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Effect of implementing nursing care of patients post liver transplantation on nurses performance.

Ebtesam Mohammed Abd Rabo[1], Mervat Anwar Abdel-Aziz[2] & Khalled Salah Mohamed[3].
[1.] Specialist nursing, Faculty of Nursing, Alrajhy liver hospital, Assiut University, Egypt.
[2.] Assistant Professor of Critical & Emergency Care Nursing, Faculty of Nursing, Assiut University, Egypt.
[3.] Lecturer of anesthesia and ICU, Faculty of medicine Assuit University, Egypt.

Abstract:
Back ground: intensive care unit nurses should be able to perform liver graft assessment post liver transplantation and learn principle of care to identify and manage any problem during ICU staying. **Aim:** this research was carried out to investigate the effect of implementing nursing care of patients post liver transplantation on nurses performance. **Study design:** Quasi-experimental research design was utilized in this study. **Setting:** intensive care unit at Alrajhey liver hospital at Assiut University hospitals. **Sample:** A convenience sample of all available nurses. The sample size was 30 nurses. **Tools**: Utilizing two tools, Nurse's knowledge questionnaire and Observational checklist. **Results:** Finding of the present study revealed that significant statistically correlation between total nurses' knowledge and skills regarding assessment of liver graft function and intensive care post liver transplantation which indicated positive relation between knowledge and skills. Finding of the present study revealed that insignificant relationship between information and skills regarding assessment of liver graft function and intensive care post liver transplantation and their socio - demographic data. **Conclusion:** Nurses` knowledge and practice regarding assessment of liver graft function in ICU and becomes to the satisfactory level after the educational program. **Recommendation:** Nurses need for continuous training programs to increase their performance regarding assessment of liver graft function post liver transplantation.

Keywords: Liver transplant patients, Nurses performance &Nursing care.

Introduction
Living donor liver transplantation:
Living donor liver transplantation is a surgery by which a diseased liver is removed and replaced with a healthy liver from a healthy person. The healthy lobe of liver is implanted in the place from which the diseased liver was removed. Two operations (donor and recipient) are performed at the same time in different operation rooms (**Medical Dictionary 2016**).

Indication to liver transplantion:
Final stages of liver disease as cirrhosis. And the patients with serious complications of cirrhosis, such as bleeding from varicese, accumulation of fluids on abdomen, hepatorenal syndrome and hepatic encephalopathy. Also liver transplantion, indicated in patients with final-stage of liver disease, in patients with the development of hepatic focal lesion and in patients with acute failure of the liver. **(Journal of Hepatology 2015**).

Indicators for liver graft function
Lactates: the end products of metabolism of the living cells, are mostly metabolized by liver. Thus, abnormally elevated lactate levels used as asign to determine liver function and its restoration after liver transplantations. **(Mert Akan 2016**).
Transaminases, bilirubin and INR both bile secretions prothrombin time (PT) and bilirubin levels were tested, especially on the synthetic activity and functional state of the liver (**Giuliano Bolondi 2017**).
Glucose Balance: A normal glucose metabolism following liver transplantation indicates a good graft function. Hypoglycemia means deterioration in the hepatic function, and it is common in primary non-graft functioning (PNF). (**Mert Akan 2016**).
Secretion and content of the bile: with the using bile producton as a indicators for outcome after reperfusion, some researches also investigated whether bile production during MP is an indicator for the secretory function of hepatocytes and cholangiocytes graft viability. Also the secretions of bile by human liver grafts under normothermic state **(Cornelia 2014**).
Post-operative care: Optimal nurse staffing could be a vital part in rising the standard of patient care and preventing complications. The standard of medical aid makes a significant distinction in patient outcomes and safety. Determinants of quality of medical aid include adequate talent, caring attitudes, effective communication, economical structure and management systems and effective participation. The nurse ought to remember of his/her responsibility for the standard of care provision to the patients, the establishment, ethics, laws and skilled standards, yet

as performance that contributes to the analysis of care. **The nurse** plays a vital role in any team of health care professionals concerned within the care of patients (**Abd Alsemia 2017**).

