

Upgrading Knowledge and Skills of Cairo University Nursing Students in Infection Control: An Interventional Study

Thesis

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ABSTRACT

Capacity building of nursing students to develop appropriate knowledge and skills in infection control (IC) is crucial for health care quality. Nurses do receive IC training before graduation, however; their actual IC performance is still unfavorable. Therefore, there is a need to provide evidence -based strategies in training practices for nursing students. **Objectives:** To design and conduct training strategy based on needs detected by the baseline assessment, and evaluates its impact on knowledge and skills of nursing students. **Methodology:** An operations research - interventional study- pretest - posttest design, it was conducted at the Technical Institute of Nursing, Cairo University (TIN-CU). Fifty eight students participated in the study (pretest-training-immediate posttest) however 38 students continued to participate in the maintenance posttest. **Results:** TIN-CU IC curriculum was assessed according to the basic national guidelines for IC (10 chapters) by Ministry of Health and Population (MOHP), it was found that 7 chapters of the national guidelines were present in the institute's original curriculum though some important items were missing and 3 chapters were completely absent from the institute's original curriculum . Regarding the total knowledge and skills scores of the trainees significant improvement was achieved immediately after the training (p value<0.001), significant decline was found between immediate and maintenance posttest (p value<0.001). Regarding the total knowledge score of the trainees, their maintenance posttest level was significantly higher than pretest level (p value<0.001), however for the total skills score no significant change was found (p value=0.772). **Conclusion:** Introducing IC training to nursing students led to immediate improvement of their knowledge and skills, this improvement was sustained regarding the IC knowledge and was lost regarding the IC skills. **Recommendations:** Upgrading IC curriculum of nursing students and conducting further research about IC teaching and training by different approaches.

Key words: Capacity building, infection control, nursing students, knowledge, skills.

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List of Abbreviations

ANA	: American Nurses Association
CABSI	: Central line-associated bloodstream infections
CAUTI	: catheter-associated urinary tract infections
CDC	: Center for disease control and prevention
CPR	: Cardiopulmonary resuscitation
ECMO	: Extracorporeal membrane oxygenation
ED	: Emergency department
EDHS	: Egyptian Demographic and Health Survey
EPA	: Environmental Protection Agency
HAP	: Hospital Associated Pneumonia
HBV	: Hepatitis B virus
HCAIs	: Health care associated infections
HCV	: Hepatitis C virus
HCWs	: Health care workers
HICPAC	: Healthcare Infection Control Practices Advisory Committee
HIV	: Human immunodeficiency virus
HLD	: High level disinfectant
IABP	: Intra-aortic balloon pumps
IC	: Infection control
ICLNs	: Infection Control Link Nurses
ICN	: International Council of Nurses
ICN	: Infection control nurse
ICT	: Infection control team
ICU	: Intensive care unit
ILD	: Intermediate level disinfectant
IP& C	: Infection prevention and control
IPCP	: Infection Prevention and Control Programs
LLD	: Low level disinfectant
MOHP	: Ministry of Health and Population
MRSA	: Methicillin-resistant staphylococcus aureus
NHSN	: National Health Safety Network
NICUs	: Neonatal intensive care units

OJT	: On the job training
OSHA	: Occupational Safety and Health Administration
PHCM- FOM-CU	: Public Health and Community Medicine department – Faculty of Medicine - Cairo University
PPE	: Personal protective equipment
SOP	: Standards of practice
SSIs	: Surgical site infections
TIN-CU	: Technical Institute of Nursing, Cairo University
U.S.	: United States
UTI	: Urinary tract infection
VAP	: Ventilator-associated pneumonia
VRE	: Vancomycin-resistant enterococci
WHO	: World Health Organization

CONTENTS

	Pages
INTRODUCTION	1
AIM OF WORK AND OBJECTIVES	4
REVIEW OF LITERATURE	
▪ CHAPTER I: Importance of Infection Control	5
▪ CHAPTER II: Standards of Practice in Infection Control ...	16
▪ CHAPTER III: Misconceptions about Infection Control	44
▪ CHAPTER IV: Infection Control in different medical settings	51
▪ CHAPTER V: Role of Nurses in Infection Control in different medical settings	65
METHODOLOGY	75
RESULTS	84
DISCUSSION	119
CONCLUSION	130
RECOMMENDATIONS	131
SUMMARY	133
REFERNECES	137
APPENDICES	150
ARABIC SUMMARY	

List of Graphs

Graph No.	Title	Page
1	Total knowledge percent score in pretest, immediate posttest and maintenance posttest among nursing students	115
2	Total skills percent score in pretest, immediate posttest and maintenance posttest among nursing students	115
3	Percent change of Knowledge score in pretest, immediate posttest and maintenance posttest among nursing students	117
4	Percent change of skills score in pretest, immediate posttest and maintenance posttest among nursing students	117

LIST OF TABLES

Table No.	Title	Page
1	The Social costs of HCAs	13
2	Content analysis of IC curriculum including importance of IC and hand hygiene	85
3	Content analysis of IC curriculum including PPE and aseptic technique	86
4	Content analysis of IC curriculum including isolation precautions, linen management, anti-microbial resistance and environmental cleaning	87
5	Content analysis of IC curriculum including Cleaning, disinfection & Sterilization and waste management	88
6	Socio demographic criteria of the studied group	91
7	Distribution of the studied group according to their opinion about IC Teaching of the institute	93
8	Percent of correct answers in IC importance, ways of infection transmission & hand hygiene in pretest and immediate posttest	95
9	Percent of correct answers in PPE, risk assessment & management and aseptic technique in pretest and immediate posttest	96
10	Percent of correct answers in isolation precautions, environmental cleaning, cleaning, disinfection & sterilization and classification of equipments in pretest and immediate posttest	97
11	Percent of correct answers in waste disposal and needle stick injury in pretest and immediate posttest	98
12	Percent of correct steps in routine hand hygiene in pretest and immediate posttest	99
13	Percent of correct steps in cannula insertion in pretest and immediate posttest	100
14	Percent of correct steps in scoop technique and thermometer cleaning in pretest and immediate posttest	101

