IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 6 Ser. IV. (Nov - Dec .2019), PP 55-64
www.iosrjournals.org

Effect of an Educational Program on the Quality of Life of Patients Undergoing Liver Transplantation

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Abstract: ***Background****: Organ transplantation has the prospective to rapidly return end stage liver disease (ESLD)patients' health and wellbeing.* ***Aim*** *of the current study was to evaluate the effect of an educational program on quality of life for patients undergoing liver transplantation.****Methods:*** *A quasi-experimental research design with pre-post and follow up assessment was used to conduct the study atoutpatient liver transplantation units in the Gastrointestinal Surgery Center, Mansoura University, Egypt from the beginning of December 2017 to end of May 2019.****Subjects:****A purposive sample of 80 patients undergoing liver transplantation was included.* ***Tools:****Two tools were used for data collection;****1)****Structured interviewing questionnaireto collect data about the patients' demographic characteristics, past and medical history, andPatient's knowledge related to liver transplantation****2)*** *The 36-item Short-Form Health Survey (SF-36) was used to evaluate quality of life (QoL).* ***Results:*** *patient knowledge had significantly increased after implementation of educational program; satisfactory knowledge scores increased to 87.5% with a highly statistically significant at P< 0.01. Also, a statistically significant differences noticed in all dimensions of QoL after implementation of educational program with obvious significant improvement in PCS (physical component summary) and MCS (mental component summary) can be noticed at p < 0.05. A positive correlation founded between patients' knowledge and QOL.****The study concluded that*** *the educational program was effective in improving level of knowledge, with significant quality of life improvement of patients undergoing liver transplantation.****The study recommended that*** *Assuring the importance of heath educational program as a usual care in liver transplantation unitsand during home visits to improve health outcomes and QOL.Disseminate health education booklet and posters for patients undergoing liver transplant related to quality of life will be effective to increase patient knowledge as well as focus on the continuity of home health care. Replication of the study on large study sample*

Key Words*: Educational program,Liver transplantation, Quality of life.*

Date of Submission: 11-11-2019 Date of acceptance: 27-11-2019

I. Introduction

Chronic liver disease carries alterations in several tissuestructures, producingvarious problems that disturb the patients' functioning and performance thatdeleteriouslydisturb their QOL**[1].**End-stage liver failure is a pathological state that has excessive impact on people's live. Liver transplantation is a promisingtherapy withbeneficialintent for the incurablephases of chronic liver disease (CLD), and delivers the only opportunity for reversing the life-threatening situation, which impacts the biological, psychological and social levels [**2**].

Transplantation processes carry substantial morbidity and possiblysevere complications including organ rejection, infections, and recurrence of disease. Earlierresearches have confirmed significant improvements in post-transplant QOL, however patients seem to have continuinginsufficiencies when compared to healthy controls**[3].**

Quality of life is a patient-reported measure involved, emotional well-being, physical and social functioning. It mirrors on the awareness of an individual concerning their health. Health related quality of life (HRQoL) focuses on the diseaseeffects on every dimension of an individual's life including physical, social, psychological dimensions**[4].**QoLwould be a main concern for health care personalworking in transplant field and should be the absolute "major outcome" to appraise the long term success of liver transplantation. QOL in liver transplantation is positivelyaffected by several factors including mental condition, sociodemographic elements, liver disease, immunosuppressive drugs, time on the waiting list**[5].**

Patients' education is abroad and intended learning practice that is attained by means of long-term learning ways, counselling and behavioral changeskills that proposed to improve the patient's knowledge and health behavior **[6].**The nurse's role in patient education is of extreme importance but also a challenge,

particularly in liver transplantation. learning activities should be performed bynursing staff for patients and their relatives concerning long-term measures to promote health **[7],**to increase patients' ability to recognize the rationale and significance of the therapeutic systemsuggested by the transplantation team, as well as to recognizeabnormalities that indicating the presence of health problem **[8].**

Significance of the study:

Chronic liver diseases are a main health concern in Egypt. Hepatitis C virus (HCV) prevalence among the age group of 15−59 years is estimated to be 14.7%. The high occurrence of chronic liver diseases resulting in increased numbers of Egyptian patients suffering from end stage liver disease (ESLD), necessitating liver transplantation (LT)**[9]**.education of liver transplantation patients is a nursing responsibility that aims to easier recovery, and reduce postoperative complications for successful transplantation. The difficulty and comprehensive nature of the transplantation process require consistent provision of information. Moreover, the search for strategies to encourage the acceptance of behavioral modifications and its practice is an ongoing challenge for the nurses responsible for the care of liver transplantation patients.

