Mansoura Nursing Journal (MNJ)

vol.3 No.1 ISSN:18235-2016

THE EFFECT OF IMPLEMENTING EDUCATIONAL STRATEGIES ABOUT INFECTION CONTROL MEASURES ON NURSES' KNOWLEDGE AND PRACTICE FOR PATIENTS UNDERGOING LIVER TRANSPLANTATION

[1]Warda Abd Allah Nasr El said,[2]Wafaa Ismaiel Shereif, &[3]Amira Ahmed Hassanin.

[1] Clinical instructor [2,3]Assist Prof.of Medical-Surgical Nursing Department, Faculty of Nursing-Mansoura University

E-mail of corresponding author: warda_magdy@yahoo.com

Abstract:

Infection is one of the leading causes of morbidity and mortality in liver transplant recipients. Nurses play a key role in infection prevention so that improvement of the practices of the nurses is an important aspect of infection control thus decreases morbidity and mortality. **Aim of the study:**evaluate the effect of the educational strategies on improving nurses' performance in caring patients undergoing liver transplantation. **Method:**A quasi experimental was used. It was conducted in surgical word (transplant unit) at Gastro-Enterology Center at Mansoura university hospital.**Subjects:** All available nurses (30), who provide direct care for liver transplant recipients. **Tool:** two tools were used 1- Pre-post designed questionnaire sheet, 2- Observation checklists sheet.**Results:**the result of this study showed significant progress in nurses' knowledge and practices in post/test; the mean scores of nurse's knowledge before implementation of the strategy was 16.36 and after implementation the strategies this mean improved to 21.16.and the mean scores of nurse's practice before implementation the strategies were 82.80and after implementation the strategies this mean improved to147.68.**Conclusion**: that, by the implementation of the program there was remarkable improvement of nurses' knowledge and practices; it was clear in post-test results**.**

Keywords: Educational Strategies, Infection Control, Nurses' knowledge - Practice, livertransplantation.

Introduction:

Egypt is a heavily populated country, with a high hepatitis C virus (HCV) infection prevalence of 26%. The high prevalence of chronic liver diseases in Egypt has led to increasing numbers of Egyptian patients suffering from end-stage liver disease. Liver transplantation represents the only curative therapy for patients with end-stage liver disease[1,2].

Infection is one of the leading causes of morbidity and mortality in liver transplant recipients. More than two thirds of liver transplant recipients have an infection in the first year after transplantation, and infection is the leading cause of death in these patients. In addition, the release of cytokines during the infection can have other indirect and negative effects, including allograft injury, opportunistic super infection, and

malignancy. The risk of infection in liver transplant recipients is determined by the intensity of exposure to infectious agents (hospital or community sources) and the overall immunosuppression level[3,4].

Nosocomial infection (Healthcare-associated infections) is a "localized or systemic condition occurring as an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that was neither present nor incubating upon the patient's admission to the acute care facility. These infections occur on or after 72 hours (three days) following admission to an acute care facility and are caused by infectious agents from endogenous or exogenous sources.[5]

Nosocomial infections contribute to the overall morbidity of patients and increase the costs for health care systems.[6]This is of extraordinary importance especially when caring for severely immunocompromised patients such as on transplant units. [7, 8]

Nosocomial infections lead to increase the patient stay in the hospital and increase both mortality and healthcare costs. Factors that promote infections among hospitalized patients include decreased immunity among patients; the increasing variety of medical procedures and invasive techniques creating potential routes of infection; and the transmission of drug resistant bacteria among crowded hospital populations, where poor infection control practices may facilitate transmission .It has been concluded that the hospital acquired infections in liver transplantation recipients increases failure rates for liver transplantation; however, proper application of infection control measures can play a very crucial role in minimizing the risk of these infections[1].

Infection control is the responsibility of all health care professionals, doctors, nurses. Standard precautions must be applied to all patients in all healthcare settings regardless of the suspected or confirmed presence of an infectious agent. This is the primary strategy in preventing transmission ofinfectious agents among patients and healthcare personnel.[9]

Nurses play a key role in infection prevention by demonstrating leadership ininfection prevention and control using their knowledge, skill andjudgment toinitiate appropriate and immediate infection control procedures and therefore keep all patients safe[10].

Improvement of the behavior of the nurses is an important aspect of infection control in healthcare. The biggest challenge is not the lack of effective precautions and evidence-based guidelines, but the fact that healthcare workers apply these measures insufficiently. Interventions to improve adherence to infection control measures should incorporate an evaluation of barriers to and facilitators of change. [11]It has been identified both nationally and internationally

that education should be a part of any overall strategy for infection prevention and control in health care settings. (12)

Aim of study:

Evaluate the effect of the educational strategies on improving nurses' performance in caring patients undergoing liver transplantation.

