

Training Program for Improving Nurses Performance toward Infection Control in Ambulatory Care Units

Nawal M. Soliman, Magda A. Ahmed & Hend M. Afefy

Department of Community Health Nursing, Faculty of Nursing - Ain Shams University Egypt

Abstract

Background: Ambulatory care is provided in a variety of settings, including physician's offices, hospital-based clinics, and public health clinics. **The Aim of this study** was to evaluate the effect of training program for improving the nurse's performance toward infection control in ambulatory care units. **Setting:** This study was conducted in ambulatory care units at University Ain Shams specialized hospital, Cairo Governorate, **Sampling:** A purposive sample of 83 nurses working in ambulatory care units in Ain Shams specialized hospital, **Study design:** descriptive Study. **Tools:** two tools were used for data collection, **First:** An interviewing questionnaire divided into two parts: Part 1 nurses Socio-Demographic, Part 2 Nurses knowledge. **Second:** Observation checklist for assessing nursing performance regarding infection control Results Reveals that 53.8% had correct performance toward infection control preprogram, improved to 87.4% post program implementation, there were statistically significant differences between nurse's total knowledge scales and subscales in Pre and Post program. Also reveals that there were highly statistically significant differences related to nurses correct performance score level pre and post program. **Conclusion:** education training program reported remarkable improvement in ambulatory care nurses' knowledge and performance toward infection control. Recommendations the study recommended that Continuing training courses for nurses to demonstrate nurses' compliance/ performance/ utilization of standard precautions of infection control by the infection control team.

Key words: Ambulatory care, infection control, Nurses Performance

Introduction

Ambulatory care center (ACC) means any freestanding healthcare facility staffed by one or more healthcare professionals that provides services on an outpatient basis and does not include an overnight stay. Examples of ACCs include, but are not limited to, community-based primary care centers, urgent care centers, dialysis centers, diagnostic centers and ambulatory surgery centers (Abdul Raheem, Amado et al., 2012).

Ambulatory care sensitive conditions (ACSC) are health conditions where reduces the need for hospital admission, Ambulatory care services represent the most significant contributor to increasing hospital expenditures and to the performance of the health care system in most countries, including most developing countries, 60% of surgical procedures are now performed in ambulatory surgical (Polit and Beck, 2012).

Infections acquired during health care delivery, more appropriately called health care-associated infections (HAIs), are a significant public health problem

around the world. It is estimated that 5%–10% of patients admitted to acute ambulatory care units in developed countries, acquire one or more infections. In developing countries the risk of infection is 2–20 times higher and the proportion of patients infected can exceed 25% (WHO, 2010).

Nosocomial (hospital-acquired) infections are a significant cause of morbidity and mortality in every health care system, especially in developing countries. Common nosocomial infections include surgical site infections, bloodstream infections, pneumonia, and tuberculosis (Mahmud and Abdul Sahib, 2011).

Many developing nations spend more than 50% of their health care budgets in hospitals, of high-risk patients such as newborns, surgical patients, or patients in intensive care units, Failure to prevent or control nosocomial infections can limit the benefits of these expenditures and further stress hospital budgets. Therefore, sound hospital infection control programs are essential from both an economic and a clinical perspective in order to reduce the risk of serious preventable, costly infections for patients and health care workers (Costello et al., 2010).

The economic cost of health care-associated infections as well as the opportunity cost to health services is enormous. According to some estimates, preventing a case of health care-associated infections saves on an average more than US\$ 10 000 and reduces the patient's risk of death from 7% to 1.6% (Reda et al., 2010).

Healthcare-associated infections delay patient discharge and increase costs. Healthcare-associated infections are accompanied by increasing numbers of laboratory and diagnostic investigations. Healthcare-associated infections increase

infection prevention and control costs, including epidemiological investigations and medical, nursing care (Talaat and Shamia, 2010).

Justification of the problem:

In Egypt Ambulatory Care Sensitive Conditions (ACSCs) at Health Insurance Organization (HIO) hospitals in Alexandria, are accounted for about one-fifth of hospitalizations and days of care at HIO hospitals (21.8% and 20.8%, respectively). Annual hospitalization rates for ACSCs were 152.5 per 10,000 insured population (Hassan, 2014).

