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# Staff nurses' core competencies for infection prevention and control: Conceptual framework for guide current and future practice

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***Abstract:*** **Today's infection prevention and control practitioners can come from a range of professional and occupational backgrounds and require a much broader range of competences than ever before. These competencies provided an overarching framework to enable nurses to develop and enhance their knowledge and skills to protect patients against infection, in order to enhance their recovery, prevent deterioration in their health, and achieve high quality of nursing care. Therefore, staff nurses should have sound competencies to infection control and prevention. Aim of the study: to assess staff nurses' core competencies of infection control and prevention. Research design: A descriptive research design was utilized in this study. Sample: All the available staff nurses (200) were recruited in the current study. Setting: The study was conducted in intensive care units, operating room unit and infection control unit at El-menshawyGeneralHospital at Gharbia Governorate that is affiliated to Ministry of Health and Population. Tools of data collection: one toolwas developed: A structured questionnaire of Staff Nurses' Core Competencies in Infection Control and Prevention to assess staff nurses' core competencies regarding infection control and prevention.Results: the current study revealed that, mean score about total domains of staff nurses' core competencies was238.895 ± 64.304. However, the highest mean scores of total staff nurses competencies related to leadership and management competency for prevention and control hospital infection was 80.225 ± 23.139.the lowest mean scores of total staff nurses competencies related to learning and teaching competency for prevention and control hospital infection was 27.220 ± 8.079 However, there was positive significant relation between staff nurses' personal characteristics and their total core competencies for prevention and hospital control in all items p<0.001. There was also, positive significant correlations matrix between differentstaff nurses' core competencies of prevention and control hospital infection p<0.001.The study conclude that,the staff nurses competency for prevention and infection control resembled the highest rated responded related to leadership and management competency corresponding with other competency of prevention and infection control. There is a significant correlation between staff nurses' personal characteristics and core competencies of prevention and infection control. Also, there is a significant matrix correlation between core competencies of prevention and infection control. Recommendation: Leadership should be developed, evaluate, and revise a mission and vision statement, goals and action plans for the infection prevention and control program. The infection control unit should be emphasis the need for continuous training courses about infection control to facilitate adherence to infection control measures.**

***Keywords:*** **Core competencies, Staff nurses, Infection control, Conceptual framework.**

## I. INTRODUCTION

Staff nurses play a vital role in preventing and controlling transmission of the infection in hospital through the application of standard precautions and maintenance of the health care environment. In any hospital, infected patients are a source of infection transmission to other patients, health care workers, and visitors. These infections have a considerable impact on the morbidity and mortality rates in the intra- and extra-hospital environment. Thus, resulting in an increase in the time spent and costs of hospitalization, and are recognized as a serious world public health problem [(1,2)].

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The benefits of an infection control service are obvious in two sides. First, it reduces costs of healthcare for individuals or the healthcare system, by reducing the need for treatment, hospital stay and re-admission due to hospital-acquired infection. Second by reducing and preventing hospital-acquired infection, it reduces indirect costs, such as patient mortality [(3)].The staff nurses, as the frontline workers in this service, must have number of competencies to perform a number of critical functions. They must have skills and knowledge to collect infection data, analyse it, disseminate results of findings to other healthcare workers and administrators concerned, help devise solutions, and implement improvements[(4)].

Therefore staff nurses need a wide range of skills, knowledge and experience, especially in patient care practices and communication, as negotiation and liaison work are crucial to their effectiveness [(5)].Core competency activities are identification of infectious disease processes, surveillance and epidemiologic investigation, preventing/controlling the transmission of infectious agents/healthcare‐associated infections, employee/occupational health, management and communication, education and research, environment of care and cleaning, sterilization, disinfection and asepsis [(1)].The Association for Professionals in Infection Control and Epidemiology, Community and Hospital Infection Control Association identified similar competencies. Extending outward is four specific domains include special knowledge about infection prevention and control, leadership, health care governance and performance improvement/implementation science (teaching and learning domain). Focusing on these 4 strategic developmental domains enables the staff nurses to build on the core competencies of infection control and prevention [(6,7)].

Special knowledge about infection prevention and control is the foundation of the staff nurses' development as infection practitioners. Infection practitioners are subject matter experts in the epidemiology and natural history of infectious processes and pathogens, recognition of clusters and risk factors for infection, and methods for breaking the chain of infection[(5)]. Leadership roles are often largely based on the influence, skill, and knowledge of an infection practitioner's rather than authority. Infection practitioners should use principles of influence, leadership, and change management, work collaboratively with others and provide direction when necessary, readily share knowledge and expertise, contribute to the development of less-experienced health care providers through education and mentorship, recognize the importance of research and critically evaluate and apply research findings to practice setting, Bring enthusiasm, creativity, and innovation to practice collaborate with colleagues to educate and influence policymaking bodies and the public[(1)].

Health care governance domain includes areas of competencies in research and development, risk management, personal and professional development and using communication skills to enhance patient and public involvement.Staff nurses routinely conduct, participate in, evaluate, and/or apply research findings to the practice of infection prevention, control, and epidemiology [(8)].Risk management, the staff nurse leads the organization in application and evaluation of basic institutional risk criteria for specific situations [(9)]. Learning and teaching domain includes area of competency in facilitating learning in others by making use of effective to help others to learn about infection prevention and control. Theinfection practitioner remains a resource for patients and staff in the area of education [(5)].

Healthcare associated infections are major healthcare problems for the people worldwide. Millions of people are affecting by them each year. Nurses have a distinctive chance to lessen the probability of hospital-acquired infections. They can assist patients in their recovery and reduce the complications associated with infections by the utilization of adequate knowledge and practices. Considering the importance and significance of nurses in the healthcare settings, this study has been carried out to assess core competencies of staff nurses in infection prevention and control in order to find permanent solutions to the problem and to alleviate the suffering of patients and reduce the economic burden on the health care system [(10)].