Nurse's education consists of the practical training and theoretical provided to nurses to arrange them for his or her duties as medical care professionals. It's important for nursing employees to participate in many coaching yet the requirements of patients still modification and there square measure new developments in procedure, the education of nurses never stops as they are required to continually master new skills and concepts throughout their career **(Elkattan, 2017).**

Nurses need inservice instructional programmers toextend theirperformance. additionally ,continuing skilled development by education and coaching when the purpose of qualification and or registration facilitate nurses in improvement patient care and permits skilled nurse practitioners to supply quality medical aid and repair delivery to their patient at medical care units **(Norush et al., 2014)**.

Significance of the study

Incidence of graft dysfunction varies between 2-14%, this percentage considered high and life threatened for the patient because it may increase the demand for urgent retransplantation **(Akan 2016**).

Living donor liver transplantation is a very difficult surgery, which need more skillful and knowledgeable nurses to introduce care for the patients.

After living donor liver transplantation comorbidities increased and organ dysfunction, an appropriate critical care management is required to support and promote recovery and prevent systemic complication.

Teaching program is very important for the nurses to increase knowledge and practice about assessment of liver graft function to help them to assess patient status and determine any complication which may be occur for the patient and when to inform doctor to manage any complication.

Aim of the study

This study is aim to investigate the effect of implementing nursing care of patients post liver transplantation on nurses performance.

Research hypothesis

There will be significance differences between post educational program nurses knowledge scores than the preeducational program scores.

There will be a significant differences between Post educational program nurses practice.

Materials and Methods

Research design: Quasi-experimental analysis design had been utilised during this study pre and post tested for study and control group groups.

Preparatory phase:

Study sample:

All available nurses (30) nurses divided into (13) nurses at liver transplant ICU and (17) nurses at liver transplant intermittent care unit and willing to participate in the study.

Setting: The study was carried out in liver transplant ICU is located in the fifth floor; it consists of two rooms with a total bed capacity of 8 bed and intermittent care unit,consists of 6 beds at Alrajhy liver hospital Assiut university Hospitals.

Tools of data collection: Two tools were developed by the researcher to collect the necessary data for this study as the following:

Tool I: Nurse's knowledge questionnaire: It was developed by the researcher after reviewing the relatives and literatures **(Mert Akan, 2016**) and (**Cornelia, 2014**). It was translated to simple Arabic language to assess exact nurse knowledge about assessment of liver graft function post liver transplantaton. It was used prior to implementation of the education program. The same tool was used immedatly after implementaton of the educational program (immediate post education program). It consisted of two parts:

Part 1: Include socio-demographic data (e.g., age. gender, educational level, years of experience and pervious attended training,).

Part 2: Nurses' knowledge assessment: questionnaire used to assess nurses' knowledge about nursing care of liver transplantion patients and assessment of liver graft function. It include 3 style of questions (multiple choice qustions, true and false questions and essay qustions). It includes 4 general items as the following:

- Basic knowledge about anatomy and function of the liver, which include 5 questions.
- Knowledge about liver transplantation (indcations/contraindcations and complications) which include 15 questions.
- Knowledge about intensive care post liver transplantation which include 25 questions.
- knowledge about assessment of liver graft function which include 15 questions.

Scoring system:

The knowledge questionnaire contains two types of questions; the first type was multiple-choice questions, the second type was true and false questions. The questionnaire consist of 60 question. The model answers where extracted from all answer after summarizing them. A scoring system was developed. For each item one grade was awarded for the complete correct answer and half grade for non-complete and zero for incorrect answer .The total score70% and more was considered good and less than 70 % was considered poor **(Onianwa et al., 2017).**

Tool II: Practice assessment tool: (Observational checklist) this tool was eveloped by researchers once reviewing literatures **(Akan, 2016)** to style checklist.
It was applied by the researchers to assess the nurse's practice as regard principle on management of patients post liver transplantation.
It used before and directly once the applying of the educational program .Each step was discovered, classified and scored as follow: one degree for every step that was done correct, [half] degree for every step done however incorrect technique and nil for step that wasn't done. The full score for all the steps was but (70%) were thought-about inadequate level, (71%) or higher than were considered adequate level. (**Walker et al., 2014**).

Technique for data collection:

Method: The study was conducted throughout 3 main phases, that include: The study was conducted on 3 parts (preparatory phase, implementation and analysis phase).

Preparatory phase:

- Permission to conduct the study was obtained from the hospital accountable authorities when clarification of the aim of the study.
- Tool one employed in this study was developed in Arabic by the investigator supported reviewing the relevant literature.
- The tool was be tested for content relevant validity by jury of three specialist within the field of vital care nursing.
- Permission for voluntary participation was be obtained from nurses and therefore the nature and purpose of the study are explained.