Approximately many million nosocomial infections occur annually these infections result in substantial morbidity, mortality, and cost, even minimally effective infection control programs are cost-effective. Increase support should be given to infection control programs so that preventable nosocomial infections and their associated expenditures can be averted (Labrague, et al., 2012).

Aim of the work

The aim of this study is to evaluate the effect of training program for improving the nurse's performance toward infection control in ambulatory care units through:

1. Assessing nurse's knowledge regarding infection control in ambulatory care units.
2. Assessing nurse's performance regarding infection control standers to detect their needs.
3. Designing and implementing programs for application of infection control standers based on nurse's needs.

4. Evaluating the effectiveness of training programs on nursing performance in ambulatory care units.

Research hypotheses

The training program will improve the nurse's performance on applying infection control standers in ambulatory care units.

Methodology

Research Design: A Quasi-experimental research design was used to achieve the aim of the study.

Setting:

The study was conducted in ambulatory care units at University Ain Shams specialized hospital, Cairo Governorate, the place included 6 units, 3 units was chosen randomly (hemodialysis unit, ambulatory care unit and cardiac catheterization units).

Subjects: A purposive sample of 83 nurses working in ambulatory care units in Ain Shams specialized hospital; 23 nurses in hemodialysis unit, 35 nurses in ambulatory care unit and 25 nurses in cardiac catheterization units (The total number of nurses working in the previously mentioned setting 93 nurses, ten of them were excluded for pilot study; and the final study sample comprised 83 nurses.) They were recruited in this study and chosen according to inclusion criteria, nurses above 30 years, have 5 years experiences, diploma and high qualified nurses and agree to participate in the study program.

Tool of Data Collection Tools for data collection:

Two tools were used for data collection

➤**First tool:** An interviewing questionnaire this tool was written in Arabic language and divided into two parts:

- **Part 1: Nurses' Socio-Demographic Data and work characteristics** such as age, gender, social status, qualification and years of experience, (Appendix 1)

This data were collected before the program only.

- **Part 2: Nurses knowledge:**

This part was completed by nurses before and after the program application and was comprised of 61 questions distributed on:

1.Ambulatory care: It included 9 questions concerned with definition of ambulatory care, what service produce, role of nurse in ambulatory care units.

2.Infection control: It included 52 questions related to types of infection chain infection, modes of transmitting infection, universal precaution of infection, barriers and challenges for preventing HAIs, disinfection, sterilization and isolation, (Appendix 1)

Second tool: Observation checklist for assessing nursing performance regarding infection control in ambulatory care according to standers such as hand hygiene, uses of personal protective equipment, assistance in insertion of peripheral intravenous catheter, preparation of IV fluids and medication, Injection safety, linen management, west management and cleaning medical instruments this part was used before and after program application, (Appendix 2)

Scoring system

Related to nurses knowledge assessment; a correct answer scored one and incorrect answer scored zero, the whole knowledge questions scored 61 points, a total of 70% and above were considered correct and less than 70% were considered in correct.

Second tool: Observation checklist for assessing correct & incorrectly done nursing performance regarding infection control, it included 136 point; a correct answer scored one and incorrect answer scored zero, the whole performance items scored 163 points, a total of 70% and above were considered correct and less than 70% were considered incorrect.

Content validity of the tools was established by A panel of five expertise's from the staff of community health nursing department, Faculty of Nursing, Ain Shams University, reviewed the tools for clarity, relevance, comprehensiveness, understanding and applicability.

Pilot Study: It was conducted on 10 nurses representing 10% of the total study sample, to test clarity, visibility and applicability, as well as the time required to fulfill the developed tools. According to the obtained results, modifications such as omission, addition and rewording were done. The number of the pilot study was excluded from the study sample.

Ethical considerations:

Approval was taken from the dean and Ethical Research committee of faculty of nursing, Ain Shams University before starting the study. Agreement of nurses to participate in the study after explaining the aim of the study. Anonymity and confidentiality & freedom to withdraw from the study at any time was assured. Then oral approval obtained from nurses to apply the study. Also a supervisor from the infection

control units attended each session and obtained a copy of the data collection tools and the program booklet

Field Work: An official permission including the title and purpose of the study were submitted from the Dean of Faculty of Nursing Ain Shams University and directed to the director of Ain Shams specialized hospital, to get an approval for data collection to conduct the study that forwarded to the director of ambulatory care units where the study was conducted.