Table No.	Title	Page
15	Different situations resulted from comparing pretest, immediate posttest & maintenance posttest among 38 students	102
16	Percent of correct answers in IC importance, ways of infection transmission and hand hygiene in pretest, immediate posttest and maintenance posttest	103
17	Percent of correct answers in PPE, risk assessment& management and aseptic technique in pretest, immediate posttest and maintenance posttest	104
18	Percent of correct answers in isolation precautions, environmental cleaning, cleaning, disinfection& sterilization and classification of equipments in pretest, immediate posttest and maintenance posttest	106
19	Percent of correct answers in waste disposal and needle stick injuries in pretest, immediate posttest and maintenance posttest	108
20	Percent of correct steps in routine hand hygiene in pretest, immediate posttest and maintenance posttest	109
21	Percent of correct steps in cannula insertion in pretest, immediate posttest and maintenance posttest	110
22	Percent of correct steps in scoop technique and thermometer cleaning in pretest, immediate posttest and maintenance posttest	111
23	Knowledge percent scores in pretest, immediate posttest and maintenance posttest among nursing students	112
24	Skills percent scores in pretest, immediate posttest and maintenance posttest among nursing students	113
25	Total knowledge and skills percent scores in pretest, immediate posttest and maintenance posttest among nursing students	114
26	Percent change of Knowledge and skills scores in pretest, immediate posttest and maintenance posttest among nursing students	116
27	Correlation between percent change of knowledge and skills in pretest, immediate posttest& maintenance posttest among nursing students	118

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الرَّحْمَنُ⁽¹⁾ عَلَّمَ الْقُرْآنَ⁽²⁾ خَلَقَ الْإِنْسَانَ⁽³⁾ عَلَّمَهُ الْبَيَانَ⁽⁴⁾

صدق الله العظيم

سورة الرحمن ايه (1-4)

INTRODUCTION

Infection is considered nosocomial if it becomes evident 48 hours or more after hospital admission **(Bello et al., 2011)**. Nosocomial infections extend patient's hospital stay and increase health care expenses and mortality **(Dawson, 2003)**. There is evidence that prevention and control of hospital acquired infection is an important aspect of health care across the world **(Ward, 2011)**². Education in infection control (IC) has been identified both nationally and internationally as essential strategy in any health care setting. As future practitioners in supporting IC in health care settings, capacity building of nursing students to develop appropriate skills in IC is crucial for quality in health care **(Ward, 2011)**¹. This type of capacity building in IC requires specific potentials as the nurse should be keen, enthusiastic, motivated and volunteer, with a special interest in IC **(Dawson, 2003)**. Additionally, improving knowledge and behavior of health care workers who could be transmittal to pathogenic agents in hospitals could reduce spread of nosocomial infections **(Bello et al., 2011)**. To improve such practices, standard precautions combine measures to prevent nosocomial infections in patients and job-related infections in health care workers (HCWs). Among which are hand hygiene, personal hygiene, safe handling of sharp objects and use of personal protective equipment (PPE) **(Duerink et al., 2006)**.

Despite having international standards of practice (SOP) in IC, it was found that developing countries are 20 times more at-risk of contracting nosocomial infections than developed countries **(Bello et al., 2011)**. According to the Egyptian Demographic and Health survey (EDHS)

2008, the prevalence of health system-related infections such as hepatitis C virus (HCV) infection is high (14% among those above 15 years of age) **(El-Zanaty and Way, 2009)** and in 2001 sepsis rates in a number of neonatal intensive care units (NICUs) reached as high as 70% **(MOHP, 2003)**⁶. Improving adherence to standard precautions has been the aim of many interventional studies focusing on behavioral changes of HCWs **(Duerink et al., 2006)**. However, those studies were mostly conducted for officially practicing - not the undergraduate – nurses. As well, the Egyptian Ministry of Health and Population (MOHP) (2003) issued the “National Guidelines for Infection Control”, but there is no enough information about the integration availability of those guidelines in the nursing education curriculum or whether they are applied in nursing training and practice. Nurses do receive IC training before graduation; however, their actual IC performance is still unfavorable especially during night shifts in critical health settings as neonatal emergency care units **(Abdel-Wahab et al., 2013)**. Therefore, there are needs to provide evidence -based methodology/strategies in training practices for nursing students that build up in-depth understanding and behavioral changes to adopt the vital importance of IC practices in healthcare settings.

Implication of the study on the Health Care System Improvement:

Training in IC is implemented as an independent course for the first year nursing students in Technical Institute of Nursing - Cairo University (TIN-CU). The course includes both theoretical part and skill lab training. First year students TIN-CU will be graduated in 2 years. They will officially lead an independent IC practice. Therefore, providing evidence

based successful strategies in the educational process could promote performance of nursing students when they start an independent practice.

AIM OF THE STUDY

Aim:

The aim of this study is to improve nursing students' knowledge and skills in IC through improving their undergraduate training course.

Specific objectives:

1. Revise the contents of the TIN-CU IC curriculum,
2. Assess the baseline knowledge and skills in IC among nursing students,
3. Design a training strategy based on needs detected by the baseline assessment,
4. Conduct the new training strategy,
5. Evaluate the impact of the new training strategy on knowledge and skills of nursing students.
6. Suggest educational methods to be adopted by TIN-CU for upgrading nurses' performance in IC.