## II. SUBJECT AND METHODS

**Aim of the study:** to assess staff nurses' core competencies of infection prevention and control**.**

**Research Hypothesis:** Staff nurses have high level of core competencies about infection prevention and control

**Research Design:** A descriptive study design was used in the present research. Such design fits the nature of the problem under investigation. It is a design that uses questionnaire to identify variables and relationship among them when enough information exists.

**Setting:** The study was conducted at El-menshawyGeneralHospital at Gharbia Governorate that is affiliated to Ministry of Health and Population in seven units which included infection control unit, operation room unit, neonatal intensive unit, neurological intensive unit, medical intensive unit, pediatric intensive unit, and cardiology intensive unit.

**Subjects:** A sample of convenience includingall staff nurses no (200) working in previous settings.

**Tools of data collection:** one tool was developed and utilized by the researcher to collect data pertinent to the current study guided by Nursing and Midwifery Council [(11)]: Astructured Questionnaire of Staff Nurses' Core Competencies in Infection Prevention and Control. It was developed to assess staff nurses' core competencies regarding infection control and prevention. This questionnaire consisted of two parts: a- Sociodemographic characteristics such as gender, age, education, work place, years of experience, and attendance of previous training programs b-Staff Nurses' Core Competencies in Infection Control and Prevention. Included four domains:

Domain one: special knowledge competency

Domain two: health governance competency

Domain three: learning and teaching competency

Domain four: leadership and management competency

**Scoring system**: The scores were allocated as follows:Always (4), often (3), sometimes (2),rarely(1), not applicable (0**).**

***Methods***

**Operational Design**

The operational design of the current study included; content validity and reliability, pilot study and field work.

**Tools Validity**

Study tools contents were developed and tested for its validity by jury of 5 academic staff in nursing administration at different Faculties of Nursing. The validity of the tools aimed to judge its clarity, comprehensiveness, relevance and accuracy. All of their comments were taken into consideration; some items were re-phrased.

**Tools Reliability**

The Cronbach's Alpha test was done for study tools. The calculated reliability was (r=0.992) for Staff Nurses' Core Competencies in Infection Control and Prevention questionnaire and that within the accepted limit.

**Approval**

An official permission was obtained from the hospital authorities in the identified setting to collect the necessary data.

**Pilot Study**

A pilot study was carried out after the experts' opinion and before starting the actual data collection. It was carried out on a sample 10%of staff nurses (20) and they excluded from the main study sample during the actual collection of data. The aim of pilot study was to test the sequence of items, clarity, applicability, and relevance of the questions. Necessary modifications were done. Pilot study also served to estimate the time required for filling the questionnaire sheets

**Ethical Considerations**

Purpose and expected outcomes of the study were explained to each study subject. They were secured that all the gathered data will be used for the research purpose only, the study is harmless and their approval to participate is a prerequisite to be included in the study. Each subject was assured that they can withdraw whenever they want.

**Field Work**

-The data was collected from the identified subject by the researcher. The researcher met the staff nurses in small groups during their work shifts to distribute the questionnaire. The staff nurses recorded the answer in the presence of the researcher to ascertain all questions were answered and giving clarification.

- The appropriate time for data collection varied according to the type of work and work load for each unit; sometimes it was done in the middle of the shift in other times before the end of the shift. The time needed to complete the questionnaire items from staff nurses were between 15-20 minutes.

-The data were collected over period of four months started from January 2019 to April 2019.

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**Statistical Analysis:**

Data entry and analysis were done using statistical package for social science (SPSS) version 18. Data were presented using: Descriptive statistics in the form (frequency, percentage, mean and standard deviation, and Chi-square). Test of significant was done. Significant level value was considered when $p \leq 0.05$ and a highly significant level value was considered when $p \leq 0.01$.

## III. RESULTS

**Table (1): Staff nurses' percentage distribution according to personal characteristics (n=200)**

| Items | N | % |
|---|---|---|
| **Age group** | | |
| **<30 Years** | 76 | 38.00 |
| **30-40 Years** | 116 | 58.00 |
| **>40 Years** | 8 | 4.00 |
| **Range** | 23-44 | |
| **Mean ± SD** | 30.525±4.311 | |
| **Sex** | | |
| **Male** | 40 | 20.00 |
| **Female** | 160 | 80.00 |
| **Years of Experience** | | |
| **<5 Years** | 54 | 27.00 |
| **5-10 Years** | 114 | 57.00 |
| **>10 Years** | 32 | 16.00 |
| **Range** | 1-30 | |
| **Mean ± SD** | 7.595±4.962 | |
| **Training attendance program** | | |
| **Yes** | 140 | 70.00 |
| **No** | 60 | 30.00 |

**Table (1):** represents staff nurses' percentage distribution according to personal characteristics. It was observed that nearly sixty (58.00%) of staff nurses' age ranged from 30-40 years. The majority percent (80.00%) were female nurses. More than half (57.00%) of staff nurses had 5-10 years of experience. Regarding attendance training program, high percent (70.00%) of staff nurses were attended training program while only 30.00% of them weren't attended.