Pilot study

A pilot study: was conducted on three nurses to check the practicability and pertinency of the tool and therefore the necessarymodification was done.

Ethical consideration

The analysis proposal was approved from the moral committee within the college of nursing, There was no risk in study subject throughout application of the analysis, The study was following common moral principles in clinical analysis, Data was assured for confidentiality and obscurity, Study subject had the correct to refuse to participate and withdraw from the study with none rational and at any time, Study subject privacy was thought-about throughout knowledge assortment.

Development of the educational program:

The researcher developed the educational program, after reviewing the literature and based on nurses identified need post the preeducational program as the following:

- Stating the content and aim of the program.
- The content of the program was arranged into two sessions in addition to preliminary one.

The content of the program covered two parts related to:

1. Knowledge about assessment of liver graft function post liver transplantation.
2. Performance of procedure required for assessment of liver graft function and principle of care post liver transplantation.

Practical part included:

Apply of GCS for post operative LT patients/ Apply of wound care/ Steps of blood transfusion/ Nursing care during arterial blood gases/ Nursing care pre, during and post Endotracheal tube insertion/ daily care of intubated patients/ caring for patients on mechanical ventilator/ endotracheal suctioning/ daily care of intubated patients/ Nursing care for patients with urinary catheter/ nursing care for extubations/ Steps of catheter removal/ Guidelines during blood samples collecting/ Apply of infection control measures post LT/ nutrational support post LT/ Nursing care for patients recived immunosupression medications post LT.

Learning environment:

The program is conduct as session in official job duty.
Teaching methods (Lecture and discussion by using audiovisual aids / Demonstration and re-dmonstration
Arrang the subgroup:
The total sample was divided into ten subgroups included five nurses each session for better performance and understaning.

Implementation phase:

All nurses were interviewed throughout break time (one hour) in several shifts or before starting of shift. Assessment of information was done doubly as follows:

- Once at starting of study was thought of as pretest assessment and as line knowledge for latter comparison with future posttest.
- The second administration of form was administered once implementation of the teaching program to spot its result on nurses data.

Assess nurses skills:

- The research worker observes the nurses skills exploitation experimental listing tool doubly befor and in real time once program implementation.
- The research worker completes the listing whereas the nurses demonstrate teqniques.

Group discussion was inspired with continuous feedback to make sure understanding and accomplishment the target of the program. An open channel of communication was established between the research worker and nurses to answer any question and reinforce the gained data and proper actions.

- In the last session, the research worker summarized and emphasised the small print.
- Each nurse demonstrates and re-demonstrates the steps singly and fully performed the steps.

Evaluation of teaching program:

The analysis of program was administrated at once when the appliance of the program mistreatment the pre - check study tools one and two so as to check the effectiveness of the program on nurses performance. Data was collected by the investigator throughout just about one year.

Limitation of the study

Dropout of some nurses from the study cluster due to long run leaves e.g. sick-leaves or rotating- shifts

Statistical analysis

The data were take a look ated for normality mistreatment the Anderson-Darling test and for homogeneity variances before additional applied mathematics analysis. Categorical variables were delineated by range and % (N, %), wherever continuous variables delineated by mean and variance (Mean, SD). Chi-square take a look at and fisher actual take a look at accustomed compare between categorical variables wherever compare between continuous variables by t-test \and ANOVA take a look at. A two-tailed p < zero.05 was thought of statistically significant. We have a tendency to ar Used person Correlation to look the Association between scores .All analyses were performed with the IBM SPSS 20.0 software.

Results

Table (1): Show percentage distribution of demographic data of nurses participant:

Variables	N	%
Age group		
Less than 25 year	16	53.3
From 25-30 year	10	33.3
More than 30 year	4	13.3
Mean ±SD	**24.46±2.38**	
Level of education		
Medium education	1	3.3
Health Technician Institute	22	73.3
Bachelor of Nursing	7	23.3
Work places		
ICU	13	43.3
Intermittent cu	12	40.0
Operating room	5	16.7
Years of experience		
Less than one year	4	13.3
From 1-3 year	16	53.3
More than 3 year	10	33.3
Training attained		
Yes	8	26.7
No	22	73.3