Aim of the study:

Thisstudy aimed to evaluate the effect of an educational program on quality of life for patients undergoing liver transplantation.

Research Hypothesis: It was hypothesized

1. Level of knowledge inliver transplant recipients will be increased after applying the educational program.
2. Quality of life of liver transplant recipients will improved after applying the educational program.

Subject and Methods:

Research design:

Aquasi-experimental research design (One group pre/ post-test)was utilized to conduct this study.

Research setting:

The study was conducted at the outpatient liver transplantation units inthe Gastrointestinal Surgery Center, affiliated to Mansoura University hospitals, Egypt.

Sample type and criteria:

A purposive sample of80 patients undergoing liver transplantation were recruited for the study using the following inclusion criteria; adult age 20 to 60 years, from both sex, able to follow instructions, and willing to participate in the study.

Sample size was determined statistically using epidemiological information (EPI info.)power analysis (version 6.02)considering the total number of liver transplantation patients admitted to liver transplantation units through year 2016/2017, alpha error 5% (= confidence level=95%) Beta error 21% (study power= 85%).

Indicating that a sample size of (70) recipients is required to validate this effect size. The sample size was increased to be 80 participants allowing for non-responders and drop out.

Tools of data collection:

Twotools were used for data collection:

Tool I: A structured interviewing questionnaire: It was developed by the researchers including three main parts:

Part I: Concerning the socio-demographic data of the study subjects; including age, gender, education, marital status, occupation, residence, caregiver, monthly income, family size and crowding index.

Part II:Patient past and health historyincludes duration of illness, causes of liver failure, complications, previous hospitalization and family history related to liver disease.

Part III:Patient's knowledge related to liver transplantationincludes meaning of liver transplantation, pre and postoperative precautions, warning signs of organ rejection, management, medications used and its side effects, immunosuppressive drugs home ventilation, and lighting, disinfectant solution, and hygiene. This part was used pre- post program implementation. **Knowledge scoring system:**The questions about patient's knowledge were scored as correct answer = 2 marks, incomplete answer = 1 mark and the incorrect answer = 0. The total score for this part was 16 marks. According to the patient's answers, knowledge was categorized into satisfactory knowledge ≥ 50% and unsatisfactory knowledge < 50%.

Tool II:Quality of life (QOL) assessment tool (SF-36)[10].

QOL was measuredby the Medical Outcomes Study SF-36. A validated self-administered questionnaire comprised of 36 items to assess QOL of liver transplantation patients, which are used to derive eight health

subscales: physical functioning (10 Question), role physical (limitations due to physical health) (4 Question), bodily pain (2 Question), general health (6 Question), vitality (4 Question), social functioning (2 Question), role emotional (limitations related to emotional problems) (3 Question), and mental health (5 Question). **Scoring system:**The eight subscales can also be summarized into a physical and mental component summary score. The total scores of each subscale were converted to scores that ranged from 0 to 100, with lower scores indicating impaired QoL.

Operational design

The operational design includes the preparatory phase, ethical considerations, validity and reliability, pilot study, fieldwork, and limitations of the study.

1. Preparatory Phase

Included reviewing of current recent local and international related literature to develop research tools, educational program(booklet) developed using simple Arabic and clear words for enhanced understanding and supplied by clear colored, descriptive pictures.

2. Ethical considerations

Ethical approval was gainedfrom ethical committee to initiation the study.Investigators presented themselves to study subjects, the study aim was explainedat the beginning to gain patients cooperation, andoral consent was gained. Confidentiality of collected data was assured. The investigators assured that involvement in the study was voluntary and they have the right to withdraw at any time.

3. Validity and Reliability

Validity of the tools were judged by a board of 7 experts in the medical surgical, and community health nursing specialty from Faculty of Nursing at Mansoura and Fayoum University to ensure its validity; their notes were considered.**Reliability** was assessed using Cronbach alpha reliability test revealed high reliability: **SF-36:**Internal consistency estimates (Cronbach's α) of 0.77 − 0.94. Test-retest reliability: 95% confidence intervals.

4. Pilot Study

A pilot study was carried out on 8 liver transplantrecipients (10%) to test the clarity and applicability of the tools, and to estimate the time needed by the patient to answer the questions. Adjustments were performed based on the results of the pilot study. Patients who participated in the pilot study were included to study sample due to limited number of cases admitted to transplantation unit.