Research Hypothesis:

Improvement of nurses' knowledge and practice related to universal precautions during caring patients undergoing liver transplantation.

Materials & Method

Study Design:

A quasi experimental research design was used in this study.

Setting:

This study was conducted in surgical word (transplant unit) at Gastro-

Enterology Center at Mansoura university hospital.

Subjects:

All available nurses (30), with various ages, different qualifications, years of experience, level of education who provide direct care for patients undergoing liver transplantation , accepted to participate voluntary in the study and gave consents, were included in the study.

Tool:

Two tools were used in this study as the following:-

Tool I: Questionnaire structure of nurses' knowledge about nosocomial infectionand infection control measures

A questionnaire form was prepared for the purpose of assessment of nurses' knowledge about nosocomial infections and infection control measures. It was elicited from the review of related literature and constructed by the researcher in Arabic form. It consists of (35 questions) divided into four parts.

Part I:

It was intended for collection of data, pertaining to personal characteristic of the study subjects which composed of (4) questions including name, age, qualifications, and years of experiences.

Part II:

Entails knowledge about services provided to nurses in hospital including in-service training period, pre employment medical examination, periodical medical examination, availability of equipment, supplies needed for infection control and booklets

about infection control (5questions).

Part III:

Intended for collecting nurses' knowledge about infection, and nosocomial infection in the form of choose the correct answer questions. It consists of (16) questions. It entailed knowledge about nosocomial infection such as definition of nosocomial infection, the most common organism causing nosocomial infection, characteristics of environment for growth of organisms, risk factors of acquiring infection in liver transplant, modes of transmission of infection recipient, types of most common nosocomial infection, types of surgical site infection and their signs and symptoms, types of blood stream infection and their signs and symptoms (questions no.1-16).

Part IV:

Was intended for assess nurses' knowledge about universal precautions. It consist of (11 questions) about infection control measure for prevention cannula related blood stream infection such as hand washing, time, type, least time of hand washing, importance of draying hands and disinfection before injection and nurses knowledge about infection control measure during wound care for preventing wound infection such as aim of wearing mask, precautions when opening sterile gloves and correct technique of handling forceps, etc (questions no. 17-27).

Scoring system: One score was allocated to each right answer and zero to the wrong answer. Scores of less than 70% areconsidered unsatisfactory, however scores of 70 % -100% are considered satisfactory.

Tool II: Observational Checklist of Certain Nursing Procedures:

A clinical observationalchecklist was constructed based on the literature of nursingreview. Aimed atassessing the performance of the studied nurses and consisted of six main parts:-

Part1: Concerned about the steps of hand washing.

Part2: Consisted of steps of put on sterile gloves.

Part 3: Observed the steps of removing sterile gloves.

Part 4: Entailed the observed of peripheral cannulation performed by nurses.

Part 5: Concerned about the steps of peripheral and central intravenous therapy.

Part 6: Consisted of steps of wound dressing.

Scoring system: One score was allocated to each correct performance and zero to incorrectly done, Scores less than 70% are considered un satisfactory practices & scores from 70 % -100% areconsidered satisfactory

Tools validity: designed tools were examined for content validity by a panel of five experts in the field of Medical Surgical Nursing to test their clarity and objectivity and if they are suitable to achieve the aim of the study.

Pilot study:

The pilot study was carried out on 5 nurses, who were selected randomly from 30 nurses. Those nurses were not included in the actual study. The pilot study was done to ascertain the relevance, clarity & applicability of the developed tool and to estimate the time needed to fill the questionnaire sheet. Based on the finding of the pilot study,necessary modifications were done accordingly.

Reliability of the study:

The reliability of the developed tools was estimated using the Cronbach's Alpha test to measure the internal consistency of the tools.

Method:

The study was implemented through the following four phases**:-**

Phase I: Initial Assessment:

After preparing the tool, the data collection was done, pre-tested questionnaire and observational check list were administered to the study sample to study their existing level of knowledge and practices regarding infection and infection control measure during care liver transplant patients; this phase was conducted by the researcher during the period from January to the end of March 2014.

Phase II: Program Development:

Based on the information obtained from initial assessment, in addition to literature, the researcher designed the educational program under the guidance of the supervisors. Its main aim was to improve knowledge and practices regarding infection and infection control measures during caring patients undergoing liver transplantation especially during insertion of peripheral intravascular cannula, administration peripheral intravascular or central therapy and wound dressing. A simple booklet was developed for nurses, which covered all items related to infection and infection control measures.

