

# **Rate of Bacterial Colonization in Pediatric Intensive Care Unit Staff**

**Thesis**

Submitted for partial fulfillment of master degree  
**in Pediatrics**

**By**

**Abdel Aal Bakheat Mohamed**  
*MBBCH, Al-Azhar University (2004)*

**Supervised by**

***Prof. Dr. Hanan Mohamed Ibrahim***

*Professor of Pediatrics*  
*Faculty of Medicine - Ain Shams University*

***Prof. Dr. Ghada Abdelwahed Ismail***

*Professor of Clinical Pathology*  
*Faculty of Medicine - Ain Shams University*

***Dr. Ahmed Sameh Said***

*Lecturer of Pediatrics*  
*Faculty of Medicine - Ain Shams University*

**Faculty of Medicine**  
**Ain Shams University-Cairo**  
**2011**



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا  
مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ  
الْحَكِيمُ

صدق الله العظيم

سورة البقرة آية (٣٢)





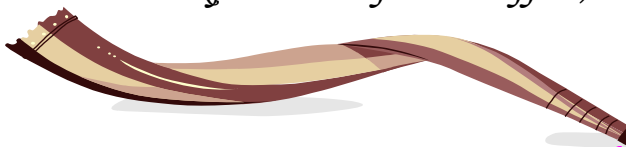
*First of all, thanks to **ALLAH** whose magnificent help was the main factor in completing this work,*

*I wish to express my unlimited gratitude to **Prof. Dr. Hanan Mohamed Ibrahim**; Professor of Pediatrics, Faculty of Medicine, Ain Shams University, for her supervision, helpful discussions and suggestions. In fact, a few words never suffice to do justice in thanking her for her extraordinary contribution of time, effort and valuable experience.*

*I would like to express my great appreciation to **Prof. Dr. Ghada Abdelwahed Ismail** Professor of clinical pathology,, Faculty of Medicine, Ain Shams University, for her brotherhood guidance, patience, supervision and instructions during the progress of this work giving me much of her time, effort and knowledge.*

*I can't fully express my deepest thanks to **Dr. Ahmed Sameh Said**, Lecturer of Pediatrics, Faculty of Medicine, Ain Shams University, for his patience, assistance and very helpful advice and guidance during the progress of this work,*

*My special thanks to all health care workers in pediatric intensive care unit who agreed to share in this study. I'm thankful to them for their effort, time and cooperation.*



***Abdel Aal Bakheat Mohamed***



# *Dedication*

*To those who have been always there  
for me*

*My caring mother,*

*My father*

*&*

*My lovely family; My wife, Ahmmed  
and Mohammed*

*I owe them all that I have become*

*& all that I will ever be....*

*Thanks for your valuable support.*

*Abdel Aal Bakheat Mohamed*





# LIST OF CONTENTS

Title	Page No.
<i>List of Abbreviations.....</i>	<i>II</i>
<i>List of Figures .....</i>	<i>III</i>
<i>List of Tables .....</i>	<i>IV</i>
<i>Introduction .....</i>	<i>1</i>
<i>Aim of the Work.....</i>	<i>4</i>
<i>Review of Literature</i>	
▪ <i>Nosocomial Infections in the Pediatric Intensive</i>	
<i>Care Unit .....</i>	<i>5</i>
▪ <i>Staph aureus .....</i>	<i>42</i>
▪ <i>MRSA .....</i>	<i>46</i>
<i>Material and Methods .....</i>	<i>65</i>
<i>Results.....</i>	<i>71</i>
<i>Discussion.....</i>	<i>81</i>
<i>Summary and Conclusion.....</i>	<i>89</i>
<i>Recommendations.....</i>	<i>91</i>
<i>References .....</i>	<i>92</i>
<i>Arabic summary.....</i>	<i>--</i>



