Literature review

Preliminary Literature Review: Alarm Fatigue in Nursing

Name

Institution

Preliminary Literature Review: Alarm Fatigue in Nursing

Jubic (2017) surveyed the importance of developing Strategies for Managing Alarm Fatigue in the PICU (pediatric intensive care unit) Setting and how it can be dangerous to patient safety. The relevance of the research was to identify and recognize the causes of alarm fatigue in the PICU setting. It involved providing relevant education on how to increase competence in technology and manage alarm fatigue in a hospital setting especially at the PICU section. The survey of the research according to Jubic (2017) focused on using various multidisciplinary collaboration concepts to increase patient satisfaction without using the alarms at the PICU setting. The findings of the research emphasized on initiating strategies that allow for appropriate alarm limits settings and incorporating nursing roles that are continuous in monitoring alarms effectively. The research findings support solutions to alarm fatigue in nursing by ensuring that the health care practitioners appropriately monitor alarms that are relevant in increasing patient safety and quality of treatment without getting fatigued. According to the studies done by Jubic (2017), nurses are encouraged to use pediatrics information in the identification of health practices that prevent unnecessary alarms. The prevention of alarm fatigue in nursing can be made possible by monitoring alarms and increasing patient safety and the quality of care, especially in the PICU setting.

The research design in the literature and survey studies was descriptive which focused on natural observation and surveys of the causes of alarm fatigue in nursing and how it can be monitored. Natural observation and survey was done in a PICU setting and monitored to know the effects of alarm to both the patients and the nurses. Additionally, the qualitative and quantitative research method used during the survey and natural observation revealed that exposure to frequent and unnecessary alarm contributes to noise and desensitize nurses. However, the findings of the research confirmed that it was important for the nurses to provide quality care and treatments at the PICU setting to diminish urgency response times of alarms and but increase monitoring processes to reduce causes of alarm fatigue in nursing. Horkan, (2014) investigated Alarm Fatigue and Patient Safety in the hospital setting. The relevance of the study was to determine the roles of the joint commission and the American Association of Critical Care Nurses, the food and Drug Administration and ECRI Institute for the advancement of medical instrumentation. The research identifies some of the best ways of addressing alarm management and alarm fatigue in a different hospital setting as an important process for medical device alarms summit. The joint commission that addresses nursing practices insists on the creation of work groups to solve the problem of clinical alarm fatigue. The nursing association and the various institutes through the research identified clinical alarm hazards and the potential of danger in the hospital and health care systems. The findings of the research that informed this capstone project are that nurses are exposed to a

cacophony of beeps, buzzers, and tones which desensitize them because of urgency alarm response. Additionally, the research found out that serious adverse medical events might sometimes occur because of inappropriate intervention and alarm responses. Horkan(2014) investigated Hemodialysis centers and found out that they are the most affected hospital areas with numerous alarms that desensitize nurses and technicians' and hence urgency responses that are not associated to alarms need to be set up at the Hemodialysis centers to control to manage alarm fatigue in nursing at the hospital setting.

    The research design was correlational by the introduction of a case-control study of a 36-year-old female who receives hemodialysis through forearm arteriovenous fistula. The case study focuses on the role of the nurses in administering medications and preparations for different shifts of patients. The female patients instill pressure and trigger alarm while the nurses reset alarms and returns to previous work. The processes occur more frequently as the nurses' resets to know the level of fatigue that the nurses are exposed to because of alarm responses at the hospital setting. The method of the research was the use of focus groups and experiments such as female patients and nurses to understand the effects of alarm fatigue for nurses, especially at the hemodialysis center. The research findings support the solutions for alarm fatigue in nursing by suggesting the development of a safety culture embraced by staff members to promote the identification of factors that leads to patient harm without using alarms. Besides, the findings of the research advocate for the installation of appropriate alarm settings that allow for the reduction of the number of alarms which staff is members are exposed to at the hospital in reducing fatigue. Ruppel et al., (2018) surveyed the Testing of physiologic monitor alarm customization software assists in the reduction of alarm rates while improving nurses' experiences within a medical intensive care unit in a hospital setting. Ruppel et al., (2018), insists on the use of physiological alarm soft wares instead of alarms to promote and reduce the rate of alarm responses in a hospital setting. The relevance of the research was to identify clinicians' importance in an intensive care unit and how they react to experiences of alarm fatigue at the units related to frequent false and non-actionable alarms that are produced through physiological monitors. Ruppel et al., (2018), research was relevant in reducing non-actionable alarms and settings that need customization for individual patients. The nurses do not need to customize alarms because of the need to compete with demands and alarm fatigue. Ruppel et al., (2018) research examined the effectiveness and acceptance of physiological monitor software in supporting customization of alarms.