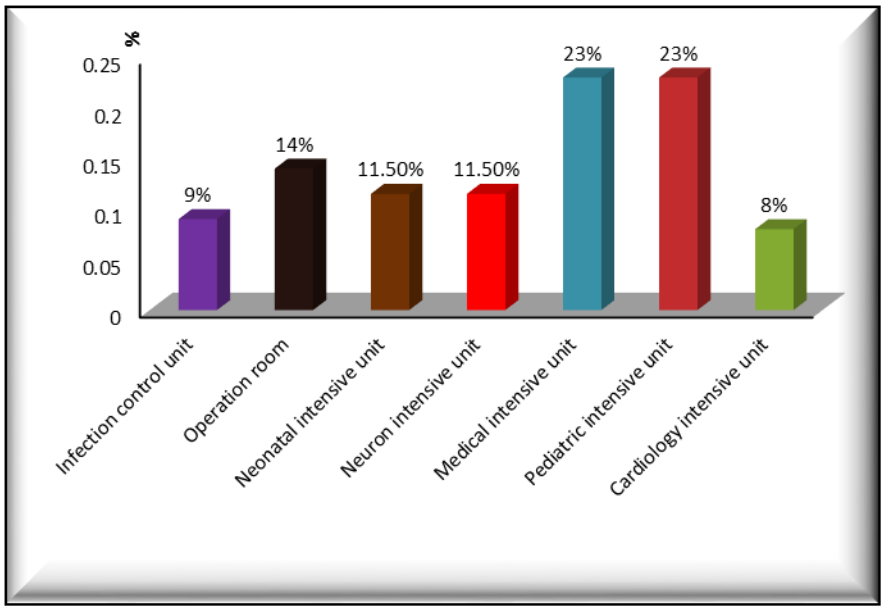


**Figure (1): Distribution of staff nurses' at different department of work**

**Figure (1):** shows distribution of staff nurses' at different department of work. It was observed that,Equal percent 23.00% of staff nurses work at medical and pediatric intensive unit while only 8.00% and 9.00% of them work at cardiology intensive unit and infection control unit respectively**.**

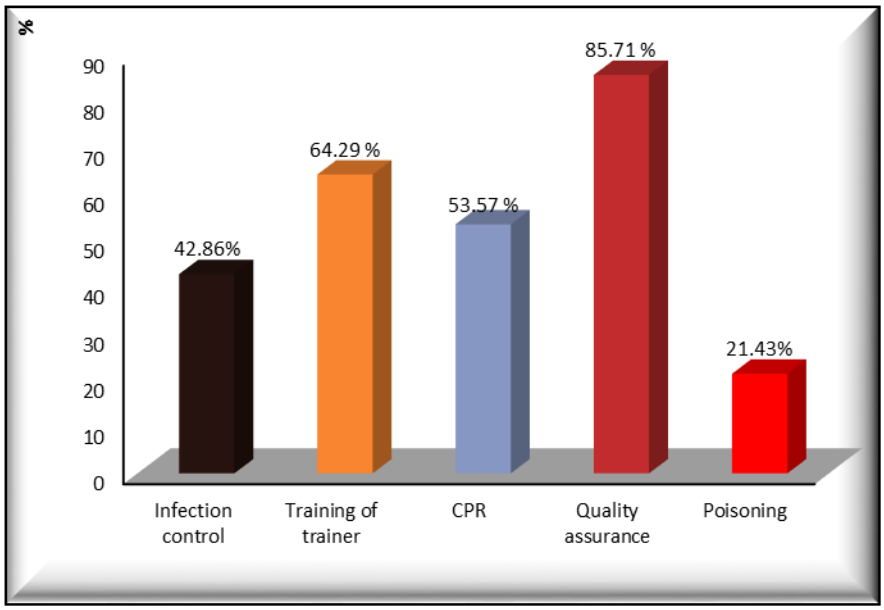


**Figure (2): Distribution of staff nurses' attendance previous training programs at El_Menshawy Hospital**

**Figure (2):** illustrates distribution of staff nurses' attendance previous training programs at El_Menshawy Hospital. As shown in the figure, the highest percent (85.71%&64.29%) of staff nurses attended training on quality assurance and training of trainer respectively.

**Table (2): staff nurses' competencies related to special knowledge competency for prevention and control hospital infection**

| **Domain One: Special knowledge** | | | | | | |
|---|---|---|---|---|---|---|
| **Criteria outcomes** | **Range** | | | **Mean** | **±** | **SD** |
| **Infection prevention & control practice** | 6 | - | 30 | 20.225 | ± | 6.023 |
| **Microbiology** | 3 | - | 15 | 10.475 | ± | 3.239 |
| **Epidemiology** | 3 | - | 15 | 10.225 | ± | 3.051 |
| **Emergency planning** | 4 | - | 20 | 13.765 | ± | 3.956 |
| **Planning practice &monitoring of immunization** | 2 | - | 10 | 6.715 | ± | 2.118 |
| **The ability to respond effectively to major incidents** | 3 | - | 15 | 10.465 | ± | 2.929 |
| **Total scores** | 21 | - | 100 | 71.870 | ± | 19.579 |

**Table (2):** shows staff nurses' competencies related to special knowledge competency for prevention and control hospital infection. As evident in the table, the total mean scores of staff nurses special knowledge competency for prevention and control hospital infection was 71.870±19.579. The highest mean scores 20.225 ± 6.023 was related to their knowledge about infection prevention and practice and the lowest mean scores was 6.715±2.118.

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**Table (3): Staff nurses' competencies related to health governance competency for prevention and control hospital infection**

| Second Domain : Health care Governance | | | | | |
|---|---|---|---|---|---|
| **Criteria of outcome** | **Range** | | | **Mean ± SD** | |
| **Research developing: critical analysis of published literature** | 4 | - | 20 | 13.340 ± | 4.072 |
| **The participation in research independently** | 4 | - | 20 | 13.020 ± | 4.183 |
| **Clinical effectiveness: using audit to monitor effectiveness** | 4 | - | 20 | 13.680 ± | 3.995 |
| **Patient and public involvement** | 3 | - | 15 | 9.580 ± | 3.048 |
| **Risk management: use of appropriate strategies systems to identify and manage risk** | 3 | - | 15 | 9.960 ± | 3.034 |
| **Total Score** | 18 | - | 89 | 59.580 ± | 16.689 |

**Table (3):** represents staff nurses' competencies related to health governance competency for prevention and control hospital infection. As shown in the table, the total mean scores of staff nurses competencies related to health governance competency for prevention and control hospital infection was 59.580±16.689. The highest mean scores 13.680 ±3.995 was related to their competencies in using audit to monitor effectiveness and the lowest mean scores 9.580±3.048 was related to their competencies to enhance patient and public involvement.