# **List of Abbreviations**

<b>AIDS</b>	: Acquired immunodeficiency syndrome
<b>BSI</b>	: Blood stream infection
<b>CAUTI</b>	: Catheter associated urinary tract infection
<b>CDC</b>	: Centers for disease control and prevention
<b>CA-MRSA</b>	: Community – associated Methicillin resistant staph aureus
<b>CLABSIS</b>	: Centralline-associated Blood stream infection
<b>CLSI</b>	: Clinical and Laboratory Standerds Institute
<b>CONS</b>	: Coagulase negative staphylococci
<b>CRBSI</b>	: Catheter related blood stream infection
<b>CVC</b>	: Central venous catheter
<b>ES<math>\beta</math>L</b>	: Extended spectrum $\beta$ lactamse
<b>ICU</b>	: Intensive care unit
<b>MRSA</b>	: Methicillin resistant staph aureus
<b>NHSN</b>	: National health care safety network
<b>NICU</b>	: Neonatel Intensive care unit
<b>PICU</b>	: Pediatric Intensive care unit
<b>RSV</b>	: Respiratory syncytial virus
<b>Spp</b>	: Species
<b>SSI</b>	: Surgical site infection
<b>TPN</b>	: Total parenteral nutrition
<b>UTI</b>	: Urinary tract infection
<b>VAP</b>	: Ventilator-associated pneumonia



## LIST FIGURES

<b>Fig.</b>	<b>Title</b>	<b>Page</b>
(1)	Yellow colonies of <i>S. aureus</i> on a blood agar plate	42
(2)	Distribution of gender of studied health care workers in NICU	71
(3)	Distribution of Occupation of studied health care workers	72
(4)	Distribution of results of first culture of health care workers before decolonization (nasal swab)	73
(5)	Distribution of results of second culture of health care workers after treatment (nasal swab)	74
(6)	Comparison between health care workers and type of infection before colonization	75
(7)	Comparison between nasal swab cultures before and after decolonization among studied health care workers	76
(8)	Comparison between interdigital cultures before and after decolonization among studied health care workers	77
(9)	Comparison between health care workers and type of infection after decolonization	78
(10)	Rate of noscomial infection before and after application of decolonization program (total cultures)	79
(11)	Rate of noscomial infection before and after application of decolonization program (blood cultures)	80
(12)	Rate of staphylococcal infection before and after application of decolonization program (blood cultures)	81
(13)	Comparison between rates of staphylococcal infections before and after decolonization	82
(14)	Descriptive statistics of total positive staph blood cultures and MRSA before and after application of the decolonization program	83

## **LIST OF TABLES**

<b>Table</b>	<b>Title</b>	<b>Page</b>
<b>(1)</b>	Sources and transmission of hospital-acquired organisms .	<b>26</b>
<b>(2)</b>	Distribution of demographic data of health care workers working in pediatric NICU screened for organisms.	<b>72</b>
<b>(3)</b>	Distribution of results of the first culture of health care workers before decolonization	<b>73</b>
<b>(4)</b>	Distribution of results of the second culture of health care workers after treatment (Decolonization).	<b>74</b>
<b>(5)</b>	Comparison between health care workers and type of infection before decolonization	<b>75</b>
<b>(6)</b>	Comparison between nasal swab cultures before and after decolonization among studied health care workers.	<b>76</b>
<b>(7)</b>	Comparison between interdigital cultures before and after decolonization among studied health care workers.	<b>77</b>
<b>(8)</b>	Comparison between health care workers and type of infection after decolonization	<b>77</b>
<b>(9)</b>	Comparison between rates of noscomial infections before and after decolonization	<b>78</b>
<b>(10)</b>	Comparison between rates of nosocomial infections before and after decolonization	<b>78</b>
<b>(11)</b>	Comparison between rates of staphylococcal infections before and after decolonization	<b>79</b>
<b>(12)</b>	Comparison between rates of Staphylococcal infections before and after decolonization	<b>79</b>
<b>(13)</b>	Descriptive statistics of the total positive staphylococcal blood cultures and positive MRSA cultures before and after the study	<b>80</b>

## **Introduction**

Centers for disease control and prevention (CDC) define Health care associated infection (HAI) or Nosocomial infection as a localized or systemic condition resulting from an adverse reaction to The presence of an infectious agent (s) or its toxin (s) That occurs in a patient in a health care setting (e.g., a hospital or out patient clinic) was not found To be present or incubating at the time of admission unless the infection was related to a previous admission to the same setting and If the setting is a hospital, meets the criteria for a specific infection Site as defined by CDC (*Mc kibben et al., 2005*).

The risk for nosocomial infections is (5-10) times higher In patients hospitalized in the ICU than in patients staying in other wards (*Jovanovic et al., 2006*).

Nosocomial infections add tremendous human costs, Prolonged hospital stays and separation from family and friends, as well as problems with functional status, medication adherence discomfort, and overall quality of life (*Strausburg et al., 2000*).

In united states the centers for disease control & prevention. estimate that roughly 1.7 million hospital – associated infections, from all types of bacteria combined, cause or contribute to 99.000 deaths each year (*Pollack et al., 2010*) .