5. Field Work

The study was carried out from December 2017 to May 2019, covering a period of 18 months. The researcher visitedOutpatient liver transplantation units two days/ week(Saturday and Wednesday) from 9.00 am to 12.00 pm according to the schedule of receiving treatment and follow up.The study include three phases: (1)preparatory phase which includes tools development, validation, reliability, pilot study, and the official permission; a formal letter was issued from the Faculty of Nursing Mansoura University to the director of Gastrointestinal Surgery Center to obtain approval for conducting this study. Phase (2) includes the selection of the study subjects, who met the inclusion, taking their approval to participate in the study after explaining the purpose of the study, applying the pretest. The researcher was using the study tools with collaboration of medical staff responsible about liver transplant in the chosen settings, as they were oriented about the concept of the educational program. Teaching sessions (pre-post operation) were conducted in outpatients clinic and patients' rooms. The average time consumed to fill in the tools was 45 minutes, and applying educational program for the study group. Phase (3) included post-test and finalizing the research.

Intervention

Program educational design

The program content was constructed in four phases: assessment, planning, implementation, and evaluation. The general aim of the educational program was to improve patient's general knowledge regarding liver transplantation and related quality of life.

1. Assessment phase:

This phase aimed to collect data about patient socio-demographic data, patient past and present health history.Assessment of knowledge related to liver transplant, and patient's quality of life pre and post implementation of the educational program.

2. Planning phase: The educational programwas designed based on the results obtained from the assessment phase.

Educational sessions were constructed by the investigator which contain the following topics:Anatomy and physiology of the liver, indications of liver transplantation, contraindications of liver transplantation, post-transplant complications, warning signs and post-transplantation lifestyle as exercise, diet, smoking, sleeping, medication, infection control measures, sanitation home environment, physical and social problems.

3. Program implementation phase:

The intervention comprised**4 educational sessions** of 30–45 min of teaching, group discussion, questions and answers, as well as educational booklet, and PowerPoint presentation.

Educational sessions

First session: Power Point presentation and open discussion about anatomy and physiology of the liver, indications of liver transplantation, contraindications of liver transplantation, and the patients were provided with the educational booklet.

Second session: Power Point presentation about post-transplant complications, rejection warning signs and post-transplantation lifestyle as exercise, diet, smoking, and sleeping.

Third session: Power Point presentation about infection control measures, sanitation home environment.

Fourth session: Power Point presentation about physical and social problems, medication and the importance of immune suppressive drugs in preventing organ rejection

- The patients were followed up for three months post discharge through the outpatient clinic and telephone calls.
- Sufficient repetitions were done when needed. At the end of each session, the patients were informed about the content of the next session and its time.

4. Evaluation phase:

Pre & Post-test

Pretest was applied first before application of educational program. **Post-test:** assessment of patients' knowledge was done immediately after program implementation and after three months post patient hospital discharge at the outpatient clinic. QOL assessment carried out after 3rd and 6th months (recommended period to evaluate QOL, to evaluate the patients' progress, and improve the activity of the studied subjects, participants were followed with telephone call. Comparison was done to assess the effect of the educational program on patient's level of knowledge and QOL.

II. Statistical Design

Statistical analysis was done using the Statistical Package for Social Sciences (SPSS), version 21. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, means and standard deviations for quantitative variables, qualitative variables were compared using the chi-square test and Spearman test for correlation.The step by step procedure of testing the stated mentioned hypothesis was estimating the rank correlation coefficient known as Spearman's (R test) rank correlation coefficient.

$$R = \frac{1 - 6 \sum d_2}{N(N^2 - 1)}$$

Grade of correlation:

0.00 – 0.24 Weak or no association, 0.50 – 0.74 Moderate, > 0.75 Strong

III. Results:

Table 1showed that**;** 45.0% of the liver transplant recipients were aged 40y with mean age 46.3 ± 6.5;87.5% of them were male and 91.3% married.Regarding educational level57.5% of them were university education, and from urban area (62.5%). 56.3% of them their crowding index was 4+, and90.0 % husband/wife was the caregivers.

Table 2 clarified that, 73.7% of the liver transplant recipients had duration of illness 5 years or more with a mean of 6.3±2.8. The common causes of liver failure were 97.5% for viral hepatitis. While the common complaints were 96.3%for ascites, and 83.8% for peripheral edema. The majority of liver transplant recipients had a history of previous hospital admission due to liver cirrhosis (96.3%). 33.8% had previous surgery due to appendectomy and 2.5% had previous liver transplantation. Also, 81.8% of the patients, had family history of liver diseases, and only 18.8% of them did liver transplantation.