Phase III: Program Implementation:

The educational program designed for this study has been carried out in classrooms at gastroenterology center. The program implantation was within the schedule of their working hours, and permission was taken to choose and assign nurses in the program. The subjects were divided into small groups (5 groups), each group consist of five nurses according to the total number of nurses (25).The

program was conducted through six sessions; each group obtained the six sessions through 2 weeks (3 session /week), each session took about two hour.

Different teaching and learning methods were used during the sessions which included; interactive lecture, group discussion, demonstration & redemonstration, instructional media. The duration of program implementation was two months (from April till the end of June2014).

Phase IV: Evaluation :

The evaluation phase was focused on estimating the effect of the program through questionnaire sheet and observation checklist using the same tools in pre-program assessment in three months after program implementation (post-test) from September 2014 to the end of october2014. The results were compared to the pretest results to evaluate the impact of the program on knowledge and practices of the nurses

Ethical consideration:

1-All relevant ethical aspects were considered for ensuring nurse's privacy and confidentiality of the collected data during the study.

2-The purpose of the study was explained to each nurse, and then an oral consent for participation in the study was obtained from each one of them.

3-Voluntaryparticipation and right to refuse to participate in thestudy andwithdrawn at any time was emphasized to nurses.

Statisticalanalysis:

Data entry and analysis were performed using the Statically Package for Social Sciences version 16 (SPSS, Inc., Chicago, IL, USA). The quantitative data were presented as numbers and percentages. The chi- square was used to find the association between variable of qualitative data. The p value of < 0.05 Indicates a significant result while, p value of > 0.05 indicates a non-significant result.

Limitations of the study:

1- The small number of the sample led to inability to generalize the results

Results:

(9.1) General characteristics of the studied sample

Items	Frequency N= 25	Percent %
Age (years)		
18-25 years	6	24
25-35 years	11	44
35 years and >	8	32
Level of education		
Nursing diploma	11	44
Nursingtechnical institution	1	4
bachelor	13	52
Years of experience		
< 2 years	5	20
2-5 years	1	4
5-10 years	3	12
10 years and >	16	64

Table (9.1) The age of the studied nurses about less than half of nurses (44%) their age ranged between 25to35 years old ,nearly one third of them (32%) their age were more than 36 years old and only more than one fifth of them (24%) were ranged from18to 25 years old. As regard level of education about half ofnurses (52%) had bachelor degree in nursing, less than half of them (44%) had nursing school diploma and only (4%) had technical nursing institution. As regard the nurse's years of experienceabout more than half (64%) had a working experience more than10years and only (4%) had a working experience less than2 years in nursing field.

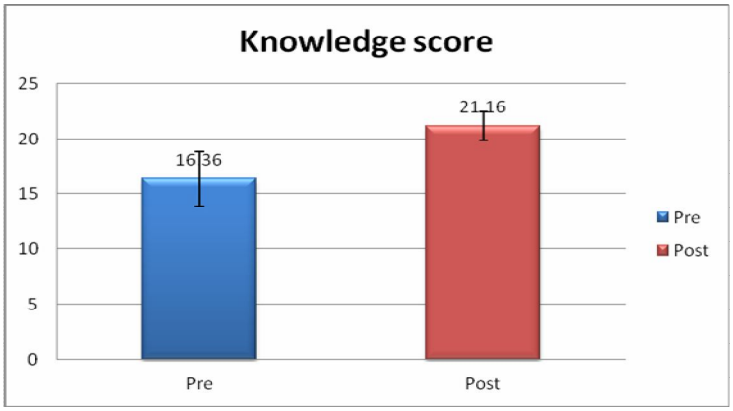

Fig. (9.1) Mean scores of nurse's knowledge

Figure (9.1) illustrate the mean scores of nurse's knowledge pre and post implementation strategies

The mean scores of nurse's knowledge before implementation the strategy was 16.36 and after implementation the strategies this mean improved to 21.16. There was highly statistically significant was found when compared between pre and post the implementation the strategies on nurse's knowledge (p=.≤0.001).