- After obtaining a permit the investigator started to visit each ambulatory care unit, meet the director and explain the aim and program content.

- The investigator was interview the nurses one day per week (Thursday) each interview took about 30 min to fill it after taking oral approval consent from them.

- The study started from mid December 2016 to mid-May 2017 the actual duration was three months & a half, "as periods of examination and holidays were excluded".

Program Construction:

The present study was conducted in three phases:

- **First, preparatory phase:** A review of recent, current, national and international related literature in various aspects of the problems to design the study tools, then assessment was done to determine the nurses needs by using pretest based on the collecting data on the nurses knowledge and their performance towered infection control in ambulatory care units

- **Second phase:** assess the nurses by using the previous tools, it was taken 8 hours every week for one month.

The program Objective:

Improve the nursing performance on applying infection control standers in ambulatory care units.

The program content was included:

For knowledge:

Ambulatory care: Meaning of ambulatory care, service in ambulatory care units **and** role of nurse in ambulatory care units

1.Infection control: Meaning of infection, chain infection, methods of transmitting infection, universal precaution of infection control, disinfection, sterilization and isolation.

For performance:

1.Applying the standard of infection control: Illustrate for the performance, including, The compliance of staff nurses in ambulatory care with universal precautions which included (hand washing, uses of personal protective equipment, re-use of machinery, assistance in insertion of peripheral intravenous catheter, preparation of IV fluids and medication, linen management, waste management, cleaning medical instruments & dealing with the environment.

▪ **Third phase:**

▪ **Evaluation phase:** This phase was evaluated the effect of training program on improving nursing knowledge and performance regarding infection control in ambulatory care. Post-test, was the same pretest and was

administrated to the nurses after accomplish the training program.

• **Course duration:** Total hours of program for each group: 12hrs, 4 hrs for total theoretical part (for 4 sessions and every session were done one hrs.), and 8 hrs., for practical part (for 8sessions and every session were for one hrs).

▪ **Place:** Nursing office in each department.

▪ **Language:** The program was conducted in Arabic language to be easily understand by nurses.

▪ **Teaching methods:** lectures, demonstration-re demonstration, video, role play & group discussion

▪ **Teaching media:** booklet, pictures, posters & CD

▪ **Resources and equipment:** Using available equipment but the material were prepared by the investigator at the end of the sessions.

▪ **Statistical Design:**

Data were revised, coded, analyzed and tabulated. Using standard computer program of Microsoft office Excel and spssv.21 program (Campbell, 2006).

Two types of statistics were done:

Descriptive: that include the following test:

The description of data in the form of $\bar{x} \pm SD$ for quantitative data and frequency and proportion for qualitative data.

• **Analytical:** that include the following tests

• **Chi-squared (X²):** it used to compare between two groups or more regarding one qualitative variable in 2x2 contingency table when the expected count of any cell less than 5

• **Correlation coefficient test** (person test) for correlation between two quantitative variables. Its results may be +ve correlation (reverse) or _ve correlation (inverse).

Z test and paired T test were also used Results were considered not significant if $P > 0.05$ significant if $P < = 0.05$ and highly significant in $P < = 0.001$.

Results

Table (1): shows that 73.5% % of the study nurse's age was ranged from 30 to < 40 years old, 89%, were female, 73.5 % of them were married and 61.4% of them were nursing diploma, while 9.6% were Bachelor of nursing.

Table (1): Frequency distribution of study nurses according to their characteristics (n= 83).

Items	NO	%
Age:		
30 – < 40	61	73.5
40 – < 50	19	22.9%
≥ 50	3	3.6%
Gender		
Male	9	10.8%
Female	74	89.2%
Social status		
Single	15	18.1%
married	61	73.5%
widowed	6	7.2%
Divorced	1	1.2%
Academic qualification		
Nursing Diploma	51	61.4%
Technician nursing Institute	24	28.9%
Bachelor of nursing	8	9.6%

Table (2): Illustrates that 48.2% of the study nurses have (10 - < 20) Years of work experience, 49.4% were received training courses in infection control, 31.3 % were exposed to sharp injury during work & 7.2% were received vaccinations against hepatitis B virus.

