

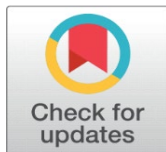
NURSES' PERFORMANCE REGARDING VENTILATOR'S ALARMS IN CRITICAL CARE UNITS AT KHARTOUM PUBLIC HOSPITALS (2021)

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ABSTRACT

Ventilation alarms in critical areas are widely used, which is an important part of many machines in particular (MV) as it alerts nurses to changes in accordance with patient conditions. Therefore, nurses should be aware of the function and limitations of ventilation modes and alarm management 1. Purpose: This study aims to study nurses' procedures regarding Ventilator alarms in critical care units. Method: This was a descriptive study based on various hospitals conducted at major public hospitals in Khartoum Province. Includes (100) Nurses working in critical Care units. The data was collected by Observational Checklist on nurse performance in parts and alarms and was analyzed using a computer statistics program for the community program. Results: The study showed that the participants' complete procedures were satisfactory and that there was an important relationship between the participant's suitability and their ability to manage the ventilation machine. Conclusion: The total number of research team practices was 58.0% with a score of $1.58 \pm (.496)$. Despite their satisfactory performance and may be due to the disclosure of their college experience or the length of their time in the program. so research Recommend, verifying skin tones for nursing staff at regular intervals based on evidence related to the ventilation machine. habits, it is important to do research to know those processes.

Keywords: Nurses, Competence, Mechanical Ventilation Alarm, Critical Care Units

1. INTRODUCTION

Mechanical ventilation (MV) is an important means of rehabilitation and comprehensive treatment of critical care patients [Wilcox et al. \(2019\)](#) it is a common procedure in emergency department (ED) patients present in respiratory depression. Mechanical respiratory indicators include respiratory protection, treatment of hypoxemic or hypersonic respiratory failure [Sole et al. \(2016\)](#). Ventilation alarms are the most important functions that every ventilator should have. These activities are designed to protect the patient from inhaling air.

Ventilation alarms are based entirely on the operation of efficient ventilation system [Sole et al. \(2016\)](#). Ventilation alarms represent confusing and frustrating records. The doctor may have little idea of the alarm and adjustment tools. This sad situation is caused by a lack of basic education about ventilator alarms and as a general lack of readily available information about different alarms (high volume, low volume, etc.), common causes of alarms, and what interventions are needed. Ventilation alarms, which include both ventilator and mechanical ventilation, provide both audible alarms and audible visual alarms designed to make the ventilation system support by informing the physician of changes in the patient's condition. Physicians can set parameters that warn of device malfunction or changes in the patient's condition [The New England Journal of Medicine \(2000\)](#). Not all sound alarms are produced by a ventilator that requires action from a physician, and such alarms are not silenced or ignored. of patients, because many patients in intensive care units do not know themselves which is why they are unable to identify when their condition is changing. Therefore, nurses must be aware of the function and limitations of the respiratory system, and alarm management has become the subject of a significant increase in the US health care system.³ Nurses adjust the order of their duties by checking the emergency alarm indicators of patients' condition and have a greater tendency to react. on long-term alarms and are considered uncommon, So the weight of the heavy load increases, the alarm response and performance decreases. Signal length is therefore an important factor in nurses' response but workload, patient status and work difficulty may trigger other response strategies. Adjusting the alarms to a patient's actual needs ensures that the alarms are valid and provides an early warning in potentially critical situations. Not all hospitals or departments have reached such a point, where alarm [Jane \(2013\)](#). Alarm management has been the subject of significant growth in the US health system, many solutions have been proposed, and the results of specific interventions have been tested and reported [Covert and Niu \(2015\)](#) Many contributing factors to fatigue, firstly as reported by the Joint Commission in 2013 the absence or insufficient alarms, secondly the faulty alarms, thirdly the audible Alarms, and the alarms off. An experts from the Association for the Advancement of Medical Instrumentation. 2011) they believe that in many cases patient death and guard events are primarily a reflection of nurse fatigue to solve the problem a low-pressure ventilator alarm immediately checks ventilator-patient communication for disconnection. if the alarm continues to sound, disconnect the respirator and inhale by hand with a bag-valve-mask device. Close the patient's ventilator circuit with a glove finger and watch for ventilation delivered by the next ventilator. When the ventilator pressure manometer tries to rise and the High-Pressure alarm goes off, the vent rotation has not changed, and the leak is still in the patient or air-conditioning machine [Spiegel et al. \(2016\)](#) A nurse caring for a ventilator patient must demonstrate the ability to detect malignancies. potential occurrences and perform the necessary interventions that may prevent the patient from progressing to the final goal of relief from respiratory failure. Despite the potential for life-threatening complications, ventilation is still the most common form of medical care available due to the explosion of technology in health care settings and the number of alarms associated with these devices continues. Sound breathing alarms for high frequency breathing or high pressure can usually occur and for a short time in very alert and moving patients in the intensive care unit. The exposure of staff to large numbers of ventilator alarms, self-adjusting and possible, results in an extended response time to the ventilator alarm bell. Sound ventilator alarms are associated with high respiratory frequency or high pressure that occurs compared to short-term in very alert and moving patients in the intensive care unit. Staff exposure to