    The research design was correlational by case study observation and experimentation. It involved pre and post intervention of studies that were conducted within a 56-bed medical intensive care unit. The experiment involved alarm advisor customization support software development that engaged alarm monitoring and

limitation of violations installed to all monitors while promoting education on how alarms need to be controlled and monitored. The research relevance involved the collection of data on patient characteristics and electronic health record. It involves alarm counts and duration through a monitoring system and study of nurses' experience because of the alarms from the surveys. The survey method used confirmed that clinicians in the intensive care units experience alarm fatigue because of high numbers of false and non-actionable alarms produced by medical devices through physiological monitors. The findings of the research confirmed that it is important to use alarm customization software that is associated with the reduction of alarms to manage alarm fatigue in nursing. The use of the software supports nurses' recognition trends to handle patients' alarms and promote changes in an alarm setting that adds value to reduce initiatives.

Trossman (2013) in the official publication of the American Nurses Association discusses the need for sounding the alarm while managing nurses and organizations work into addressing alarm fatigue. According to Trossman (2013), the relevance of the research was to determine patients and families influence the use of beeps and buzzes that come from machines, medical equipment, and cardiac monitors. Besides, the relevance of the research was to know the negative effects of cacophony sounds on nurses and health care professionals. The use of alarms in hospitals is a critical problem that requires the intervention of a joint commission to learn and educate the public on ways of handling the issue of alarm sounds at the hospitals. The nursing association is focused on educating the nurses on the importance of alarm sounds and warning of health issues. Care providers need to be taught on the importance of designating and implementing national patient safety goals without the incorporation of sound alarms in the process. The findings of the research emphasized on the development of the American Association of Critical Care Nurses to promote practice alert and alarm safety resources.

The research design was conducted through descriptions such as surveys and the method used was qualitative and quantitative. The surveys found out that the use of safety resources and clinical toolkits was an important strategy of handling alarm sounds in a health care unit. Safety resources manage alarm fatigue and assists in allowing for proper management of alarm sounds. The findings of the research emphasized on sustaining cultures that allow for quality and safe practices at the hospitals to handles alarm sounds (Trossman, 2013). The findings insisted on creating a supportive patient safety culture and the improvement of care coordination across disciplines.

The article Alarm Management (2013) investigates the importance Critical Care Nurse, by studying management practices and ways of handling alarm sound in the hospitals. The relevance of the research was to determine the scope and impact of the alarm problems in the health care units and how the development of strategies

that assists in handling sound alarms at the hospitals. The findings of the research confirmed that alarm fatigues are developed because of exposure to an excessive number of alarms and how the situation develops sensory overloads. The research design was experimental such as providing nurses with proper skin preparation electrodes and education about alarm devices. The methods of the research entailed surveys that found out changing of electrocardiographic monitor alarms and customization of alarm parameters and levels promoted effective monitoring of alarms at the health centers. Besides, education about the devices provided an opportunity for nurses to properly monitor the alarm systems and operate effectively in handling staff within periodic basis as alarm management practices.

Alarm Management (2013) article emphasizes on education and use of proper skin preparation to assists in handling alarm fatigue in nursing. The customization of the alarms meets the needs of specific patients, reducing nursing attendance to patients based on alarm responses.

Carr & Herrmann (2014) studied EB57 processes of Quitting Alarming and how to reduce the Incidence of False Alarms to Prevent Alarm Fatigue. The relevance of the study was to understand the survival rates and how to maintain cool at the hospitals without the use of alarms. It involved studying nursing and medical stuff approaches within the medical change management and handling of patients that receive mechanical ventilation. Furthermore, the relevance of the study was to improve patient safety and reduce alarm fatigue by decreasing the incidence of false alarms. The findings of the study were that the use of computers greatly improved the medication process and prevented false alarms at the hospitals. The order was effectively presented at the hospitals because of the ability to engage the nurses in more discipline criteria.

The research design was experimental and the method of research was through observation. According to Carr & Herrmann (2014) arguments, the findings confirmed rehabilitation services and the use of guidelines in the hospitals was important in managing incidences of false alarms and promoting cohesion at the hospitals effectively. Nurses need to work with the set guidelines and standardize collaboration and individual goals to prevent incidences of false alarms and develop commitment. Haight et al., (2018) investigated patient safety by learning and understanding the role of hospital technicians and use of information overload for professional safety. The relevance of Haight et al., (2018), studies was to determine the cause risk of managers' hospital systems and alarm-related deaths that occur in the healthcare industry. Additionally, the study focused on the need for monitoring technicians' roles and industrial operations to promote cognitive processes that monitor HealthCare distractions and response of alarms.

The findings of the research were that each technician needed to manage data points so as to develop existing alarm system activation effectively. The technicians

need to determine the alarm type and respond appropriately by collecting data as part of patient safety management process. The research design was experimental which involved the gathering of monitoring systems and operating data through alarm activation. Technicians needed to better understand the operation, technician capabilities, and equipment uses to meet the demands of the patients as the patient safety process. The method of the research was through interviews to determine some of the specific duties, responsibilities and fatigue levels that needed to address by the technicians to allow for monitoring and regulating operations of alarm responses. According to Cvach (2012), the findings of the research that informed the capstone project was that technicians monitoring positions was important as industrial operations for patient safety and promotion of attention. It was important for technicians to monitor operational information as the expectation for responding to upset conditions and hence control of the alarms.