Table 3 revealed that; a highly statistically significant improvement in recipients knowledge in relation to meaning, liver transplantation management, infection control measures, pre and postoperative precautions and home ventilation at $p< 0.001$, while there were statistically insignificant differences in relation to warning signs of organ rejection, sexual relation and at $p > 0.05$.

Figure 1 illustrated that, before the programimplementation; the liver transplant recipients have unsatisfactory totalknowledge score, while after the educational program implementation; satisfactory total knowledge scores increased to 87.5% with a highly statistically significant at P< 0.01.

Table 4 showed that; a statistically significant differences between pre, post and follow-up QOL scores in relation to general health (P < 0.003), social-functioning (P < 0.005), bodily pain (P < 0.002), vitality (P < 0.003), PCS (P < 0.001) and MCS (P < 0.002) domains of quality of life at p < 0.05.

Table 5 showed that;a statistically insignificant differences between ages, gender, marital status of the liver transplant recipients and their knowledge, while the table shows a statistically significant relation between the level of education and knowledge at p < 0. 05

Table 6showed that, statistically significant positive correlations between QOL of the liver transplant recipient and their knowledge.

Table (1): Distribution of Liver Transplant Recipients according to their socio-demographic characteristics (**n=80).**

Items	No.	%
Age /years		
< 40	13	16.3
40-	36	45.0
50-60	31	38.7
Mean ±SD	**46.3 ± 6.5**	
Gender		
Male	70	87.5
Female	10	12.5
Marital status		
Single	7	8.8
Married	73	91.3
Education level		
Basic	2	2.5
Secondary	32	40.0
University	46	57.5
Job		
Retired/housewife	7	8.8
Employee	56	70.0
Manual worker	17	21.2
Crowding index		
< 4	35	43.7
4+	45	56.3
Residence		
Rural	30	37.5
Urban	50	62.5
Caregivers		
Husband/wife	72	90.0
Children/others	8	10.0
Smoking		
Yes	17	21.2
No	63	78.8

Table (2): Distribution of Liver Transplant Recipients according to their Health History (n=80).

Items	No.	%
Duration of Illness /Years		
< 5	21	26.3
5+	59	73.7
Mean ±SD	**6.3 ± 2.8**	
Cause of Liver Failure		
Viral hepatitis	78	97.5
Schistosomiasis	43	53.8
Tumor	11	13.7
Complaints		
Ascites	77	96.3
Peripheral edema	67	83.8
Dyspnea	45	56.3
Hematemesis	23	28.8
Recurrent bleeding	11	13.8
Causes of Previous Hospitalization		
Liver cirrhosis	73	96.3
Ascites	30	37.5
Hepatic coma	12	15.0

Causes of Previous Surgery		
Appendectomy	27	33.8
Umbilical hernia	22	27.5
Inguinal hernia	13	16.2
Family History of Liver Diseases:		
Yes	66	81.8
No	14	18.2
Family History of Liver Transplantation:		
Yes	8	10.0
No	72	90.0

*Responses are not mutually exclusive

Table (3): Distribution of Liver Transplant Recipients according to their Knowledge related to Liver Transplant **(n=80).**

Knowledge	Pre Program		Post Program		Follow-up Program/3months		X^2	P Value
	No.	%	No.	%	No.	%		
Meaning of liver transplantation								
• Incomplete answer	33	41.3	2	2.5	2	2.5		
• Complete answer	44	55.0	67	83.7	51	63.8	78.94	0.001**
• Do not know	3	3.7	11	13.8	27	33.7		
Liver transplantation management								
• Incomplete answer	3	3.7	10	12.5	30	37.5	93.48	0.001**
• Complete answer	30	37.5	59	73.7	48	60.0		
• Do not know	47	58.8	11	13.8	2	2.5		
Pre and postoperative precautions								
• Incomplete answer	3	3.7	10	12.5	30	37.5		
• Complete answer	30	37.5	59	73.7	48	60.0	93.48	0.001**
• Do not know	47	58.8	11	13.8	2	2.5		
Infection control measures								
• Incomplete answer	2	2.4	17	21.3	26	32.5		
• Complete answer	39	48.8	53	66.2	52	65.0	68.47	0.001**
• Do not know	39	48.8	10	12.5	2	2.5		
Warning signs of organ rejection								
• Incomplete answer	14	17.5	4	5.0	10	12.5		
• Complete answer	62	77.5	71	88.7	64	80.0	6.50	0.16
• Do not know	4	5.0	5	6.3	6	7.5		
Medications and its side effects								
• Incomplete answer	15	18.8	14	17.5	11	13.8		
• Complete answer	58	72.4	62	77.5	62	77.5	1.82	0.76
• Do not know	7	8.8	4	5.0	7	8.7		
Home ventilation								
• Incomplete answer	25	31.3	2	2.5	4	5.0		
• Complete answer	52	65.0	66	82.5	62	77.5	40.25	0.001**
• Do not know	3	3.7	12	15.0	14	17.5		