large numbers of ventilator alarms, which can be adjusted and do not occur, may end up over the next response time when the ventilator alarm sounds. Alarms are an important part of mechanical ventilation because these systems provide vital life functions. Alarms alert for technical or patient events that require attention or action; therefore, information about alarms and how to fix them is important. The Association for the Advancement of Medical Instrumentation has identified challenges regarding ventilation [Spiegel et al. \(2016\)](#).

2. PROBLEM STATEMENT

As result the explosion of technology in health care settings continues so does the number of alarms related to these devices. Audible mechanical ventilator alarms such as high breathing frequency or high peak pressures can occur with relative frequency and short duration for patients who are more awake and mobile in the critical care setting. Staff exposure to large numbers of mechanical ventilator alarms, which may self-correct and are no actionable, may result in a longer response time the next time the ventilator alarm sounds. Alarms are an integral part of mechanical ventilation because these systems provide vital life support functions. Alarms warn of technical or patient events that require attention or action; therefore, knowledge about alarms and how to troubleshoot them is essential. The Association of the Advancement of medical Instrumentation identified challenges Regarding mechanical ventilation alarm. Notably, some alarm systems do not properly is considering life-threatening this reported [Spiegel and Mallemat \(2016\)](#). Two important rules must be followed to ensure patient safety: 1 currently in intensive care units in South Africa the mechanically ventilated patient is most likely to be cared for by, thus placing the patient at risk of complications which may not be correctly assessed by the non-competence qualified nurse. the researchers" own experience of varying levels of competence amongst nurses regarding mechanical ventilation in intensive care units, prompted the researcher to further investigate the level of nurses" competence in mechanical ventilation alarm in Critical Care unit "s in South Africa.

Although physiologic monitor alarms have received great attention during the previous five years, little work has been reported regarding ventilator alarms. Among the ECRI Institute's top 10 health technology hazards for 2017, ventilator alarm management was listed as the third greatest hazard because of the unique challenges that ventilators pose to the healthcare team [Wallis \(2010\)](#).

3. GENERAL OBJECTIVE

To assess nurse's practices regarding ventilation clinical alarms.

4. METHODS

This is descriptive cross sectional, Hospital based study was carried out in Critical Care Units in the three main governmental hospitals, located in Khartoum State. The targeted populations were all nurses working in Critical Care Units s both gender during study period and willing to participate (100). an observational checklist was used to collect the data from study subjects. The Rating scale was used (good, satisfied, poor performance) more or two third performance for equal 75 percent inadequate performance for more or equal 50 percent Poor performance for less than 50 percent [Lieto et al. \(2018\)](#). The tool was examined by expertise in the field of the study and their comments about content and context was considered.

Piloting was done among 12 nurses and Alpha Cronbach's test was 82.5%. Data was analyzed by using statistical package of social program (SPSS) version 26. P value considered significant at (0.05). The research was respecting the rights of participants. Consent was obtained from all participants after explanation.