Table (3): Reveals that there were statistically significant differences between nurse's total knowledge scales and subscales in Pre and Post program.

Table (4) & Figure (1): Reveals that there were statistically significant differences between nurses total Score Level about factors that facilitate the application of stander precaution of infection control pre and post program.

Table (5) & Figure (2): Reveals that there were highly statistically significant differences related to nurses correct performance score level pre and post program while there were non-significant statistically differences related to Preparation of IV fluids & dealing with specimen collected from the patient with p value 0.98236 & 0.31917.

Table (1): Frequency distribution of study nurses according to their work Characteristics (n= 83)

Items	NO	%
Years of work experience		
5 – < 10	30	36.1
10 – < 20	40	48.2
≥ 20	13	15.7
Number of working / hours		
8 hours	6	7.2
12 hours	31	37.3
8 & 12 hours	37	44.6
Received training courses in infection control	41	49.4
Exposed to sharp injury during work	26	31.3
Received vaccinations against hepatitis B virus	6	7.2

Table (3): Frequency distribution of nurses according to their total knowledge scales and subscales in Pre and Post program (N=83)

Knowledge item	Pre		Post		T	P value
	Mean	SD	Mean	SD		
I: Ambulatory care units	47.29	21.01	70.18	22.09	6.84	0.00000
II: Infection Control	33.13	19.56	75.10	22.60	12.79	0.00000
Hand washing	31.08	26.55	81.93	22.22	13.38	0.00000
Aseptic technique	38.80	19.09	67.71	24.56	8.47	0.00000
Personal protective equipment	33.53	21.70	78.71	25.14	12.39	0.00000
Injection	34.34	24.01	78.51	25.49	11.50	0.00000
Information on the care of instrument and machines	24.82	19.15	72.29	27.56	12.89	0.00000
Evaluating the isolation procedures	21.69	21.42	75.70	27.95	13.97	0.00000
Vaccinations	29.52	30.28	75.00	35.14	8.93	0.00000
III: Standard precautions	30.51	13.91	75.87	19.82	17.06	0.00000

Table (4): Mean differences according to factors that facilitate the application of stander precaution of infection control pre and post program (n=83)

	Pre		Post		t	P value
	Mean	SD	Mean	SD		
A: Personal factors	65.66	42.72	79.52	37.48	2.22	0.02771
B: Regulatory factors	53.41	36.42	77.51	34.57	4.37	0.00002
C-Environmental factors	49.00	32.02	65.26	28.30	3.47	0.00067
Total Factors Scale	53.23	31.08	71.19	29.26	3.83	0.00018

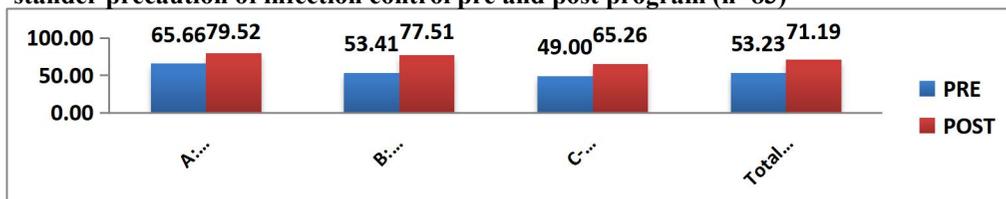
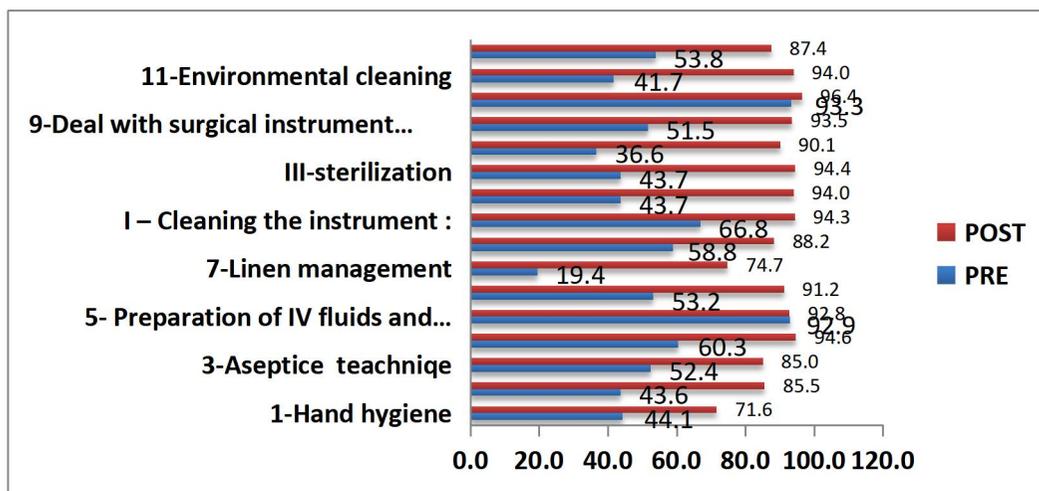
Fig (1) Mean differences according to factors that facilitate the application of stander precaution of infection control pre and post program (n=83)