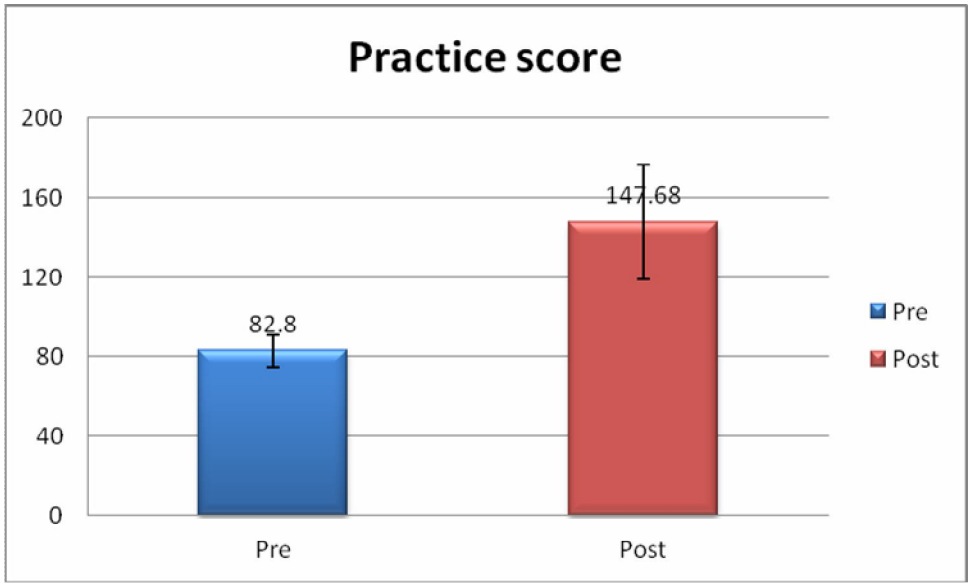

Fig. (9.2) Mean scores of nurse's practice

Figure 9.2illustrate the mean scores of nurse's practice pre and post implementation strategies

The mean scores of nurse's practice before implementation of the strategies were 82.80and after implementation the strategies this mean improved to147.68. Highly statistically significant was found when compared between pre and post the implementation the strategies on nurse's practice (p=.≤0.001)

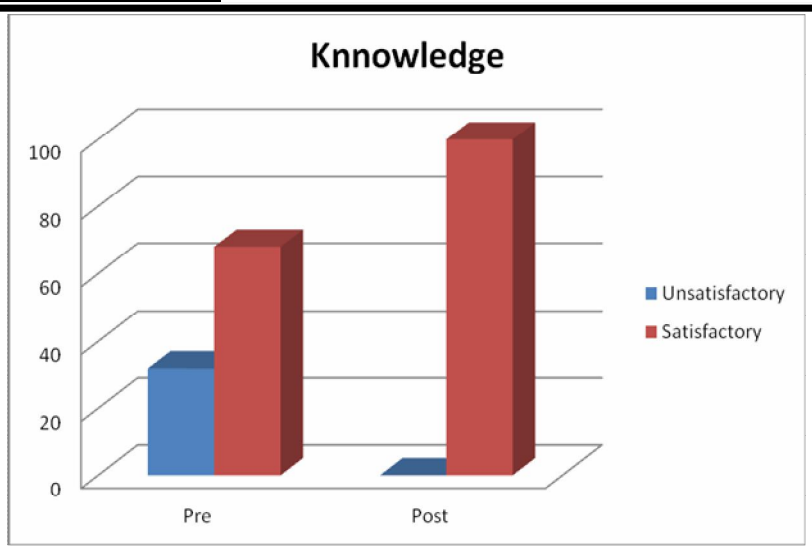

Fig. (9.3) Level of nurses 'knowledge about infection and preventive measures Unsatisfactory knowledge <70%Satisfactory knowledge ≥70%

Figure (9.3) Illustrate the level of nurse's knowledge about infection infection control precaution.

It was revealed that before implementation of the strategies, none of the nurses had "Satisfactory" knowledge score and this percentage improved to (100%) after implementation the strategies

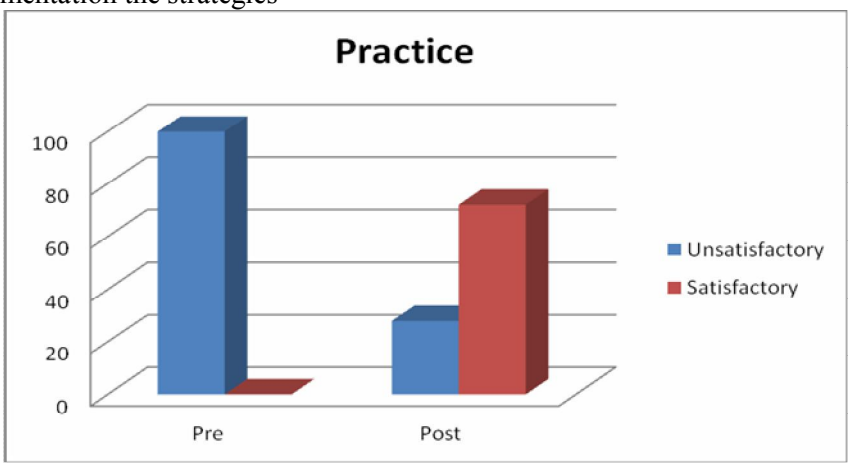

Fig. (4) Level of nurses 'practice about infection control precautions Unsatisfactory Practice <70%Satisfactory Practice ≥70%