Table 1

Table 1 Cross Tabulation Between Years of Experience and Total Practice			
Years Of Experience	Value	Df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	.406a	3	0.939
Likelihood Ratio	0.403	3	0.94
Linear-by-Linear Association	0.321	1	0.571

Table 2

Table 2 Study Group Total Level Practice			
Level of practice	Frequency	Percentage	Mean ±(Std)
Good	42	42.00%	
Satisfied	58	58.00%	
Poor	0	0.00%	1.58± (.496)
Total	100	100.00%	

Table 3

Table 3 Cross Tabulation Between Qualification and Total Practice				
Qualification	Value	Df	Asymptotic Significance (2-sided)	Qualification
Pearson Chi-Square	.881a	2	.644	Pearson Chi-Square
Likelihood Ratio	.873	2	.646	Likelihood Ratio
Linear-by-Linear Association	.476	1	.490	Linear-by-Linear Association

Table 4

Table 4 Study Group Level of Practice Regarding Ventilator Alarms			
Conduct appropriate assessment of the patient	88(88%)	12(12%)	0(0.00%)
Ensured that all high-pressure gas hoses were tightly connected to oxygen sources.	50(50%)	41(41%)	9(9%)
Appropriately manage alarm according to the	80(80%)	13(13%)	7(7%)
Mute of alarm	61(61%)	33(33%)	6(6%)
Establish patient base line / normal ventilator setting	59(59%)	34(43%)	7(7%)
Intervention of according to types of alarm			
Re Set	52(52%)	44(44%)	4(4%)
Changed to	43(43%)	53(53%)	4(4%)
Tested	48(48%)	44(44%)	8(8%)
Perform appropriate suction, as indicated	88(88%)	10(10%)	2(2%)

Checked oxygen and air pressure.	86(86%)	12(12%)	2(2%)
Ensured that the alarms were set properly.	70(70%)	26(26%)	4(4%)
Verified that the alarm had been corrected and the patient was stable	82(82%)	16(16%)	2(2%)
Documentation of the findings	94(94%)	5(5%)	1(1%)

5. DISCUSSION

The present study revealed that most of nurses were female (97%), and they have Bachelors degree (76%) while their years of experience its less than half of years with experience range form (6-1) years and two third of them exposed to training course about management of patient o mechanical ventilator once or twice. Regarding to the group level of practices about colors and massage alarm. It was fond that good output in experience, Nurse's role during high and low aspiratory volume alarms, Nurses role related to set too low little volume, Low power Alarm, nurse's role related to

decreasing Spo2 alarm. because more than half of them they don't have enough information knowledge about cause of ventilator alarm, except one third of them have satisfied practices about high and low expiratory volume alarm 32(32%) mean $2.32 \pm (.763)$ this finding was in agreement with study done in University of Nairobi Kenyatta National Hospital to assess the nurses' interventions when managing clinical alarms.

According to the result it was done that study group level of practices of mute ventilator alarm and reset alarm will direct after their response and skills to manage alarm which may result on patient conditions and out com and may present patient to compliance

In spite of their satisfied practices about cause and their result toward ventilator alarm about the knowledge they have good response to ventilator alarm more than two third of them wear response to assess cause of alarm 83(83%) and assess the patient 77(77%), response to alarm always but only 3(3%) not response to alarm –this result corresponding with study done on, also in Nairobi, the response percentage is about 10%. Nurses respond to alarms for different reasons, not just the fact that the alarm sounds.f

In addition to that, the study the level of practice regarding ventilator alarm colors and massage 92(92%)and assessments of patient condition88(88%) ,mute alarm ,check oxygen and air pressure alarm86(86%)managing alarm 82(82%) .Furthermore it was revealed that the total practices of the study group was satisfied 58.0% with their mean $1.58 \pm (.496)$.In spite of their satisfied performance and there may be due to their exposed to their collage experience or their short duration There was insignificant relationship between qualification, years of experience and tanning program and total level of participant practice p value (.0644).0 939) and .0822)

6. CONCLUSION

Total of mean level of practices regarding ventilator alarms was satisfied and they have ability to manage alarm according to the type and rest it and their verification

7. RECOMMENDATION

Insure tanning for nursing staff in regular period based on evidence-based practices pertaining to mechanical ventilation alarm practices, it is imperative that research be done to inform those practices. Alarm protocols should also be established in the unit and the element of alarm checklists should be introduced. Finally, more research should be undertaken on alarm management where all the nurses and biomedical personnel should be included.

CONFLICT OF INTERESTS

None.

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