lowe, Claudia; Ghaneeb, Sameh A.; Antinian, Nancy T.
- doi: 10.1097/01.NAJ.0000352474.55746.81

Figure 1. How Pulse Oximetry Works:
To measure oxygen saturation (SpO2) the percentage of hemoglobin molecules in the blood carrying their full potential of oxygen the pulse oximeter probe is attached to the patient’s finger. Red and infrared light pass through the patient’s blood, and the amount of light received by the detector on the other side indicates the amount of oxygen that is bound to the hemoglobin. (Oxygen attaches to the heme portion of hemoglobin molecules in the red blood cells. Each hemoglobin molecule can carry up to four oxygen molecules.) Oxygenated hemoglobin (oxyhemoglobin, or HbO2) absorbs more infrared light than red light, while deoxygenated hemoglobin (Hb) absorbs more red light than infrared light. By comparing the amounts of red and infrared light received, the instrument can calculate the SpO2. Illustration by Anne Rains.

PROVIDES CRITICAL MONITORING
- Pulse Oximetry determines baseline oxygenation of patients in respiratory distress
- Assesses patient’s response to therapeutic decisions
- Monitors patients during conscious sedation or resuscitation.

IS A POINT OF CARE TEST
- Monitoring of Pulse Oximetry is a point-of-care testing allowing for continuous noninvasive monitoring of patient’s oxygenation status.

NURSING CONSIDERATIONS
- Based on nurse resident’s findings they proposed that pulse oximetry readings become part of vital sign readings on all patients.

PROJECT IMPLEMENTATION
- Due to multiple indications for use to assess and monitor patient’s clinical status a decision was made to implement the project at our hospital.

STANDARDIZATION
- Pulse oximetry was piloted on 4th Floor for patients who meet criteria for oxygen saturation monitoring.

CONCLUSION
The use has impacted care as an alert system is activated when patient’s oxygen saturation status falls below expected range and intervention is needed.

REFERENCES
- 2010 AJN The American Journal of Nursing. Published by Lippincott Williams & Wilkins.

RAPID RESPONSE TEAM ACTIVATION INCLUDES CHANGES IN PULSE OXIMETRY
- The Code Blue and Rapid Response systems demonstrate a strong correlation between mobilization of early critical care intervention (RRT) and successful recovery and discharge from the hospital (both RRT and survival rate from Code Blue).

GRAPH 1
Total # of RRT’s Activated and Code Blue

GRAPH 2
% Alive at Discharge

% Alive at D/C

0% 25% 50% 75% 100%

0 20 40 60

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