Table (2): Total means score for knowledge before and after educational program (n=30)

Assessment nurse's knowledge about liver transplantation and nursing care	Max Score	Pre (n=30) Mean ±SD	Post(n=30) Mean ±SD	P. value
Anatomy and physiology of the liver	5	1.73±0.74	4.77±0.43	<0.001**
Knowledge about liver transplantation	4	1.23±0.82	3.73±0.45	<0.001**
liver graft function post liver transplantation	6	1.7±0.99	5.47±0.68	<0.001**
Initial poor graft dysfunction (IPGD)	4	0.87±0.68	3.77±0.43	<0.001**
Medication post liver transplantation	5	2.6±0.72	4.73±0.52	<0.001**
Post- operative care for liver transplantation on ICU	11	6.2±1.27	10.63±0.56	<0.001**
Fluid and electrolyte post liver transplantation on ICU	4	1±0.59	3.57±0.57	<0.001**
Blood transfusion post liver transplantation	4	1.6±0.56	3.63±0.61	<0.001**
Complication from liver transplantation	5	1.9±1.88	4.83±0.75	<0.001**
Total knowledge	**48**	**18.83±3.1**	**45.13±1.87**	**<0.001****

Independent T- test ***statistically significant difference (p<0.0.01).*

Table (3): Total means score for practice before and after implementing care (n=30)

Procedures	Max Score	Pre	Post	P. value
		Mean ±SD	Mean ±SD	
Apply of GCS for post-operative LT patients	6	3.07±2.13	4.27±0.45	0.004**
Apply of wound care	16	10.4±4.5	15.23±0.82	<0.001**
Steps of blood transfusion	34	19.2±2.87	21.57±4.51	0.018*
Nursing care during arterial blood gases	28	18.8±4.89	20.2±1.35	0.136
Nursing care pre, during and post Endotracheal tube insertion	44	27.13±3.03	34.33±3.47	<0.001**
Daily care of intubated patients	12	6±1.74	9.87±1.38	<0.001**
Caring for aptients on mechanical ventilaor	30	17.43±2.16	22.3±2.52	<0.001**
Endotracheal suctioning	26	11.93±2.32	18.5±2.27	<0.001**
Daily care of intubated patients	12	6±1.74	9.87±1.38	<0.001**
Nursing care for patients with urinary catheter	30	14.4±5.78	25.2±5.16	<0.001**
Nursing care for extubations	10	5.03±1.33	7.87±0.86	<0.001**
Steps of catheter removal	8	2.47±0.9	6.23±0.9	<0.001**
Guidelines during blood samples collecting	36	12.6±4.49	22.53±3.88	<0.001**
Apply of infection control measures post LT	20	4.5±2.64	14.4±1.87	<0.001**
Nutrational support post LT	14	3.13±1.43	8.8±1.32	<0.001**
Nursing care for patients recived immunosupression medications post LT	22	5.47±2.58	15.33±1.88	<0.001**
Total Practice	348	167.57±12.96	256.5±13.34	<0.001**

