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Environmental management strategies during emerging of infectious situation

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Background

Ventilator Associated Pneumonia (VAP) is the most common hospital acquired infection among patient in intensive care unit and is associated with significant mortality rate and rising the cost of care by increasing a patient's stay (Babcock, 2004). In the month of August 2017 at Tertiary Care Hospital, HAI surveillance system was modified to see that how many patients received hospital acquired pneumonia from ventilator and was identified that 61.2 cases per 1000 ventilated days got VAP which was a leading cause to increase a patient's stay with ventilator that was almost 8 days. Several standards of care have been developed in attempt to reduce the occurrence of VAP rate and patient stay with ventilator by developing a VAP committee with inclusion of purchase manager to get a right item with required amount for implementation of IPC practices & biomedical managers for medical equipment maintenance to reduce infection rate.

Purpose

- The 1st purpose of all exercise, to implement a HAI surveillance system in a right manner with described time frame.
- The 2nd purpose was that, 50% reduction of hospital acquired VAP rate and patient stay with ventilator by the end of December 2017.
- The 3rd purpose to observe current practices of nursing staff and doctor on patient with mechanical ventilator in critical care units.
- The 4th purpose to identify the gape for improvement in IPC related practices to reduce the VAP rate.
- The 5th purpose of this study to see the benefit of supply chain and biomedical managers inclusion in VAP committee to reduce a VAP rate.
- The 6th purpose was that to train all concern people who participate directly or indirectly with maximum and minimum percentage and can contribute in reduction of hospital acquired infection in a future by putting their right efforts.

Methodology Setting: Observation was conducted in all intensive care units including medical, surgical and pediatric consist of 51 beds at tertiary care hospital.

Population: All patients who are connected to a ventilator after admission. All register nurses and attending doctor are assigned on patient with ventilator.

Inclusion criteria: All patients who developed a VAP connected to ventilator for more than 48 hours and

within 48 hours after disconnection of ventilator. Exclusion Criteria is none.

Selection criteria: High risk, high cost, high volume, problem prone and requirement of standard such as IPC and ISO.

Design: That was retrospective and concurrent study.

Data collection: Collected by making a daily round in all intensive care units, reviewed patient's clinical condition and their medical records and reviewed all investigation reports such as x-ray, sputum C/S, CBC. Status of ventilator's cleaning, PPM and calibration. Supply related respiratory therapy, hand hygiene and PPE such as suction catheter, HME filter, soap, hand rub were reviewed for the specification and inventory management with coordination of purchase department.

Data analysis: Patients' data was compiled on excel sheet & mini-tab. Pre and post swim lane & value stream map were prepared on evaluation of staff practices as six sigma project.

Results: Initially as a base line, just observed the current practices and knowledge of the healthcare workers and surveillance systems conducted by IPC team from July to August 2017. During baseline phase, it was observed no coordination among ICU's stakeholder, IPC team, purchase and bio-medical department. All healthcare worker involved in care on ventilated patient were educated on VAP bundle, hand hygiene and appropriate using of PPE. VAP committee was established with including of purchase manager and bio-medical manager to purchase right items for use and appropriate cleaning, PPM and calibration. Hand hygiene compliance monitoring systems were introduced. HAI surveillance system was modified. Initially it was based on positive culture reports only. HAI key performance indicators were introduced. All interventions produced improvement and hospital acquired VAP were reduced from 61.2 to 24.0 cases per 1000 ventilator days. The compliance of IPC practices such as hand hygiene, changes of gloves, proper technique of suctioning, use of RO water for oxygen therapy, oral hygiene, head elevation and humidifier disinfection were improved from 39.2 to 87.8%. The mean of patient stay with ventilator were reduced from 6.38 to 4.01 and standard deviation was reduced by 34.9% ($p<0.05$).

Conclusion: Conduction of HAI surveillance system is a first necessary step for IPC team there for it is essential that HAI surveillance system must be perform with a right direction to get a correct rate of hospital acquired infection as it will reflect on IPC's work competency. These whole exercises concluded that by improving of hand hygiene, changing of PPE from one use to another use, VAP bundle implementation, using of RO water for oxygen therapy, avoiding contamination during suction and cleaning and disinfection of oxygen humidifier can play a major role. Another important factor was identified that people who can have indirect relation with less percentage can play a major role to achieve big percentage of compliance. Preparation on monthly VAP indicator will capture the attention of concern stakeholders for continuity of improvement.

Biography

Riffat Shaheen is from Karachi, Pakistan and working since more than in the field of IPC, QA and healthcare management. Currently she is working as a consultant QA and IPC with National Institute of Blood Diseases (NIBD) in Karachi.