Figure 9.3 Illustrate the level of nurse's practice pre &post implementation the strategies

None of the nurses had "Satisfactory level" of practices score before the program implementation the percentage improved to (72.0%) after implementation the strategies

Table (4): Relations between nurses' level of knowledge about nosocomial infection and preventive measure and socio-demographic characteristics

Item	Pre Mean ±SD	P1	Post Mean ±SD	P2
Age				
18-25	17.33±1.03	F=3.599 P= .044	21.5±0.84	F=1.053 P=.366
26-35	15.00±2.75[A]		21.36±1.28	
>36	17.5±2.07[A]		20.63±1.51	
Level of education				
Nursing diploma	17.36±1.8	F=3.228 P=.059	20.82±1.4	F=6.740 P=.005
Nursing technical institution	12±0		18±0	
Bachelor	15.84±2.61		21.69±0.63	
Years of experience				
<2y	17.6±0.89	F=1.901 P=.160	21.2±0.83	F=.710 P=.557
2-<5y	19.0±0		20±0	
5-<10y	14.0±1.73		22±0	
≥10y	16.25±2.67		20.06±1.48	

Table (4) showed that, nurses' knowledge was increased significantly Post implementation the strategies in relation to their level of education (p=.005)

Table (5) Relations between nurses' level of practice and socio-demographic characteristics

Item	Pre Mean ±SD	P1	Post Mean ±SD	P2
Age				
18-25	87.33±11.46	F=1.465 P=.253	158.67±27.94[A]	F=8.381 P=.002
26-35	82.27±7.18		161.27±17.27[B]	
>36	80.12±5.41		120.75±24.92[AB]	
Level of education				
Nursing diploma	80.36±5.98	F=.690 P=.512	133.45±30.88	F=4.01 P=.033
Nursing technical institution	84±0		124±0	
Bachelor	84.53±9.62		161.54±20.53	
Years of experience				
<2y	86.2±12.91	F=.673 P=.578	152.2±27.82	F=2.344 P=.102
2-<5y	75±0		113±0	
5-<10y	80.33±0.58		180.33±4.62	
≥10y	82.68±7.11		142.31±27.91	

Table (5)illustrated that, nurses' level of practice was increased significantly post implementation the strategies in relation to age and their Years level of education (p=.002, .033 respectively).

Table (6): Illustrate the correlation as total pre and post program between nures' level of knowledge and their practice. (n=50)

Item	R	P
Practice scores	0.775	≤0.001*

Table (6)it is revealed from the table that there is highly positive correlation between nures'level of knowledge and level of practice

Discussion:

10.1.SociodemographicCharacterstics of the Nurses Studied

Regardingthe nurse's age, the present study revealed that less than half of nurses were in age group (25-35) year. On the other hand half of them had bachelor degree in nursing. According to years of experience the same study found that more than half had working experience more than 10 years in nursing field, similarly **Mohamed & Wafa (2011)**[13], found in their study that most of the nurses were in age group (20-30) years, and the majority of them were with years of experience between (6-10) years; while the majority of them had school diplomas

10.2: The effect of implementing the strategies on nurses knowledge scores

In the current study, regarding the nurses' knowledge aboutnosocomial infection and preventive measures pre and post implementing the strategies, there was a highly statically significant difference (p= ≤0.001) between the improvement of nurse's knowledge scores and the implementation of the strategies, the present study finding was supported by the study carried out by**Goma (2013)**[14] who stated that, there was a statistical significant difference between the nurses' knowledge scores and the implementation of the infection control program. Also this was in line with the study done by **March aim & Keith (2012)**[15]they stated that after implementation of infection control program the nursing staff had good knowledge about infection control. This indicates that lack of nurses' knowledge before implementation of educational strategies this may be due to deficiency in their education as well as lack of in-service training program about infection control. Result indicated

that continuous in-service education is needed to improve and updatetheir knowledge in this field of infection control

10.3The effect of implementingof the strategies on nurses' practice

Concerning nurses' practice of hand washing in the present study the result show that, there was a significant change pre post program in the steps of hand washing to better result including cutting nails, taking off jewels, and rising hands correctly, used clean towel or elbow to turn off faucet and dried their hands after washed-up. This agree with**Hussien (2012)**[16]who stated that there was a significant change pre post program in the steps of hand washing to better result concerning cutting nails ,taking off jewels, and rising hands correctly (p.001,001respectively) .Also This agree with the study carried out in London (2010) by **Gould &Ream**[17]evaluating the efficiency of an educational feedback intervention program on hand washing , it was shown that only few more than one eights perform hand washing steps correctly before the program and improved to most of nurses after participation in program. The result of the study emphasized that a periodic educational program on nosocomial of knowledge and performance of nurses will help in improving nurses' performance. In present study the result of the nurses 'practice of wearing sterile gloves indicated that, all of nurses didn't perform hand washing before wearing gloves and the minority of them followed the correct manner in picking up and wearing the sterile gloves before participation in the program and there was statically significant improvement in nurses' performance after participation in the program. (p=.000)in contras**t Williams (2008)**[18] found that the majority of nurses demonstrated correct performance for wearing sterile gloves. But they didn't wash their hands before wearing it. A similar study was conducted in USA to evaluate the level of compliance with universal precaution before and after practical training program, nurseswere improved from one third to nearly all of nurses followed a correct way of wearing sterile gloves **Boelle & Carrat (2009**)[19].