- Independent T-test quantitative data between the two groups

**Significant level at P value < 0.05,* ***Significant level at P value < 0.01*

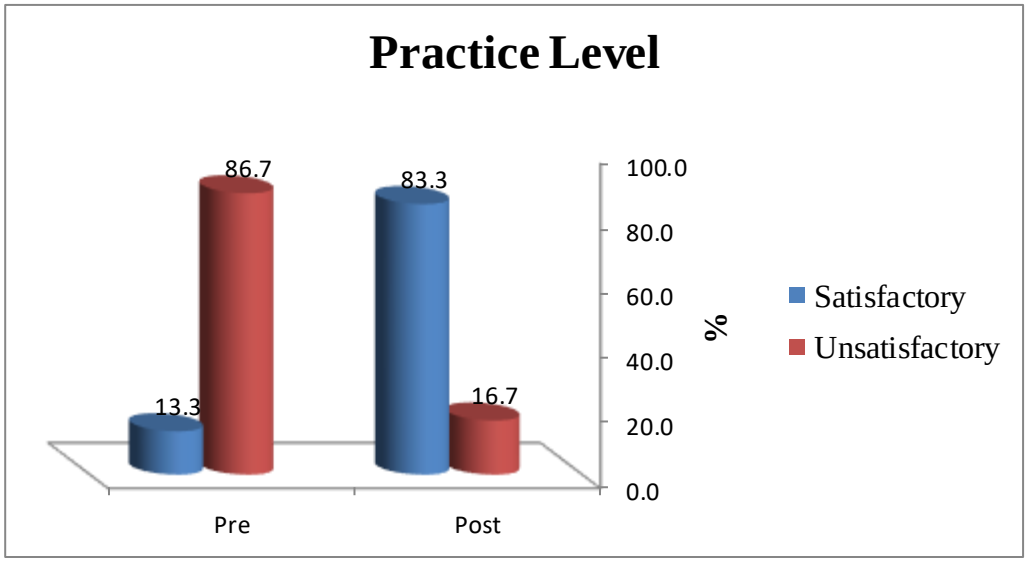

Figure (1): Correlation between Practice Score before and after teaching program .

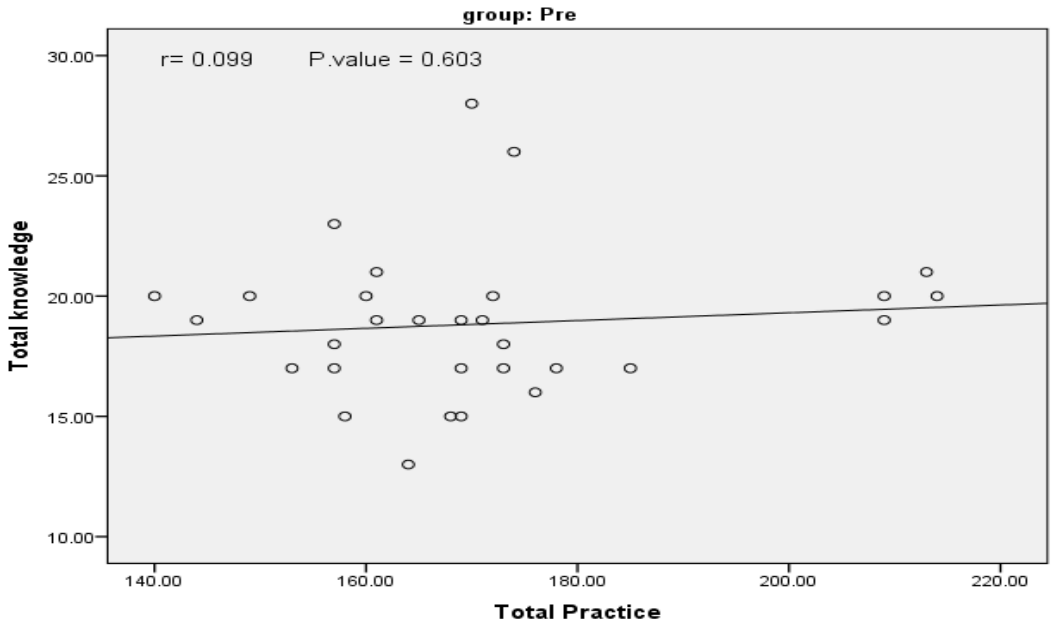

Figure (2): Shows the correlation between total score of nurses' knowledge and practice after the educational program

Table (1): Show demographic data of studied nurses, it showed that 53.3% of them were in the age group less than 25 years old, concerning their educational level 73.3% of the nurses with technical institute and 23.3% of nurses hold nursing bachelor degree. Moreover, the majority of the nurses 53.3 % had experienced from 1to 3 years. Concerning their previous training courses, 73.3% of them had not received any training courses, while 26.7% of them had courses.

Table (2): Illustrates that the total score for nurses' knowledge level in pre-test (Mean ±SD18.83±3.1) and posttest (Mean ±SD 45.13±1.87) showed significant differences between nurses' knowledge categories indicating adequate knowledge level after the educational program compared with knowledge before the educational program with P. value <0.001** .

Table (3): Illustrates that the total score for nurses' practices level in pre-test(Mean ±SD 167.57±12.96) and posttest (Mean ±SD 256.5±13.34) showed significant differences between nurses' practices categories indicating adequate practice level after the educational program compared with practice before the educational program with P. value <0.001**.

Figure (1): Total score for nurses' practices in pre-test and post-test. This figure shows that the majority of studied nurses (83.3%) were adequate practices the skills during patients care after the educational program, compared to only (13.3%) adequate practices level score before the educational program implementation with significant differences (p <0.05).