**Table (4): Staff nurses' competencies related to learning and teaching competency for prevention and control hospital infection**

| Third Domain: Learning and Teaching | | | | | |
|---|---|---|---|---|---|
| **Criteria outcome** | **Range** | | | **Mean ± SD** | |
| **Personal& professional development** | 4 | - | 20 | 13.655 ± | 4.157 |
| **Facilitating learning in others** | 4 | - | 20 | 13.565 ± | 4.167 |
| **Total scores** | 8 | - | 40 | 27.220 ± | 8.079 |

**Table (4):** represents staff nurses' competencies related to learning and teaching competency for prevention and control hospital infection. As shown in the table, the total mean scores of staff nurses competencies related to learning and teaching competency for prevention and control hospital infection was 27.220 ± 8.079.

**Table (5): staff nurses' competencies related to leadership and management competency for prevention and control hospital infection.**

| Fourth Domain :Leadership and management | | | | | |
|---|---|---|---|---|---|
| **Criteria outcomes** | **Range** | | | **Mean ± SD** | |
| **Leads in the development of a proactive infection and control services** | 13 | - | 65 | 42.990 ± | 12.552 |
| **Managing &infection prevention and control services** | 11 | - | 55 | 37.235 ± | 11.672 |
| **Total scores** | 24 | - | 118 | 80.225 ± | 23.139 |

**Table (5):** illustrates staff nurses' competencies related to leadership and management competency for prevention and control hospital infection. As evident in the table, the total mean scores of staff nurses competencies related to leadership and management competency for prevention and control hospital infection was 80.225 ± 23.139.

**Table (6): Total domains of staff nurses' core competencies for prevention and hospital control**

| Total domains of staff nurses' core competencies | | | | | |
|---|---|---|---|---|---|
| | **Range** | | | **Mean ± SD** | |
| **Special knowledge** | 21 | - | 100 | 71.870 ± | 19.579 |
| **Healthcare Governance** | 18 | - | 89 | 59.580 ± | 16.689 |
| **Learning and teaching** | 8 | - | 40 | 27.220 ± | 8.079 |
| **Leadership and management** | 24 | - | 118 | 80.225 ± | 23.139 |
| **Total score** | 71 | - | 338 | 238.895 ± | 64.304 |

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**Table (6):** shows total domains of staff nurses' core competencies for prevention and hospital control. It was observed, the total mean scores about total domains of staff nurses' core competencies was 238.895 ± 64.304.

**Table (7): Relation between staff nurses' personal characteristics and special knowledge competencies for prevention and control of hospital infection**

| Items | | Special knowledge | | | | ANOVA or T-Test | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | ± | SD | F or T | P-value |
| Age group | <30 Years | 76 | 65.316 | ± | 23.500 | 9.718 | <0.001* |
| | 30-40 Years | 116 | 74.948 | ± | 15.594 | | |
| | >40 Years | 8 | 89.500 | ± | 2.673 | | |
| Department | Infection control committee | 18 | 83.222 | ± | 8.565 | 2.913 | 0.010* |
| | Operation room | 28 | 69.929 | ± | 15.112 | | |
| | Neonatal intensive unit | 23 | 75.783 | ± | 10.023 | | |
| | Neuro intensive unit | 23 | 74.043 | ± | 17.063 | | |
| | Medical intensive unit | 46 | 63.435 | ± | 25.995 | | |
| | Pediatric intensive unit | 46 | 73.783 | ± | 20.080 | | |
| | Cardiology intensive unit | 16 | 72.500 | ± | 18.924 | | |
| Sex | Male | 40 | 58.600 | ± | 26.778 | -5.083 | <0.001* |
| | Female | 160 | 75.188 | ± | 15.764 | | |
| Years of Experience | <5 Years | 54 | 67.481 | ± | 22.836 | 5.645 | 0.004* |
| | 5-10 Years | 114 | 71.211 | ± | 19.344 | | |
| | >10 Years | 32 | 81.625 | ± | 8.477 | | |
| Training attendee program | Yes | 140 | 75.743 | ± | 16.686 | 4.472 | <0.001* |
| | No | 60 | 62.833 | ± | 22.768 | | |

**Table (7):** shows relation between staff nurses' personal characteristics and special knowledge competencies for prevention and control of hospital infection. The table showed positive significant relation between staff nurses' personal characteristics and special knowledge competencies for prevention and control of hospital infection in all items of personal characteristics p<0.001.

**Table (8): Relation between staff nurses' personal characteristics and Health governance competencies for prevention and control of hospital infection**

| Items | | Healthcare Governance | | | | ANOVA or T-Test | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | ± | SD | F or T | P-value |
| Age group | <30 Years | 76 | 55.868 | ± | 20.620 | 3.525 | 0.031* |
| | 30-40 Years | 116 | 61.500 | ± | 13.689 | | |
| | >40 Years | 8 | 67.000 | ± | 3.207 | | |
| Department | Infection control committee | 18 | 65.222 | ± | 5.331 | 4.407 | <0.001* |
| | Operation room | 28 | 62.000 | ± | 9.467 | | |
| | Neonatal intensive unit | 23 | 64.522 | ± | 10.126 | | |
| | Neuro intensive unit | 23 | 64.261 | ± | 16.105 | | |
| | Medical intensive unit | 46 | 49.391 | ± | 21.588 | | |
| | Pediatric intensive unit | 46 | 60.739 | ± | 18.020 | | |
| | Cardiology intensive unit | 16 | 61.125 | ± | 12.377 | | |
| Sex | Male | 40 | 52.400 | ± | 23.799 | -3.108 | 0.002* |
| | Female | 160 | 61.375 | ± | 13.908 | | |
| Years of Experience | <5 Years | 54 | 58.074 | ± | 18.521 | 2.204 | 0.113 |
| | 5-10 Years | 114 | 58.719 | ± | 17.510 | | |
| | >10 Years | 32 | 65.188 | ± | 6.684 | | |
| Training attendance program | Yes | 140 | 61.971 | ± | 13.698 | 3.165 | 0.002* |
| | No | 60 | 54.000 | ± | 21.263 | | |

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**Table (8):** demonstrates relation between staff nurses' personal characteristics and Health governance competencies for prevention and control of hospital infection. As noticed in the table, there was positive significant relation between staff nurses' personal characteristics and health governance competencies for prevention and control of hospital infection in all items of personal characteristics p<0.001 except with regarding to years of experience.

