

EPIDEMIOLOGICAL STUDY OF NOSOCOMIAL INFECTIONS IN CAIRO GOVERNORATE NICUs

Thesis

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۲۰۱۲

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

اللَّهُ نُورُ السَّمَاوَاتِ
وَالْأَرْضِ مِثْلُ نُورِهِ
كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ
الْمِصْبَاحُ فِي زُجَاجَةٍ
الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ
دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ
مُبَارَكَةٍ زَيْتُونَةٍ لَا
شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ
يَكَادُ زَيْتُهَا يُضِيءُ
وَلَوْ لَمْ تَمْسَسْهُ نَارٌ
نُورٌ عَلَى نُورٍ

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List of Abbreviations

Abb.	Full term
AIIR	Airborne infection isolation room
ASB	Asymptomatic bacteriuria
AMR	Antimicrobial resistance
BSI	Body Substance Isolation
BW	Birth weight
CAUTI	Catheter-Associated Urinary Tract Infection
CBC.....	Complete blood count
CDC	Centers for disease control and prevention
CHG	Chlorhexidine gluconate
CRBSI.....	Catheter related blood stream infection
CRP	C-reactive protein
CS.....	Cesarean section
CT	Computed tomography
CVC.....	Central venous catheter
DIC.....	Disseminated intravascular coagulation
ELBW	Extremely low birth weight
ETO	Ethylene oxide
FDA	Food and Drug Administration
GA.....	Gestational age
GI	Gastrointestinal
GU	Genitourinary
HAI	Healthcare associated infection
HCAI.....	Healthcare associated infection
HCAIs.....	Healthcare associated infections
HCW	Health care worker

HEPA.....	High-Efficiency Particulate Air
HH.....	Hand hygiene
HICPAC.....	Healthcare Infection Control Practice Advisory Committee
HW.....	Hand wash
IgG	Immunoglobulin G
MDROs	Multi-drug resistant organisms
MOHP.....	Ministry of Health and Population
MRI.....	Magnetic Resonance Imaging
NICU	Neonatal intensive care unit
NIs	Nosocomial infections
NHSN	National Healthcare Safety Network
OPA	Ortho-phthalaldehyde
PCMX	Para Chloro Meta Xylenol
PICC	Peripherally inserted central catheter
PN.....	Parenteral nutrition
PPE	Personal protective equipment
PSAE.....	Pseudomonas aeruginosa
RDS.....	Respiratory distress syndrome
SARS.....	Severe Acute Respiratory Syndrome
SIRS	Systemic inflammatory response syndrome
TPN.....	Total parenteral nutrition
UP	Universal Precautions
UTIs	Urinary tract infections
VAP	Ventilator-associated pneumonia
VLBW	Very low birth weight
VRE.....	Vancomycin-Resistant Enterococcus
WBC.....	White blood cell
WHO	World Health Organization



INTRODUCTION

Neonatal deaths account for over a third of the global burden of child mortality. In many developing countries neonatal mortality rates (deaths in the first 28 days of life) are as high as 40–50 per 1000 live births, with infections being the major cause of death (**Mahfouz et al., 2010**).

Neonates, particularly those who are preterm and low birth weight, are at higher risk of acquiring infections compared with term and older infants. As a result, many interventions have been established in the NICU to attempt to decrease the infants' risk of acquiring infection (**Judith and Guzman-Cottrill, 2010**).

Nosocomial sepsis is a serious problem for neonates who are admitted for intensive care. As it is associated with increases in mortality, morbidity, and prolonged length of hospital stay, both the human and fiscal costs of these infections are high (**Clark et al., 2004**).

Improvements in antenatal management and neonatal intensive care over the past 10 to 15 years have changed the prognosis for preterm infants. This has resulted in a dramatic change in the populations of infants occupying neonatal intensive care beds. The average length of stay for

a term or near-term infant who has surgical or respiratory problems is about 10 days (**Richard et al., 2003**).

The population of extremely low-birthweight (ELBW) infants who remain hospitalized for extended periods of time (and who undergo numerous invasive procedures) is most susceptible to nosocomial infections (**Richard et al., 2003**).

Unfortunately, hospitals in developing countries are at high risk of infection transmission, and improvements in neonatal outcomes are subverted by hospital-acquired infections and their associated morbidity, mortality and cost. These infections can be attributed to lack of knowledge and training about basic infection control processes, coupled with inadequate infrastructure, systems of care and resources. This has serious consequences when devices such as intravenous catheters and ventilators are introduced without sufficient attention to the substantial risk of infection they entail (**Mahfouz et al., 2010**).

Systematic surveillance is the first and integral step of all infection control measures, especially in intensive care settings. Surveillance systems started evolving in developed countries nearly 40 years ago. Infection surveillance in the NICU presents a number of unique challenges regarding definitions and differing symptoms and signs in the neonate (**Kumar and Kumar, 2009**).



Healthcare associated infection (HAI) rate is an indicator of the quality and safety in all areas of health care. Determination of HAI rate via a surveillance program is the first step towards identification of the problems as well as evaluating the impact of interventions to decrease the frequency of hospital acquired infections (**Kumar and Kumar, २००९**).

An infection is considered to be HAI only if it occurs after ४८ hours of stay in the NICU. Although ४८-७२ hours period is traditionally used to differentiate between vertically or postnatally acquired infections, this cut-off may underestimate the incidence of HAIs. This is because many times the incubation period is less than ४८-७२ hours and many infections acquired in first ७२ hours may actually be hospital acquired (**Kumar and Kumar, २००९**).

For the above reasons, many studies worldwide have been done to identify the epidemiology of the nosocomial infections among neonates in NICUs (**Jeong et al., २००६**).