Concerning the nurses' practice of taking off gloves the present study revealed that, only more than one fifth of the studied nurses taken off the gloves in correct way by picking the glove from the inner surface so that the outer surface will be inside, throwing gloves in the basket and washing hands after that, nurses' performance were improved to the majority of nurses follow the right way of removing

gloves and carried out hand washing (p= ≤0.001).

In contrast with the study conducted in USA, nurses took off gloves and discard it correctly but one fifth only of them washed their hands and improved after the program to include the majority of nurses **Lee (2008)**[20].

The result of the present study is also showed that, nurses' practice of infection control precautions regarding to peripheral cannulation insertion There was a statistical significant difference (P<0.01) between the improvement of nurse's practice in pre and post the implementation of the infection control program including hand washing, glove wearing, disinfection of insertion site and avoid palpation of the puncture site after disinfection. the finding was supported with **Kampf et al ,(2013)**[21]they stated that, there was improvement in nurse's practice in post observationstest of peripheral cannula insertion including hand disinfection before patient contact, no palpation of the puncture site after disinfection hand disinfection before aseptic procedure and use of a sterile dressing to cover the puncture site.

A significant improvement in nurses' performance was seen. The finding was also supported by the study carried out by **Ozyazıcıoglua and Arıkanb (2008)**[22] they reported that, there is improvement in nurses' practice pre-test and post-test observations of peripheral cannulation insertion regarding hand washing, glove wearing, antiseptic use and recording the time of cannula placement .

In the current study nurses' practice of infection control precautions regarding to nurses' performance in Peripheral and central intravenous therapy, There was a statistical significant difference between the improvement of nurse's practice before and after implementation of the infection control program including improvement of nurses' practice in cleansing medication 'car, disinfection of hands and wearing gloves and scrubbing the hub of the cannula before infusion demonstrations. The finding was supported by the study carried out by **Fakih et al (2012)**[23]they reported that there were significant improvements in processes, compared with the pre intervention period, for accurate documentation of dressing catheter dressing being intact, and correct demonstration of scrubbing the hub before infusion demonstrations, And prove that education and real-time feedback to nurses increases and sustains compliance with processes to reduce the risk of infection from Peripheral Vascular Cannula (PVC).

The finding was supported also by the study carried out ***Varghese (2011)***[24]who stated that there was improvement in nurse's practice pre-test and post-test observations following implementation of structure teaching program on aseptic non touch technique on intravenous therapy. And this prove the effect of education and training in improving nurse' performance of peripheral and central intravenous therapy.

In the current study, the level of nurses' practice regarding using aseptic non touch technique during wound dressing pre and post implementation of educational strategies. There was a statically significant difference between the improvement of nurses' practice and the implementation of strategies, for hand washing, clean the dressing' car, wear apron, place sterile drab under the wound, change gloves after removing old dressing and follow the correct technique in cleansing the wound. The present study finding was supported by the study carried out by **Chinchun,(2013)**[25] who stated that in the pretest the majority of staff nurses have average practice on aseptic medical wound dressing where as in the post majorityof the staff nurses have good practice aseptic medical wound dressing including dressing preparation, dressing execution and post procedure phase . who stated that, in-service education program for the nursing personnel on the aseptic medical wound dressing can upgrade the knowledge and practice there by helps to prevent wound infection. It was proved that direct education could lead to increase in the quality of wound dressing procedure. In this study, regarding the ' level of nurses' practice pre and post implementation of infection control program there was a statically significant difference ($P<0.001$) between the nurses' practice in pre and post the implementation of infection control program.

The present study finding was supported by the study carried out by **Goma (2013)**[14] who stated that, There was a statistical significant difference ($P<0.01$) between the nurses' practice in pre and post the implementation of infection control program.