Ulrich (2013) investigated Alarm Fatigue as a growing Problem in most health care centers and how it can be managed to allow for the safety of patients. Ulrich (2013) suggests that the relevance of the research is to determine the causes of alarm fatigue and how it can be regulated as the growing problem in most health care centers around the world. The findings of the research were that alarm fatigue occurs because of nurses and caregivers exposure to an excessive number of alarms that desensitize them or makes them immune to alarms. The findings were that it contributes to nurses' delay to respond to alarms and hence the alarms needed to be adjusted outside the limits to create a safe environment.

The research design was through a survey and the research method was through the use of secondary data analysis. The findings of the research were that it was important to improve patient safety by regulating alarm fatigue through the approaches that the joint commission of nurses recommends and following of the strategies that they set in place (Tanner, 2013). It was important to develop a multidisciplinary team that reviews trends and develops protocols to handle alarm fatigue and responses. Additionally, the team needed to ensure the process of alarm management was safe and done according to the established guidelines and alarm management processes effectively. the use of the strategies recommended by the joint commission was important to allow for nephrology nurses to lead efforts in ensuring that alarms are used for patient safety while lessening alarm fatigue or eliminating the incidences of alarm fatigue.

Borowski et al., (2011) investigated Medical device alarms used in Biomedizinische Biomedical Engineering. The findings of the study was that high number of false positive alarms causes a serious problem in critical area of medicine. It is important to promote patient safety by developing mechanisms that suppress the use of alarms in hospitals.

The research design was experimental by incorporating electrical and electronic

technologies at a hospital and determining the effect of alarm use. The methodology used was through surveys and observations to learn the effects of alarm sounds in a biomedical engineering area. The findings of the research confirmed that it was important to use a network of medical devices bedside the beds of patients as predictive warning signs and educate healthcare providers on importance of patient monitoring to prevent the use of alarms.

Sendelbach & Funk, (2013) surveyed the effects of Alarm fatigue and how to improve patient safety concern. The findings of the research was that alarm fatigue was a sensory overload that exposes healthcare to excessive number of alarms resulting into desensitization of the alarms or missed alarms scenarios'.
The research design was descriptive by analyzing surveys and natural observations. On the other hand, the method used in the research was observational to understand the effects of alarm fatigue and how to develop patient safety concerns. The findings of the research for the completion of the capstone project insists on addressing care related alarm signals through evaluations and effectiveness of wireless technology, and use of bedside monitoring screens to eliminate the use of alarms.

Action Item Checklist

Specific future steps required in completing the capstone project will involve cleaning and monitoring equipment used in various hospitals and how technicians are well skilled to handle the equipment, educating the nurses on ways of decreasing clinically inconsequential alerts, funneling alarm alerts to the right people, the need to use alert with software, methods on how to get rid of the alarms and ways of tailoring alerts to patient characteristics. Involving these studies and the steps above will contribute to the successful completion of the capstone project and ways of reducing alarm fatigue in nursing (Sendelbach & Funk, 2013). The use of soft wares in handling alarm fatigue is important in managing patients and reducing alarm fatigue in nursing successfully. The action plan for the completion of the capstone project will take four months because of the surveys and interviews involved in sourcing information from nurses and patients on ways of eliminating alarm fatigue in nursing (Borowski et al., 2011).

References

 "Alarm Management." 2013. Critical Care Nurse 33 (5): 83–86.

Borowski, M., Görges, M., Fried, R., Such, O., Wrede, C., & Imhoff, M. (2011). Medical device alarms. Biomedizinische Technik/Biomedical Engineering, 56(2), 73-83.

Carr, S., & Herrmann, C. (2014). EB57 Quite Alarming! Reducing the Incidence of False Alarms to Prevent Alarm Fatigue. Critical Care Nurse, 34(2), e5–e6.

Cvach, M. (2012). Monitor alarm fatigue: an integrative review. Biomedical instrumentation & technology, 46(4), 268-277.

Haight, J. M., Wetz Jr., H. F., Daves, L. J., & Olumese, O. D. (2018). Patient Safety: Hospital Technicians & Information Overload. Professional Safety, 63(12), 24–29.
Horkan, A. M. (2014). Alarm Fatigue and Patient Safety. Nephrology Nursing Journal, 41(1), 83–85.

Jubic, K. L. (2017). Strategies for Managing Alarm Fatigue in the PICU Setting. Pediatric Nursing, 43(5), 215–218

Ruppel, H., De Vaux, L., Cooper, D., Kunz, S., Duller, B., & Funk, M. (2018). Testing physiologic monitor alarm customization software to reduce alarm rates and improve nurses' experience of alarms in a medical intensive care unit. PLoS ONE, 13(10), 1–16.

Sendelbach, S., & Funk, M. (2013). Alarm fatigue: a patient safety concern. AACN advanced critical care, 24(4), 378-386.

Tanner, T. (2013). The problem of alarm fatigue. Nursing for women's health, 17(2), 153-157.

Trossman, S. (2013). Sounding the alarm. (Cover story). American Nurse, 45(5), 1–7
Ulrich, B. (2013). Alarm Fatigue: A Growing Problem. Nephrology Nursing Journal, 40(4), 293–346.