



Priority #1: Safety



The Problem of Alarm Fatigue

TANYA TANNER, PhD, MBA, RN, CNM

When entering a busy labor and delivery unit or neonatal intensive care unit, the first thing people usually notice is the sheer volume of activity. Nurses hurry from room to room while beeps, bells and whistles ring out accompanied by the sounds of laboring women and crying babies. In the background, Brahms' *Lullaby* plays over

the loudspeaker, signaling yet another birth. This cacophony of sound has been compared to sounds heard in a carnival or casino and can result in a phenomenon known as "alarm fatigue" (Welch, 2012).

In 2011, the ECRI Institute (an independent nonprofit organization dedicated to using evidence to improve the safety, quality and

Abstract Up to 99 percent of alarms sounding on hospital units are false alarms signaling no real danger to patients. These false alarms can lead to alarm fatigue and alarm burden, and may divert health care providers' attention away from significant alarms heralding actual or impending harm. As the health care environment continues to become more dependent upon technological monitoring devices used for patient care, nurses must become aware of the possibility and consequences of alarm fatigue and ways to prevent it from negatively affecting their practice, as well as the possible consequences for patient care. DOI: 10.1111/1751-486X.12025

Keywords alarm burden | alarm fatigue | patient safety



cost-effectiveness of patient care) cited alarm hazards as the top technology hazard for 2012 (ECRI Institute, 2011). The Association for the Advancement of Medical Instrumentation (AAMI) is an alliance of more than 6,000 members united by the mission of “supporting the health care community in the development, management, and use of safe and effective medical technology” (AAMI, 2012). The AAMI has invited the health care community to embrace a mission for alarm safety that by 2017, no patients will be harmed by adverse alarm events (AAMI, 2011a).

Defining Alarm Fatigue

Although no current consensus definition exists, alarm fatigue occurs when nurses experience sensory overload leading to desensitization in an environment of many regularly occur-

or assume that other staff members are already attending to the alarm (Cvech, 2012; Harris, Manavizadeh, McPherson, & Smith, 2011).

Causes of Alarm Fatigue

Alarm fatigue caused by alarm desensitization may result in slower nursing response time, and may cause nurses to ignore or override the alarm or to turn it off altogether. Between 2002 and 2004, half of the reported deaths related to clinical alarms were associated with human error (ECRI Institute, 2007). A recent Medsun Report (U.S. Food and Drug Administration, 2012) identifies the likely purposeful unplugging of an audio cable from a display unit, effectively silencing the alarms of an electronic fetal monitoring system. These human errors exemplify those described as being a major cause of hospital deaths in the landmark 1999 Institute

Many devices regularly found in obstetric and neonatal units have alarms, including patient call lights, emergency call lights, electronic fetal monitors, infant warmers, ventilators, pulse oximeters, IV pumps and infant security systems—all of which may alarm simultaneously

ring alarms (AAMI, 2011a). These alarms may reflect actual events requiring nursing attention or, as is the case with the large majority of alarms, may be false or “nuisance” alarms requiring no nursing action (AAMI, 2011a).

False alarms may occur because of patient factors, such as alarms resulting from the inability of the external fetal monitor to accurately monitor fetal heart tones due to maternal obesity; equipment factors, such as alarms resulting from artifact on the electronic fetal monitor tracing and a combination of patient and equipment factors, such as frequent maternal position changes during labor that impair the ability of the monitor to accurately interpret fetal heart rate. These alarms then add to the existing strain, commotion and noise of the unit and can negatively affect patient safety and disrupt patient care (AAMI, 2011b; Healthcare Technology Foundation, 2011). Nurses may become desensitized to alarms as a result of excessive exposure and fail to “hear” the alarms

of Medicine Report: *To Err is Human: Building a Safer Health System* (Kohn, Corrigan, & Donaldson, 1999).

Many devices regularly found in obstetric and neonatal units have alarms, including patient call lights, emergency call lights, electronic fetal monitors, infant warmers, ventilators, pulse oximeters, IV pumps and infant security systems—all of which may alarm simultaneously. This synchronized occurrence of alarms results in “alarm burden,” which can result in nurses giving attention to one alarm at the expense of another, more critical alarm (ECRI Institute, 2011). Evidence shows that 80 percent to 99 percent of alarms are false alarms for which no danger is posed to the patient (Cvech, 2012). False alarms are frequently triggered by erroneous or absent patient data (Walsh, 2012). These types of alarms can be caused by such events as patient movement or repositioning and by poor placement of sensors such as an external fetal heart rate monitor or pulse oximeter. Recurrent false

Tanya Tanner, PhD, MBA, RN, CNM, is a course coordinator at Frontier Nursing University in Hyden, KY, and practices clinically at Aurora Nurse-Midwives at The Medical Center of Aurora in Aurora, CO. The author reports no conflicts of interest or relevant financial relationships. Address correspondence to: tanya.tanner@frontier.edu

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