The finding was supported also by the study carried out **by Tved & Bukholm,(2010)** [26] whose were shown that the nosocomial intervention program has been applied to the health care personnel in a Norwegian University hospital .among those almost two third reported practice change.This was in line with study done by This was in line with study done by **Mohamed & Wafa (2011)**[13]they stated that the results of their study emphasized that scores of

knowledge and practice among studied subjects were increased after implementation of infection control program. The improvement in nurses' practice after implementation the strategies was noticeable since their practice before implementation the strategies, This finding could attribute to the fact that nurses were in need of specialized team in infection control to provide and clarify information about importance of infection control for the patient**.**

Relations between variables of the study.

As regards, personal data of nurses and their knowledge .The Present study indicated that there was statistical significant between level of nurses' education and their knowledge in the post program (p=.005). This agree with **Mohamed & Wafa,(2011)**[13] who stated that, there was positive statistically correlation between nurses 'knowledge and nurses' level of education ($p < 0.05$). This study disagrees with the study conducted by **Abdulla, (2014)**[27] whose result showed that, that there was highly statistical positive correlation between level of education and knowledge of nurse pretest. While posttest there was no positive correlation in the significant level of 0.01% .Result indicates that the effects of educational program make adjust between nurse knowledge and their level of education.

According to personal data of nurses and their practice. The Present study also indicated that there no statistical significant between nurses' level of education or their age and their practice in pretest, While in the post test there was positive statistical in the significant in their level of education and their age level. These agree with the study conducted by **Abdulla, (2014)**[27] who stated that, there was a positive statistically significant correlation between post program practice and education level ($p < 0.05$).

This study also indicated that there was statistical significant correlation between nurses' practices level and their level of knowledge (increase practice with increase knowledge of nurses). This indicates importance of educational program in improving nurses' practice. This agreed with [28,29] who stated that continuous in–service training program is very important to improve knowledge and practice of nurses as nurses in their studies were highly improved after the program having.

According to research hypnosis and results was a significant improvement in post the program implementation in relation to knowledge and performance of

universal precautions after the training program provided to them by the researcher this agree with the study carried out by ***Sobayo (2003)***[30]who emphasized on the need for in-service education program for different categories of nursing personnel in Egypt. ***Ismail (2008)***[31] who found that nurses' awareness level about infection concept is low which could be related to deficiency of their knowledge.

The study recommended that educating health care workers about the principle of infection control is critical and integral element of an effective infection control program, educator need to tailor the specific content of training program to nurses working in liver transplant unit

Conclusion:

Based on the findings of the present study the following can be concluded that:

- The findings of this study showed that educational intervention had a positive

Recommendation:

Based on the results of the present study the following recommendations are suggested:-

- Posters should be posted in the transplant units to remind nurses of the need to comply with standard precautions.
- A developed program should be applied and repeat again every 6 months in the same study setting and adopted in other similar settings with required modifications, provision of continuing education programs
- Strict observation of nurses' performance/ utilization of infection control standard precautions and improvement of poor practices by the infection control team are required.

Conflict of interest:

The authors declare that they have no conflict of interests.

Acknowledgments:

Thanks to all the nurses and other healthcare staff on the wards involved.

Reference:

1. **Wiesner R, Rakela J & Ishitani (2012):**Recent Advances in Liver Transplantation. Mayo ClinProc; 78: 197-210.
2. **Ahmed H (2011):** Hospital acquired infection in liver transplant recipients, Master Thesis, Faculty of Medicine; Mansoura University.
3. **Eghtesad B, Miller C &Fung J (2013):** Post-

LiverTransplantationManagement.Availableathttp://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/hepatology/postlivertransplantation-management/.accessed on July 28, 2014.

4. **El-Araby H, Ghoneim E, AbdElaziz A& Ibrahim T(2010):** Early Infections after Living Donor Liver Transplantation in Egyptian Children (Single Center Experience). Egyptian Journal of Medical Microbiology; 19(2):76.

5. **Centers for Disease Control and Prevention (2013)**: surveillance definitions for specific types of infections. Centers for Disease Control and Prevention. National Healthcare Safety Network. Retrieved on July 28, 2013,fromhttp://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf.

6. **Sax H, Uckay I, Balmelli C, Bernasconi E, Boubaker K & MuhlemannK(2011):**Overall Burden of HealthCare-Associated Infections among Surgical Patients. AnnSurg ;253:365-70.

7. **Alonso CD, Treadway SB, Hanna DB, Huff CA, NeofytosD & Carrol KC (2012):** Epidemiology and Outcomes of Clostridium Difficile Infections in Hematopoietic Stem Cell Transplant Recipients. Clin Infect Dis; 54:1053-63.

8. **Linares L, Cervera C, Canclemente G, Marco F, Cofan F&Ricart MJ(2010):**KlebsiellaPneumoniaeInfection in Solid Organ Transplant Recipients Epidemiology and Antibiotic Resistance. Transplant Proc; 42(4):2941-3.