Table (5): Mean differences according to nurses correctly performance done related to infection control in ambulatory care units pre and post program (N=83)

	Pre		Post		T	P value
	Mean	SD	Mean	SD		
Hand hygiene	44.1	24.5	71.6	16.3	8.48	0.00000
Personal Protective Equipment	43.6	27.9	85.5	16.6	11.77	0.00000
Aseptic technique	52.4	20.1	85.0	13.9	12.15	0.00000
Assistance in insertion of peripheral intravenous catheter:	60.3	25.2	94.6	16.5	10.37	0.00000
Preparation of IV fluids and medication.	92.9	24.0	92.8	26.1	0.02	0.98236
Injection safety	53.2	24.9	91.2	15.7	11.77	0.00000
Linen management	19.4	35.6	74.7	43.7	8.94	0.00000
Waste management sharp disposal	58.8	23.0	88.2	17.5	9.26	0.00000
Cleaning the instrument:	66.8	30.2	94.3	21.6	6.74	0.00000
Disinfecting the instrument.	43.7	24.3	94.0	23.9	13.45	0.00000
Sterilization	43.7	24.3	94.4	18.6	15.10	0.00000
instruments storage	36.6	27.3	90.1	25.6	13.02	0.00000
Dealing with surgical instrument after use.	51.5	23.6	93.5	14.7	13.76	0.00000
dealing with specimen collected from the patient	93.3	21.5	96.4	18.8	1.00	0.31917
Environmental sanitation	41.7	49.6	94.0	23.9	8.65	0.00000
Total Performance	53.8	19.8	87.4	7.8	14.39	0.00000

Fig (2): Mean differences according to nurses correct performance related to infection control in ambulatory care units pre and post program (N=83)

Discussion

Ambulatory care sensitive conditions are those conditions for which hospital admission could be prevented by interventions in primary care & recognized as an integral part of a country's health care system. Measuring

hospitalizations that could potentially be avoided with high quality and accessible primary care, is one indicator of how well primary care services are performing (CHP, 2014).

Health care-associated infection remains a major issue of patient safety. It

complicates a significant proportion of patient care deliveries, adds to the burden of resource use, and contributes to unexpected deaths. Early infection control pioneers showed that surveillance and prevention programs can be successful and have set the scene for today's infection control activities (WHO, 2012).

Ambulatory care nurses' socio demographic characteristics; the results of this study revealed that, nearly three quarter of study nurses were in the age group 30 – < 40 years, regarding the majority of nurses gender were female (Table 1). This result is agreement with Atalla,et al.(2016) who study Effect of nursing guidelines compliance to infection control among nursing student, in Menoufia university, report that three quarter were female, this result may be due to female were the majority of nursing staff in this hospital.

As regards mother's socio-demographic characteristics, the present study shows that near half of the study sample were received training courses in infection control (Table 2) while one third were exposed to sharp injury during work, This finding disagree with Yousef et al. (2014) who study Effect of Nursing Guidelines Regarding Infection Control Measures on Performance of Internship Students in Applied Medical Science College at Hafr Al-Batin, in Saudi Arabia, found that the majority of sample were received Training about infection control. This result due to the large number of nurses who work in this large hospital and the smallest number of infection control team to the same hospital.

