Effect of an Intervention Training Program on Hospital Acquired Infection Rates in Intensive Care Units of Governmental Hospit als in Egypt

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List of Abbreviations

ABUTI	Asymptomatic Bacteremic Urinary Tract Infection
AICU	Adult Intensive Care Unit
AIDS	Acquired Immune Deficiency Syndrome
AIIMS	All India Institute of Medical Sciences
AIIRs	Air Born Infection Isolation Rooms
ARO	Antibiotic Resistant Organism
BSI	Blood Stream Infection
CAUTI	Catheter Associated Urinary Tract Infection
CCU	Coronary Care Unit
CDC	Center for Disease Control and Prevention
CFUs	Colony Forming Units
CI	Confidence Interval
CLABSI	Central Line Associated Blood Stream Infection
CLU	Central Line Utilization
CPAP	Continuous Nasal Positive Airway Pressure
CSEP	Clinical Sepsis
CVC	Central Vascular Catheter
DAI	Device Associated Infection
DU	Device Utilization
DUR	Device Utilization Ratio
EIA	Enzyme Immuno Assay
ESBL	Extended-Spectrum Beta Lactamase
FAMA	Fluorescent Antibody staining of Membrane Antigen
HAI	Healthcare Associated Infection
HAP	Healthcare Associated Pneumonia
HCW	Health Care Worker
HICPAC	Healthcare Infection Control Practices Advisory Committee
HIV	Human Immunodeficiency Virus
HSV	Herpes Simplex Virus
IC	Infection Control
ICU	Intensive Care Unit
IFA	Immuno Fluorescent Antibody
INICC	International Nosocomial Infection Control Consortium
IPAC	Infection Prevention And Control
IPPB	Intermittent Positive Pressure Breathing
LCBSI	Laboratory Confirmed Blood Stream Infection
LOS	Length Of Stay
LRI	Lower Respiratory Infection

MICU	Medical Intensive Care Unit
MOHP	Ministry Of Health & Population
MRSA	Methicillin Resistance Staphylococcus Aureus
MV	Mechanical Ventilation
NHSN	National Healthcare Safety Network
NICU	Neonatal Intensive Care Unit
NNIS	National Nosocomial Infection Surveillance
OR	Odds Ratio
OUTI	Other Urinary Tract Infection
PCR	Polymerase Chain Reaction
PDA	Personal Digital Assistant
PDR	Patient Day Rate
PEEP	Positive End Expiratory Pressure
PICC	Peripherally Inserted Central Catheter
PICU	Pediatric Intensive Care Unit
PIR	Patient Infection Rate
PPE	Personal Protective Equipment
QI	Quality Improvement
RCT	Randomized Controlled Trial
RIA	Radio Immuno Assay
RICU	Respiratory Intensive Care Unit
RR	Relative Risk
SD	Standard Deviation
SE	Standard Error
SICU	Surgical Intensive Care Unit
SSI	Surgical Site Infection
SUTI	SUTI
UC	Urinary Catheter
UCU	Urinary Catheter Utilization
UTI	Urinary Tract Infection
VAP	Ventilator Associated Pneumonia
VRE	Vancomycin Resistant Enterococcus
VU	Ventilator Utilization
WHO	World Health Organization

Introduction

Nosocomial infection or health care associated infection is an infection acquired in health care facility by a patient who was admitted for a reason other than that infection, this infection is not present or incubating at admission. Infection occurring more than 48 hours after admission is usually considered nosocomial infection ***(WHO, 2002)***.

Studies throughout the world documented that health care associated infections are among the leading causes of death and they cause significant morbidity among patients who receive health care ***(Kim et al, 2000)***.

A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing4 WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications acquired in hospital. The highest frequencies of nosocomial infections were reported from hospitals in the Eastern Mediterranean and South-East Asia Regions (11.8 and 10.0% respectively), with a prevalence of 7.7 and 9.0% respectively in the European and Western Pacific Regions ***(WHO, 2002).***

A WHO study has shown that the highest prevalence of nosocomial infections occurs in intensive care units. Infection rates are higher among patients with increased susceptibility because of old age, underlying disease, or immunosupression ***(WHO, 2002).***

In the USA, the most frequent type of infection hospitalwide is urinary tract infection (36%), followed by surgical site infection (20%), and bloodstream infection and pneumonia (both 11%) ***(Pollack, 2010).***

Healthcare-associated infections are serious, common, and important patient safety issues in health care today. Infection prevention is a cornerstone of continuous quality improvement ***(Stone et al, 2002).***

Surveillance as an element of epidemiological practice is "the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link in the surveillance chain is the application of these data to prevention and control." This definition is part of the plan for the national coordination of disease surveillance of the Centre for Disease Control and Prevention ***(Robert, 2008)***.

Surveillance of HAI is a critical component of prevention efforts, particularly in infection control programs newly introduced into hospitals. In the 1970's, the Study on the Efficacy of Nosocomial Infection Control (SENIC) showed that intensive surveillance, in combination with other aspects of an infection control program, was associated with significantly reduced rates of HAI ***(Zaidi, 2005).***

A survey conducted by the CDC in 2000 found that an infection control epidemiologist spends 35%–40% of work time performing surveillance ***(Nguyen et al, 2000).*** A study found that the use of electronic systems reduced the time spent on surveillance by 65% ***(Chalfineet al, 2006).*** Both commercial and independently developed computer based surveillance systems have the potential to increase efficiency and to reduce economic costs at multiple levels of the healthcare system. There are few peer reviewed studies that explicitly investigate the cost-effectiveness of computer-based surveillance, but at least 2 studies have shown automated surveillance to be significantly cost-effective ***(Furuno et al, 2008).*** Several individual case studies have found that implementing an electronic surveillance system reduced both infection rates and associated economic costs ***(Hess et al, 2007).***

In Egypt, the national infection control (IC) program started in 2003. The strategic plan of the IC program included training and capacity building of staff, creating organizational structure, promotion of occupational safety, monitoring and supervision, and surveillance of HAI. So far, 313 hospitals have been trained on IC standard precautions. However, nowadays a surveillance system for HAIs is ongoing in Egypt, as it is an essential component but till now, there is no governmental national wide laboratory based surveillance data regarding HAIs. The development of such a laboratory based surveillance system is essential to detect hospital outbreaks and improve the performance of the infection control program in the hospitals to improve the quality of health care provided.

Study Rationale:

Since HAI is still a problem in Egyptian hospitals and there is weak knowledge and poor adherence of HCWs to the infection control standard precautions in addition to the presence of weak data on HAI rates in Egyptian hospitals, therefore close surveillance, accurate measurements and conducting an intervention in the form of training of HCWs on infection control standard precautions are essential to reduce HAI rates in Egyptian hospitals to improve the quality of health care provided.

Study Hypothesis

Intervention in the form of training of health care workers on infection control standard precautions including the preventive bundles for each of urinary tract infection (UTI), blood stream infection (BSI) and pneumonia, will reduce HAI rates in the selected ICUs of the study hospitals.

Research Questions

What is the incidence rate of HAIs in the selected ICUs of the study hospitals before the intervention?

What is the incidence rate of HAIs in the selected ICUs of the study hospitals after the intervention?

Will the intervention done in the form of training of health care workers on infection control standard precautions including the preventive bundles for each of UTI, BSI and pneumonia, be effective in the reduction of HAI rates in the selected ICUs of the study hospitals?