9. **Farmer T& Mitchell C (2010):**Australian Infection Control Guidelines: preventing and managing infection in health care. Health care Infection; 15(4): 101-103.

10. **Jenipher O (2012):** The Role of A nurse in Infection Control. J of Clinical Nursing; 31(6): 71-90.

11. **Duerink O, Hadi U, Lestari E, Roeshad D, Wahyono H & Nagelkerke N (2009):**A tool to Assess Knowledge, Attitude and Behaviour of Indonesian HealthCare Workers with Respect to Infection Control. Infection Control & Hospital Epidemiology; 33(5):1559-6834.

12. **Ward D (2011):**The Infection Control Education Needs of Nursing Students: An interview Study with Students and

Mentors .Nurse Education Today; 31(8): 819–824.

13. **Mohamed S A & Wafa AM (2011):**The Effect of An Educational Program on Nurses' knowledge and Practice Related to hepatitis C virus: A pretest and Post Test Quesi - experimental Design. Astralian Journal of Basic and Applied Sciences; 5(11):564-576.
14. **Goma A(2013)**: The Effect of Implementing Nosocomial Infection Control Preventive Strategy on The Occurance of Infection among Liver Transplant Recipients.,thesis.
15. **Marchaim D& Keith K (2012):**Infection and Antimicrobial Resistance in the Intensive Care Unit. Epidemiology and Out Comes Antimicrobial Agents; 52-141.
16. **Hussien M (2012):** The Impact of Health Education Intervention on Nurse's Knowledge and Practice for Preventing Infection in Operating Room in zigzag university Hospitals. Infection Control in Clinical Practice. Master Thesis, Faculty of Nursing, zigzag University.
17. **Gould D & Ream E**(2010): Nurses' views and practice of infection control measures: an interview and observational study .University of London ,London, England .Journal of advanced nursing,19:1121-1131.
18. **Williams B (2008):**An examination of Nurse Practices when Performing Aseptic Technique for Wound Dressing. Journal of advanced nursing; 23(11):48-54.
19. **Boelle P & Carrat F (2009):** Risk of Hepatitis C virus Transmission to Surgeon's and nurses from infected patients. American Journal of Infection Control; 30(5):765-766.
20. **Lee J (2008):** Surgical Wound Infections Surveillance for Quality Improvement, Surgical Infections, Boston, Infect ion control Hospital Epidemiology; 19(8):145-59.
21. **Kampf G, Reise G& James G (2013):**Improving Patient Safety During Insertion of Peripheral intravenous cannula. GMS Hyg Infect Control.; 8(2): 2196-5226.
22. **Ozyazıcıoğlua N& Arıkanb D(2008)**:The Effect of Nurse Training on The Improvement of Intravenous Applications. Nurse Educ Today; 28 (2): 179-185.
23. **Fakih MG, Jones K, Rey JE, Berriel-Cass D, Kalinicheva T, Szpunar Sand Saravolatz LD (2012):**Sustained

Improvements in Peripheral Venous Catheter Care in Non-intensive Care Units: A quasi-experimental Controlled Study of Education and Feedback. Infection Control & Hospital Epidemiology; 33(5): 449-55.

24. **Varghese E (2011):**Effectiveness of Structured Teaching Program on Knowledge and Practice Regarding Intravenous Cannulation among Staff Nurses Working at Selected Hospitals, Bangalore. Diana College of Nursing, Bangalore
25. **Chinchun M (2013):**Effectiveness of Planned Demonstration on Aseptic Medical Wound Dressing in Term of Practice among Staff Nurses in Selected Hospital in Mangalore. International Journal of Nursing Education; 7(1): 7- 10.
26. **Tvedt C & Bukhol M (2010):**Health Care Workers Self –Reported. Effect of An Interventional Program on Knowledge and Behavior Related to infection control .qualsaf health cure; 19-7.
27. **Abdulla S (2014):**Effect of an educational program on nurses' knowledge and practices toward Hepatitis B virus in emergency hospitals in Erbil City. Zanco J. Med. Sci.; 18 (1):620-621
28. **Roberts C(2009):**Universal Precautions, Improving the Knowledge oftrainedNurses.BritishJNurs9: 43-7.
29. **Nelsing S (2009):** Non Compliance with Universal Precautions and The Associated Risk of Mucocutaneaous Blood Exposure among Danish nurses. Infect Control HospEpidemiol;18(10):692-8.
30. **Sobaya E (2003):**Nursing Aspects of Infection Control in Developing Countries. Journal of Hospital Infection; 18:388-91.
31. **Ismail T (2008):**Assessment of Nurse's Awareness and Attitude toward Infection Control Concept at El-Maniel University Hospital. Master Thesis, Faculty of Nursing, Cairo University