The present study revealed that there was a highly statistically significant difference and a statistically significant difference respectively between nurses total knowledge scales, nurse's total score level about factors that facilitate the application of stander precaution &

correct performance score level "(Tables 16, 17&18). Which has been incorporated in a study by Galal et al (2014) who study impact of an infection-control program on nurses' knowledge and attitude in pediatric intensive care units at Cairo University hospitals. Who reported that highly statistically significant difference pre and post program. The finding of the present study reflects that the education training, affect on nurses to improve their knowledge, factors and performance related to infection control.

Conclusion

On the light of the results and answers on research hypothesis the study was concluded that:

The study sample age ranged between 30 to < 40 years, There was a highly statistically significant difference between pre and post educational training program implementation related to ambulatory care nurses knowledge and performance toward infection control.

There was a positive correlation between knowledge and performance pre and post educational training program implementation.

In conclusion, educational training program reported remarkable improvement in ambulatory care nurses knowledge and performance toward infection control.

The findings of this study highlight the following recommendations: The findings of this study highlight the following recommendations:

Availability of all facilities and equipment's required for applying standard precautions of infection control.

Availability and accessibility of written guidelines in the hospital and unit polices related to standard precautions for infection control.

Emphasizing on the importance of continuing in service education for nurses by using the evidence based practices for application of standard precautions of infection control.

Continuing training courses for nurses to demonstrate nurses' compliance/ performance/ utilization of standard precautions of infection control by the infection control team.

Providing orientation programs for newly employed nurses about standard precautions infection control.

periodic refresher training courses should be provided in order to keep nurses of updating knowledge and practice regarding to infection control.

Further reseasch about nurses performance about infection control in ambulatory care units

References:

- Abdul Raheem IS, Amado MO, Sake MJ, Bolarinwa OA, Othman MMB (2012):** Knowledge, Awareness and Compliance with Standard Precautions among Health Workers in North Eastearn Nigeria. *J. Community Med Health Edu* 2:131. doi:10.4172/jcmhe.1000131.
- CHP (2014):** Recommendations on the Management and Postexposure Prophylaxis of Needlestick Injury or Mucosal Contact to HBV, HCB and HIV [http:// www. chp. gov. hk/ files/ pdf/ recommendations_ on_ postexposure_ management_ and_ prophylaxis_ of_ needlestick_injury_or_mucosal_contact_to_hb_v_hcv_and_hiv_en_r.pdf](http://www.chp.gov.hk/files/pdf/recommendations_on_postexposure_management_and_prophylaxis_of_needlestick_injury_or_mucosal_contact_to_hb_v_hcv_and_hiv_en_r.pdf)
- Costello MJ, Graham AD, Morrow FD, Morrow J, Potter-Bynoe G, Sandora JT, Pigula AF and Laussen CP (2010):** Risk factors for surgical site infection after cardiac surgery in children. *Ann Thorac Surg*, 89, 1833-1842.
- Labrague LJ, Rosales RA and Tizon MM (2012):** Knowledge of and compliance with standards precautions among student nurses. *International journal of advanced nursing studies*. 1(2):84-97. www.sciencepubco.com/index.php/IJANS
- Mahmud N and Abdul Sahib S (2011):** Assessment of Nurses' Practices Toward Infection Control Standardized Precautions in Azady Teaching Hospital in the City of Kirkuk. *Iraqi National J. for Nursing Specialties*; 24(1):52 - 58.
- Polit, F. and Beck, C. (2012).** *Essential of Nursing Research*. (9th ed.) Lippincott Williams & Wilkins, Philadelphia
- Reda AA, Frisseha S, Mengistie B, Vanderweerd J (2010).** Standard precautions: occupational exposure and behavior of health care workers in Ethiopia. *Plos One*, 5 (12): e14420.
- Talaat E and Shamia E (2010):** Developing a control action plan for infection prevention at the endoscopy unit. *Journal of international Academic research*. JJuly; 2 (4): 412-420.
- WHO (2012):** Hand Hygiene in Outpatient and Home-based Care and Long-term Care Facilities. [http:// www. who. int/gpsc/5may/hh_guide.pdf](http://www.who.int/gpsc/5may/hh_guide.pdf)