**Table (9): Relation between staff nurses' personal characteristics and Learning and teaching competencies for prevention and control of hospital infection**

| Items | | Learning and teaching | | | | ANOVA or T-Test | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | ± | SD | F or T | P-value |
| Age group | <30 Years | 76 | 24.895 | ± | 9.735 | 6.679 | 0.002* |
| | 30-40 Years | 116 | 28.345 | ± | 6.548 | | |
| | >40 Years | 8 | 33.000 | ± | 4.276 | | |
| Department | Infection control committee | 18 | 32.333 | ± | 3.181 | 3.875 | 0.001* |
| | Operation room | 28 | 27.643 | ± | 4.863 | | |
| | Neonatal intensive unit | 23 | 29.000 | ± | 5.309 | | |
| | Neuro intensive unit | 23 | 27.696 | ± | 5.338 | | |
| | Medical intensive unit | 46 | 23.000 | ± | 10.646 | | |
| | Pediatric intensive unit | 46 | 27.826 | ± | 8.962 | | |
| | Cardiology intensive unit | 16 | 27.875 | ± | 7.402 | | |
| Sex | Male | 40 | 23.900 | ± | 10.959 | -2.962 | 0.003* |
| | Female | 160 | 28.050 | ± | 6.984 | | |
| Years of Experience | <5 Years | 54 | 26.037 | ± | 9.375 | 7.125 | 0.001* |
| | 5-10 Years | 114 | 26.439 | ± | 7.886 | | |
| | >10 Years | 32 | 32.000 | ± | 3.716 | | |
| Training attendance program | Yes | 140 | 28.343 | ± | 6.691 | 3.065 | 0.002* |
| | No | 60 | 24.600 | ± | 10.233 | | |

**Table (9):** illustrates relation between staff nurses' personal characteristics and learning and teaching competencies for prevention and control of hospital infection. As shown in the table, there was positive significant relation between staff nurses' personal characteristics and learning and teaching competencies for prevention and control of hospital infection in all items of personal characteristics p<0.001.

**Table (10): Relation between staff nurses' personal characteristics and Leadership and management competencies for prevention and control of hospital infection**

| Items | | Leadership and management | | | | ANOVA or T-Test | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | ± | SD | F or T | P-value |
| Age group | <30 Years | 76 | 74.895 | ± | 28.898 | 3.405 | 0.035* |
| | 30-40 Years | 116 | 83.284 | ± | 18.655 | | |
| | >40 Years | 8 | 86.500 | ± | 6.949 | | |
| Department | Infection control committee | 18 | 90.889 | ± | 9.755 | 3.479 | 0.003* |
| | Operation room | 28 | 78.214 | ± | 17.806 | | |
| | Neonatal intensive unit | 23 | 83.957 | ± | 17.616 | | |
| | Neuro intensive unit | 23 | 86.435 | ± | 16.959 | | |
| | Medical intensive unit | 46 | 68.391 | ± | 27.871 | | |
| | Pediatric intensive unit | 46 | 83.739 | ± | 25.706 | | |
| | Cardiology intensive unit | 16 | 81.375 | ± | 23.278 | | |
| Sex | Male | 40 | 70.100 | ± | 31.215 | -3.163 | 0.002* |
| | Female | 160 | 82.756 | ± | 19.973 | | |
| Years of Experience | <5 Years | 54 | 78.222 | ± | 28.571 | 2.412 | 0.092 |
| | 5-10 Years | 114 | 78.886 | ± | 22.402 | | |
| | >10 Years | 32 | 88.375 | ± | 11.404 | | |
| Training attendance program | Yes | 140 | 84.164 | ± | 18.428 | 3.800 | <0.001* |
| | No | 60 | 71.033 | ± | 29.718 | | |

**Table (10):** shows relation between staff nurses' personal characteristics and Leadership and management competencies for prevention and control of hospital infection. As noticed in the table, there was positive significant relation between staff nurses' personal characteristics and Leadership and management competencies for prevention and control of hospital infection in all items of personal characteristics p<0.001 except with item of years of experience.

**Table (11): Relation between staff nurses' personal characteristics and their total core competencies for prevention and hospital control**

| Items | | Total score | | | | ANOVA or T-Test | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | ± | SD | F or T | P-value |
| Age group | <30 Years | 76 | 220.974 | ± | 80.441 | 5.726 | 0.004* |
| | 30-40 Years | 116 | 248.078 | ± | 50.336 | | |
| | >40 Years | 8 | 276.000 | ± | 11.759 | | |
| Department | Infection control committee | 18 | 271.667 | ± | 18.905 | 3.768 | 0.001* |
| | Operation room | 28 | 237.786 | ± | 45.022 | | |
| | Neonatal intensive unit | 23 | 253.261 | ± | 39.623 | | |
| | Neuro intensive unit | 23 | 252.435 | ± | 50.218 | | |
| | Medical intensive unit | 46 | 204.217 | ± | 82.740 | | |
| | Pediatric intensive unit | 46 | 246.087 | ± | 70.775 | | |
| | Cardiology intensive unit | 16 | 242.875 | ± | 59.035 | | |
| Sex | Male | 40 | 205.000 | ± | 90.307 | -3.855 | <0.001* |
| | Female | 160 | 247.369 | ± | 53.043 | | |
| Years of Experience | <5 Years | 54 | 229.815 | ± | 77.040 | 3.931 | 0.021* |
| | 5-10 Years | 114 | 235.254 | ± | 63.964 | | |
| | >10 Years | 32 | 267.188 | ± | 21.538 | | |
| Training attendance program | Yes | 140 | 250.221 | ± | 51.113 | 3.942 | <0.001* |
| | No | 60 | 212.467 | ± | 82.323 | | |