Figure (2): Shows the correlation between total score of nurses' knowledge and practice after the educational program; there was a significant positive correlation between the score of knowledge and the score of practice with significant differences (p <0.05). r= 0.099, p= 0.603*

Discussion:

Living donor liver transplantation causes several complications include Primary graft disfunction (PGD) that lead to poor prognosis. Recipients who develop PGD have higher mortality and graft loss rates compared with those while not graft disfunction **(Chen, 2014).**

This discussion will cover the main result findings as follows:

For the educational program ,all nurses participated have taken brochure for program objective and content further as ample materials and provides were provided for coaching and not provided at actual work scenario. These results were congruent **(Ahmed & Dutta 2016)** WHO reportable that data and apply level of nurses considerably improved when the teaching program , also congruent with **(Rosenthal et al., 2012)** they found educational program were significantly influenced the participants performance and in the same line **(Mohamed & Wafa 2011**) stated that there was positive statistically correlation between the score of nurses practice and knowledge

pre and post implementation program. Also ,the result of study revealed the most nurses aged 18 to 28 years and concerning years of experience of nurses in the present study majority had experience more than three years and majority of participant were female . These finding supported **(Mohamed & Salwa 2011).** who the entire sample were female nurses, who were between 20: 30 years of age.

The result of present study has shown the majority of nurses have improvement in nurses knowledge regarding anatomy and physiology of the liver, before educational program compared with post educational program. These finding supported **(Karina et al., 2013)** who reported that knowledge after educational program improved compared with pre educational program.

The result of present study has shown the majority of nurses have improvement in nurses knowledge regarding liver transplantation (definition, indication, contraindication and donor criteria) before educational program compared with post educational program. These finding supported **(Zarrinpar, 2015)** who reported that knowledge after educational program was improved compared with pre educational program.

The result of present study has shown the majority of nurses have improvement in nurses knowledge regarding liver graft function post educational program compared with pre educational program. These finding supported **(Kashimutt et al 2017)** who reported that knowledge after educational program improved for compared with pre educational program

The result of present study has shown that about half of nurses have improvement in nurses knowledge regarding medication post liver transplantation at pre educational program compared with post educational program. These finding supported **(Seham et al., 2013)** who reported that knowledge after educational program improved compared with knowledge pre educational program.

The result of present study shown that the majority of nurses have poor knowledge before teaching program compared with knowledge after implementation of teaching program and shown that the majority of nurses have good knowledge after implementation of teaching program compared with knowledge pre educational program .These findings supported **(Youssef et al., 2013)** who reported that the nurses knowledge were having unsatisfactory level of knowledge before implementation of the program while having satisfactory level of knowledge after implementation of the program with significant difference.

The results of study shown that the bulk of nurses have improvement in GCS follow once teaching program compared with the level before implementation of teaching program. These findings supported **(Santos et al., 2016)** that show improvement within the follow of GCS scores once implementation of the program with applied significant difference.

There is an urgent need of training programmers in critical units to educate nurses on blood transfusion risks reduction, latest safety guidelines, nurse interventions and decision-making. Blood transfusion saves lives and improves health, but millions of patients' need transfusions do not have time access to have safe blood **(WHO, 2008).** The result of present study shown that the majority of nurses have improvement in blood transfusion knowledge after thr program compared with knowledge before implementation of the program. These findings supported **(Hamdy et al., 2013)** that show improvement in the blood transfusion knowledge after implementation of the program with statistical significant difference. Also result of present study shown that about third of studied nurses have improvement in blood transfusion practice after the program compared with practice before teaching program. These study support with **(Hanan et al., 2013)** that indicates that there were highly significant differences among nurses in different settings of their work as regards competent level of nurses practice pre/post program and during follow up-period towards preparatory phase, procedure phase of blood transfusion therapy and nursing intervention of blood transfusion phase ($p<0.001$).

Also this study revealed that no statistical differences between nurses knowledge and practice related socio demographic characteristics. These result supported with **(Hanan et al., 2018)** showed that demographic characteristics not affect nurse's pre- knowledge and practice.

