EPIDEMIOLOGICAL STUDY OF NOSOCOMIAL INFECTIONS IN CAIRO GOVERNORATE NICUS

Thesis

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بسم الله الرحمن الرحيم

اللهُ نُورُ السَّمَاوَاتِ
وَالأَرْضِ مَثَلُ نُورِهِ
كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ
المِصْبَاحُ فِي زُجَاجَةٍ
الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ
دُرِّيٌّ يُوقَدُ مِن شَجَرَةٍ
مُّبَارَكَةٍ زَيْتُونَةٍ لاَ
شَرْقِيَّةٍ وَلاَ غَرْبِيَّةٍ
يَكَادُ زَيْتُهَا يُضِيءُ
وَلَوْ لَمْ تَمْسَسْهُ نَارٌ
نُورٌ عَلَى نُورٍ

صدق الله العظيم

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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 central
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.....	Parentral nutrition
PPE	Personal protective equipment
PSAE.....	Pseudomonas aeruginosa
RDS.....	Respiratory distress syndrome
SARS.....	Severe Acute Respiratory Syndrome
SIRS	Systemic inflammatory response syndrome
TPN.....	Total parentral 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 ٢٨ days of life) are as high as ٤٠–٥٠ per ١٠٠٠ live births, with infections being the major cause of death **(Mahfouz et al., ٢٠١٠).**

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, ٢٠١٠).**

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., ٢٠٠٤).**

Improvements in antenatal management and neonatal intensive care over the past ١٠ to ١٥ 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 ١٥ days **(Richard et al., ٢٠٠٣).**

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., ٢٠٠٣).**

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., ٢٠١٠).**

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 ٤٠ 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, ٢٠٠٩).**

Healthcare associated infection (HAl) rate is an indicator of the quality and safety in all areas of health care. Determination of HAl 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, ٢٠٠٩).**

An infection is considered to be HAl only if it occurs after ٤٨ hours of stay in the NICU. Although ٤٨-٧٢ hours period is traditionally used to differentiate between vertically or postnatally acquired infections, this cut-off may underestimate the incidence of HAls. This is because many times the incubation period is less than ٤٨-٧٢ hours and many infections acquired in first ٧٢ hours may actually be hospital acquired **(Kumar and Kumar, ٢٠٠٩).**

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., ٢٠٠٦).**