**Table (11**): shows relation between staff nurses' personal characteristics and their total core competencies for prevention and hospital control l. It was observed that there was positive significant relation between staff nurses' personal characteristics and their total core competencies for prevention and hospital control in all items p<0.001

**Table (12): Correlations matrix between staff nurses' core competencies and core competencies of prevention and control hospital infection**

| Correlations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Special knowledge | | Healthcare Governance | | Learning and teaching | | Leadership and management | |
| | r | P-value | r | P-value | r | P-value | r | P-value |
| Healthcare Governance | 0.868 | <0.001* | | | | | | |
| Learning and teaching | 0.833 | <0.001* | 0.909 | <0.001* | | | | |
| Leadership and management | 0.847 | <0.001* | 0.890 | <0.001* | 0.915 | <0.001* | | |
| Total score | 0.939 | <0.001* | 0.958 | <0.001* | 0.945 | <0.001* | 0.963 | <0.001* |

**Table (12):** shows correlations matrix between staff nurses' core competencies and core competencies of prevention and control hospital infection. It was observed that there was positive significant correlations matrix between staff nurses' core competencies and core competencies of prevention and control hospital infection p<0.001.

## IV. DISCUSSION

With our rapidly changing health care systems, need to be more flexible response to infection prevention and control. Staff nurses should be able to address the challenges that health care related infection presents **Moyano (2015)** [(12)]. Staff nurses' competencies for infection prevention and control are play a key role in improving the safety and quality of care delivered to patients. Recognition and improve of staff nurses' competencies play a very important role in the improvement of their performance. These competencies provided an overacting structure to enable staff nurses to develop

and enhance their knowledge and skills to increases the safety and quality of patient care**Exposito et al .,(2017)**[13]. **Johnson et al., (2013)** [14]**; Reda et al., (2010)** [15] **and Labrague et al., (2012)** [16] they mentioned that the important to protect the health worker from hospital infection.

The result of current study revealed that the staff nurses' self- rating competencies above seventy percent had been related to special knowledge for competency activity for prevention and control hospital infection. This result may be attributed that the most of staff nurses were attended training program and around half of them were attended ofinfection control program. On the other hand, **Fashafsheh et al., (2015)** [17]who found that the half of the respondents nurses were found to have fair knowledge of infection control. Also, **Abdulraheemetal., (2012)**[18] **and Isara&Ofifi , (2010)**[19] **and Talaat&Shmia,(2010**[20] studies which state the low knowledge of infection control among nurses. While other studies with **Johnson et al., (2013)** [14]**,Vaz et al., (2010)**[21] **and Eskander et al., (2013)**[22] they found that the nurses have good knowledge of infection control.

The current results revealed that the low rating response of staff nurses' knowledge competency related to infection prevention and control practice and followed it emergency planning and the same staff nurses rating for epidemiology and ability to respond effectively to major incidents. This finding reflects that the slight role of staff nurses in management of infection and control practice. **Royal Collage of Nursing (2017)** [23] supported this result they mentioned that less attention is paid to role of nurses in the many of infection prevention in the hospital education. Also, in this result the low rating responded of nurses' staff competency related to planning and monitoring of immunization. This result may be attributed that the staff nurses lack of training for immunization program.

On the other hand, **Teymourzadeh&Bahadori (2019)** [24] who found that the competency of novices' nurses described as preventing, controlling transmission of infection agent, epidemiologic and monitoring of immunization had the highest percent survey responded with self- rating of novice. Also ,**Cong(2011)** [25]who concludes that nurse core competency for prevention and control infection in general hospital among staff nurses in China was a high level and the average score of nurse core competency .The current study revealed that staff nurses rating responded of competencies showed low related to participation in research independently, critical analysis of published literature, using audit to monitor effectiveness and risk management. This result may be attributed that the staff nurses lack of training course for using evidence-based practice to develop research for nursing practice. **Mitchell et al., (2018)**[26] who state that the recognition and training of human resources competencies play a very important role in the improvement of their performance. Also, this findings may be the lack of supervision to awareness' staff nurses to identify appropriate strategies for risk management and important of participation of patients in plan of care. Nursing research is crucial because it builds a knowledge base and provides a framework for assisting nurse managers in the evaluation of nursing services delivery. **Mejia (2019)**[27]who found that the nurses must demonstrate high competencies in performing the nursing process, collaborative care and nursing documentation .

On contrast of current study **Keshk and Mersal (2017)**[28] they concluded that new entry level of nurses demonstrated a greater assessment in terms of research competencies in Saudi Arabia. The infection prevention remains a recourses for patients and staff nurses in the area of education. However, the leadership will be needed to meet learning needs for an increase nurses knowledge for infection prevention .the staff nurses competency for infection prevention must be able to critically evaluate research and apply the findings to their practice setting. Also, **Philippine Board of Nursing (2012)**[29] inconsistent with the current study they mentioned that the Filipino staff nurse responded demonstrated very high research competence.

The current study result showed that the staff nurses low rating responded to learning and teaching competencies of prevention and infection control. This result may be reflects to low recognition of staff nurses for identifying their strengths and limitations to professional development and lack of updates their knowledge and skills in relation to their role in the prevention and infection control.. Moreover, this result may be reflects that lack of routine of in services training program for infection control. **Baker, (2017)**[30] who mentioned that the importance of organized routine for infection control for nursing staff continuously. Also, other studies with **Massaroli, et al (2019)**[31]**,Expasito, et al ., (2017)**[13] **, Mayono et al ., (2015)**[12] **and Backes et al . (2012)**[32]verifying that the core competencies for prevention and control of infection includes communication , ethics, decision making ,education and professional development for nursing staff.