The result of present study shown that the majority of nurses poor level of total practice before teaching program compared with level after implementation of educational program. These findings supported **(Ghada et al., 2018**) that shown a sharp improvement in the practice scores after implementation of the program with statistical significant difference.

concerning the impact of the intervention program, the findings of this study has shown statistically important improvement in nurses' information and skills relating to indicators of liver graft function and principle of caring of patients post liver transplant , this was detected forthwith once program implementation compared to pretest to satisfy the hypotheses I,II. This improvement is also because of several reasons as information refreshment through the program session ,relevance of item of the program content, simple language, exaggerated motivation that was required for action of the of the specified

objectives, convenience of sources of data as pamphlet.

The study finding unconcealed that there was statistically important correlation between total nurses' data and skills that indicates positive relation between data and skills. To meet the hypotheses II. This result refers to the extent of skills influenced by the extent of information.

Nurses have an important role in dealing with patients on ICU and caring of them. Nurse can discover any complication in early phase during caring of patients.

The assessment of nurses knowledge and skills regarding indicators of liver graft function post liver transplantation and principle of care on ICU for liver transplantation patients before program implementation ,in the current study has shown that almost all of studied nurses has statistically significant lacking in the basic knowledge and skills about evaluation of liver graft function and vigileo monitor. This result may be due to the most studied nurses are newly graduated, liver transplantation are new in Upper Egypt (**these from researcher point view**).

This research allowed unveiling that the skills developed by the nurses are central to the effectiveness of liver transplantation, because it is for that plan, organize, coordinate, implement and evaluate a number of technical and scientific procedures of nursing in direct care and indirect to patients and family; hold records of nursing care; report data that support scientific and administrative investigations; conduct consultation and nursing lectures; and interact with the multidisciplinary team with interest to watch the real needs of the patients in an integrated manner. The nurse uses open and accessible communication, through educational activities, aiming to improve understanding of therapeutic procedures; prevention of possible complications; increased satisfaction and quality of performance; decreased anxiety **(Francisca et al., 2016).**

Finally, the findings of the present study supported the research hypothesis that nurses working in the emergency unit and exposed to the educational program about performance regarding nursing care of patients post-liver transplant will show high score of knowledge and practice in the result of the posttest more than the pretest.

Conclusion

The present study was evaluate the effect implementing an educational program for Nurse's Performance Regarding nursing care of patients post liver transplant at Al Rajhy liver hospital.

Based on the results of this study, it is all over that applied mathematics important improvement was found between the nurses level of data before, right away once application of an academic program regarding assessment of liver graft operation.A applied mathematics important improvement was found between the nurses level of skills before, rightaway once applicationof an academic program regarding assessment of liver graft operate. There was correlation found between information and skills score obtained by nurses receiving program.

Recommendation

Guidelines of intensive care should be available in written format in intensive care unit. On the nurses' knowledge and skills level must have strict observation of nurses' performance about intensive care post liver transplantation, Conduction of periodic training session to improve nurses' knowledge and skills about assessment of liver graft function and principle of care at intensive care post liver transplantation, availability of written guidelines booklet, Establishment of continuing educational program including guidelines to improve nurses' knowledge and skills regarding care of patient's post liver transplantation, Learning supplies such as books and update scientific journals, posters, and results of researches. In addition to access to the internet should be available to promote self-learning regarding assessment of liver graft function and intensive care of patient's post-liver transplantation.

References:

- **Ahmed, N., & Dutta S., (2016):** Effectiveness of planned Teaching Program on nurses' knowledge and practice Regarding Glasgow Coma Scale for Neurological Clients of a Selected Hospital, Kolkata,vol.18(2),74-86
- **American Hospital Directory (2015):** Individual hospital statistics for California. Retrieved June 21, (2016), available at https://www.ahd.com/states/hospital_CA.html.
- **Azza Abd Alsemia Elewa, Badria Abd Elshahed Ahmed Elkattan (2017):** American Journal of Nursing Research, 2017, Vol. 5, No. 1, 13-21 Available online at http://pubs.sciepub.com/ajnr/5/1/2
- **Cataldo D, Yoogoo K & Elia (2017):** Contemporary Liver Transplantation, part III , Anesthesia Management of Liver Transplantation p(154)
- **Cornelia J. Verhoeven, Waqar R.R. Farid, Jeroen de Jonge, Herold J. Metselaar, Geert Kazemier, Luc J.W. van der Laan (2014):** Biomarkers to assess graft quality during conventional and machine preservation in liver transplantation, Journal of Hepatology 2014 vol. 61, p(675).

- **Critical care nursing monitoring and treatment for advanced nursing practice edited by kathy j. Booker, phd, rn, cne, (2015):** edition 1,p27.
- **Douglas B, Marcela B, Luiz G, Paolo S,(2016):** primary graft dysfunction of the liver: definitions, diagnostic criteria and risk factors,p (2)
- **Fayed, MN., Hanan. T, Elbahnasaway,T.H, & Omar, KT (2016):** Effect of instructional program on Nurses compliance with universal precaution of infection control, International Journal of Novel Research in Health Care and Nursing vol3,issue 1,Pp (81-92).
- **Francisca D, Alice M, José H, Cleide C, Isis F, Ana M, & Maia R (2016):** Liver transplant in reference hospital: nursing skills, 10(suppl. 3).
- **Giuliano B, Federico M, Roberto M, Daniele N, Marco V, & Lesley P, (2016):** Predictive factors of short term outcome after liver Transplantation,vol(22) issue 26 p (5942:5943) available at http://www.wjgnet.com/esps/
- **Hanan M, Ghada T, & Shaymaa S, (2018):** Infection control: effect of nursing teaching protocol on nurses' knowledge and practice regarding kidney transplantation patients , p(23:25).
- **Hanan S, Asmaa H, & Marwa M, (2013):** Evaluation of Teaching Safety Procedure to Acquire Nurses, Best Practice for Patient Receiving Blood Transfusion, Faculty of Nursing-Benha University,p (13:24).
- **Hoyer DP, Paul A, Gallinat A, Molmenti EP, Reinhardt R, & Minor T, (2015):** Donor information based prediction of early allograft dysfunction and outcome in liver transplantation. Liver Int. (2015); 35(1):156-63.
- **Karina D; Orlando C; Luciana C; Fabiana M; Márcia M; & Cristina M, (2013):** Educational intervention for liver transplantation candidates, vol.21 no.1,p(5) available at http://www.scielo.br/scielo.php?script=sci_arttext &pid=S0104
- **Mert A, (2016):** Intensive care management in adult liver transplantation.
- **Mohamed, S, & Wafa, A, (2011):** The Effect Of An Educational Program On Nurses Knowledge And Practice Related To Hepatitis C Virus: A Pretest And Posttest Quasi-Experimental Design Australian Journal Of Basic And Applied sciences, 5(1):564-570, 2011, Iss N1991-8178.
- **Salwa A, & Alaa M, (2011):** The Effects of an Educational Program on Nurses Knowledge and Practice Related to Hepatitis C Virus, Australian Journal of Basic and Applied Sciences, 5(11): 564-570.
- **Seham Ahmed Mohamed El-Gamal, Warda Youssef Mohamed Morsy, Manal Sayed Ismail, Mostafa Abdel-Rahman El-Shazly, (2013):** Impact of a Designed Nursing Intervention Protocol about Preoperative Liver transplantation Care on Patients Vol.4, No.19.
- **Kashimutt, MBBS FRCA FCAI, A Kotzé, MB ChB MMedSc FRCA (2017):** Anaesthesia for liver transplantation (2017): BJA Education, Volume 17, Issue 1, Pages 35–40, available at https://academic.oup.com/bjaed/article/17/1/35/2706110.
- **Swamy C (2014):** Blood transfusion practice in the liver transplantation; 58(5):647- 651.
- **Ikegamia, T. Shirabea, K. Yoshizumia, T.Aishimab, S. Taketomia, Y. Soejimaa, Y. Uchiyamaa, H. Kayashimaa, H. Toshimaa T. & Maehara, Y. (2012):** Primary Graft Dysfunction After Living Donor Liver,p(1886)
- **Perilli, V. Aceto, P. Sacco, T. Modesti, C. Ciocchetti, P. Vitale, F. Russo, A. Fasano, G. Dottorelli, A. & Sollazzi, l. (2016),** Anaesthesiological strategies to improve outcome in liver transplantation recipients,p(3173)
- **Wesley C, Cássia R, Maria C, Meiry F, & Ruth E, (2016):** Assessment of nurse's knowledge about Glasgow coma scale at a university hospital, 4(2):213-8.
- **WHO (2008):** Blood transfusion error prevention: Nurse role. Journal of Nursing; 1940-6967. Available at: http://www.asrn.org/journalnursing/285-blood-transfusion-error. Retrieved on: 3-1-2013.