As concerning to leadership and management competency of prevention and control infection, the staff nurses showed that the highest rating responded of core competencies of prevention control. This result may be attributed that the leadership guide and give instruction to their staff nurses to understand their contribution in prevention infection and communicate their view and maintains optimum relationships within the infection control team. Moreover, the leadership recognize and resolve conflict among their staff nurses .This result supported with **Mejia, et al (2019)**[27] who found that the Filipino staff nurses respondents demonstrate very high competencies in leadership and management competencies . Also, this result inconsistent with study of **Hassan (2013)** [33] which states that the majority of the newly graduated excellent performance in performing the six domains of nursing competencies include leadership and management skills.

As regarding to the relation between staff nurses personal characteristics and core competencies for prevention and control of hospital infection, there is a positive significance difference between competencies of prevention and infection control and staff nurses age, department, sex, years of experiences and previous attendance program. The result revealed that the competency rating of staff nurses for prevention and infection control was significantly correlated with age and experience. This means that staff nurses ages and experience have a great impact on their competency regarding infection prevention which might be explained by the higher knowledge, improved attitudes and the implementation of infection control practices. **Teymouzadeh et al., (2019)** [24] supported this study who found that the staff nurses more age and experience had impact positive in prevention and infection control. As, regards to the department the result showed that staff nurses competency of prevention and infection control rating responded higher than other units. The result may be attributed that the staff nurses who works in infection control unit had more opportunity to acquired knowledge and skills for prevention and infection control.

The study result reported that the female staff nurses competency for prevention and infection control were responded higher than male staff nurses. This result may be attributed that the female staff nurses had more knowledge of prevention and infection control than male. Also, female staff nurses more willing to learn more in order to prove themselves in a profession in the hospital. This result supported with **Teymouedeh(2019)**[24],**Nakhael et al ., (2015)**[34] **, LLiyasu G et al ., (2016)**[35] **and Ezzeldeen et al ., (2016)**[36] .,they found that the female nurses more rated responded than the male . Moreover, the result showed that the staff nurses competency of prevention and infection control who attended previous training program had resembled more rated responded than no attended of other staff nurses. This result reflects the effect of in services training program for staff nurses which enhancing their knowledge and skills for practice and quality of care. **Paguio J &Pajarillo et al., (2016)**[37], unsupported this study who found that the two thirds of the study group hadn't had previous course.

Today's infection prevention and control practitioners can come from a range of professional and occupational backgrounds and require a much broader range of competences than ever before. These competencies provided an overarching framework to enable nurses' to develop and enhance their knowledge and skills to increase the safety and quality of patient care **James., et al ., (2019)**[38]. Nevertheless, the prevention of infection is a major concern of all health care team and health policy maker. Nursing is corn stone to the success of any preventive program aimed at reducing the incidence of infections in our health care facilities. Nurses therefore, must possess adequate knowledge and demonstrate practices towards achieving the goal of prevention of infection **Sue Millward(2018)**[39].

## V. CONCLUSION

Based on the findings of this study, it can be concluded that staff nurses competency for prevention and infection control resembled the highest rated responded related to leadership and management competency corresponding with other competency of prevention and infection control. There is a significant correlation between staff nurses' personal characteristics and core competencies of prevention and infection control. Also, there is a significant matrix correlation between core competencies of prevention and infection control.

## VI. RECOMMENDATION

**The current study recommends the following:**

1-The infection control unit should be emphasis the need for continuous training courses about infection control to facilitate adherence to infection control measures.

2-Improve nurses' core competency through staff enhancement and development training programs to ensure safe nursing practice.

3- Emphasizing the importance of following evidence-based practices of infection control in continuing education and training programs.

4-Leadership should be providing training programs for newly nurses about infection control and at regular intervals.

5- Development of policies and procedures designed to prevent adverse events in the hospital.

6- Leadership should be develop, evaluate, and revise a mission and vision statement, goals and action plans for the infection prevention and control program.

## REFERENCES

[1] Tantia N., et al. APIC professional and practice standards. American Journal of Infection Control. 2016. Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier.

[2] Salem OA. Knowledge and Practices of Nurses in infection Prevention and Control within a Tertiary Care Hospital. Ann Med Health Sci Res. 2019;9(1):422-25.

[3] Kim, K.M., Jeong, J.S. & Park, H.R. Infection control nurse specialist education in Korea. American Journal of Infection Control. 2010; 38 (5), 413-15.

[4] Chan, W.F., Adamson, B., Chung, W.Y.J. & Chow, C.M.M. (2011). Validity and reliability of the proposed core competency for Infection Control Nurses (ICNs) of hospitals in Hong Kong. American Journal of Infection Control.2011; 39, 11-13.

[5] Denise M. Murphy RN, et al. Competency in infection prevention: A conceptual approach to guide current and future practice. American Journal of Infection Control. 2012; 40:296-303.

[6] Community and Hospital Infection Control Association (CHICA)-Canada. SELF AUDIT TOOL for Infection Prevention and Control Professionals. Audit Toolkit, version 2.0, 2009. Available from: http://www.chica.org/inside_members_info.php. Accessed February 22, 2012.

[7] Burnett E. Outcome competences for practitioners in infection prevention and control. J Infect Prev. 2011;12:67-90.

[8] Feltovich F, Fabrey J. The current practice of infection prevention as demonstrated by the practice analysis survey of the Certification Board of Infection Control & Epidemiology, Inc. Am J Infect Control 2010;38: 784-8.

[9] Streed SA. Metrics and management: two unresolved problems on the pathway to health care-associated infection elimination. Am J Infect Control. 2011; 39:678-84.

[10] Haleema Sadia et al.; Saudi J. Med. Pharm. Sci.; Vol-3, Iss-6B (Jun, 2017):585-595

[11] Nursing and Midwifery Council. Infection Control Association: Core Competencies for practice in infection prevention and control. 2004

[12] Moyano L., (2015). The ethics of caring and its application in nursing profession.ActaBioethica. 2017;21(2):311-317.

[13] Exposito J., Costa C., Agea J., Izquierdo M., & Rodriguez D. Ensuring relational competency in critical care: importance students' communication skills. Intensive Crit Care Nurs.2018:44:85-91.doi:10.10/J.iccn.2017.08.010.(Pub Med)

[14] **Johnson et al.**,.Knowledge and practice of universal precautions among professionals in public and private health facilities in Uyo, Southern Nigeria- a comparative study. Ibom Med. J.2013;6(1): 9-19.

[15] Reda A., Frisseha S., Mengistie B., &Vanderweerd J. Standard precautions: occupational exposure and behavior of health care workers in Ethiopia. Plos One. 2010;5(12): e14420.

[16] Labrague L., Rosales R., &Tizon M. Knowledge of and compliance with standers precautions among students nurses. International Journal of advanced nursing studies. 2012;1(2):84-97.

[17] Fashafsheh I., Ayed A., Eqtai F., &HaraznehL.Knowledge and a practice of nursing staff towards infection control measures in the Palestinian hospitals. Journal of Education and Practice. 2015; 6(4):79-91

[18] Abdulraheem IS, Amodu MO, Saka MJ, Bolarinwa OA, Uthman 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.

[19] Isara A., &Ofili A., Knowledge and Practice of standard precautions among health workers in the Federal Medical Centre ,Asaba ,Delta state, Nigeria. Niger Postgrad.Med.J. 2010; 12(3):204-9.

[20] Talaat E., Shamia E., Developing a control action plan for infection prevention at the endoscopy unit. Journal of international Academic :research.2010:2(4): 412-420

[21] Vaz K., Mcgrowder D., Lindo R., Gorden L., & Brown P., et al ., (2010) . Knowledge, Awareness and Compliance with Universal Precautions among Health Care Workers at the University Hospital of the West Indies, Jamaica. 2010; 1 (4):171-81.

[22] Eskander H., Morsy W., &Elfeky H. Intensive Care Nurses' Knowledge & Practices regarding Infection Control Standard Precautions at a Selected Egyptian Cancer Hospital. Journal of Education and Practice. 2013;4(19):160-74.

[23] Royal College of Nursing.(2017). Essential Practice for infection prevention and Control: Guidance for Nursing Staff. London: Royal College of Nursing; November.

[24] Teymeurzadeh E., Bahadori M., Fattahi H., Khodadost M., &Shori A. Nurses Competency and Their Role in Prevention and Control of Hospital Infections: A Case Study in a Large Military Teaching Hospital. A case study in a large military teaching hospital. Adv Hum Biol. 2019; 9:156-61.

[25] Cong L., (2011). Investigation and analysis on nurses core competency and its related factors in tertiary general hospital in Hubei province, China. Retrieved from Pro Quest Dissertation Publishing.

[26] Mitchell B., Gardner A., Stone P., Hall L., &Maziarz M. Hospital Staffing and Health care-associated infections: A systematic review of the literature. JtComm J Quail Patient Saf. 2018;44:613-22.

[27] Mejia P., Osman A., Allan Kari N., Yngenete R., 7 Feliciano E., (2019). The Relationship Between Professional Nursing Competencies and key Performance Indicators for Patient Safety Outcomes Among the Filipino Staff Nurses In Selected Private Secondary Hospitals In The Philippines .European Journal of Pharmaceutical and Medical Research. 2019;6(1):404-9

[28] Keshk&Mersal (2017). Effects of Job Stress on Health of Saudi. Nurses Working in Ministry of Health Hospitals in Qassim Region in KSA. Saudi Arabia: Life Science Journal.

[29] Philippine Board of Nursing (2012).Professional nursing competency standards among registered nurses Manila, Philippines.

[30] BarkerA., Brown K., Ahsan M., SenguptaS., &Safdar N., (2017). Barriers and Facilitators to infection control at a hospital in northern India: a qualitative study. Research; Antimicrobial Resistance and Infection Control.Doi 10.1186/s13756-017-0189-9

[31] Massaroli A., GueMartni J., Moya J., Severino P., & Ferreira A., et al ., (2019).Skills for general and specialist nurses working in the prevention and control of infection in Brazil. Rev Lat Am Enfemagem;27:e3134. Published online 2019 Apr 29.doi: 10.1590/1518-8345-2620.3134

[32] Backes V., Prado M., Feetaz F., &CaneverB ., (2012). Nursing Education Research Groups in Brazil.Rev Esc Enferm USP.;46(2):436-442.doi:10.1590/S0080-62342012000200023.(Pub Med) Cross Ref)( Google Scholar).

[33] Hassan D., (2013). Measuring performance in health care: The effect of joint Commission International standards on quality performance. Walden University, Minneapolis: Pro Quest Dissertation Publishing.

[34] Nakhaei M., &Mofrad S. Investigating nurses' knowledge and self-efficacy regarding the principles of infection control in the operating room.Mod Care J. 2015;12:79-83.

[35] LLiyasu G., Dayyab M., Tiamiyu A., AbubakarS.,&Mijinyawa M et al . Knowledge and practice of infection control among healthcare workers in a tertiary referral center in North-Western Nigeria. Ann Afr Med. 2016;15:34-40.

[36] EzzEldeen A., Abd-Elaziz M., Shahin E., & Abo El-Ata A., (2016). Evaluation of an infection control measures protocol application by nurses on patients safety at burn units .J Surg. 4:1-9

[37] Paguio J &Pajarillo E. Safety cultures and safety attitude of nurses in the National University Hospital. Philippine Journal of Nursing. 2016;86(1):12 .

[38] James F., Callery S., &Boukidjian R. Value of certification in infection prevention and control. American Journal of Infection Control.2019;47:1265-69

[39] Millward S., (2018). Enhancing leadership in infection prevention through training. Nursing Times.20;Augst.https:// www.nursingtimes.net/clinicalarchive/infection-control/enhancing-leadership.