****P< 0.01 highly significant value**

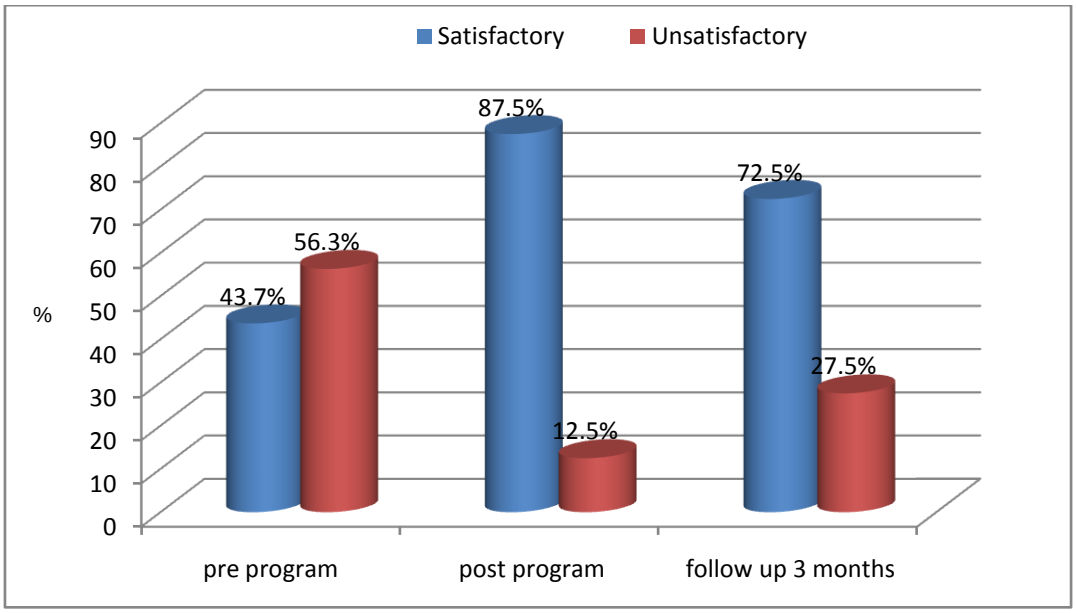

Figure (1): Distribution of Liver Transplant Recipients according to their Total Knowledge Scores pre, post, and follow up after program implementation (**n=80).**

Table 4: **Recipient health related quality of life (SF-36)**

Factors SF-36 Domains	Pre test Mean ± SD	Post test Mean ± SD	Follow up Mean ± SD	F -test	P
General health	**60.33 ± 16.02**	**66.45 ± 17.32**	**70.52 ± 18.45**	**3.201**	**0.003***
Physical functioning	**63.33 ± 12.55**	**73.57 ± 16.12**	**77.37 ± 14.84**	**3.306**	**0.004***
Role physical	**64.25 ± 20.45**	**74.35 ± 26.46**	**78.55 ± 23.58**	**3.235**	**0.004***
Role emotional	**59.95 ± 42.56**	**75.95 ± 30.21**	**77.23 ± 37.12**	**3.299**	**0.003***
Social functioning	**68.42 ± 21.85**	**88.42 ± 21.41**	**90.47 ± 20.24**	**5.709**	**0.005***
Bodily pain	**68.35 ± 20.55**	**79.25 ± 30.24**	**81.24 ± 31.85**	**3.345**	**0.002***
Vitality	**60.30 ± 25.20**	**77.56 ± 18.77**	**79.24 ± 19.23**	**4.405**	**0.003***
Mental health	**65.88 ± 12.96**	**73.85 ± 17.45**	**77.58 ± 18.56**	**3.209**	**0.005***
PCS (physical component summary)	**60.07 ± 10.63**	**62.85 ± 11.39**	**76.98 ± 10.47**	**7.103**	**0.001***
MCS (mental component summary)	**52.65 ± 8.33**	**58.53 ± 10.16**	**62.14 ± 11.24**	**4.306**	**0.002***

Table (5):Relations between Knowledge of the Liver Transplant Recipients and some Socio-demographic characteristics (n=80).

Items	Knowledge				X^2	P Value
	Satisfactory		Unsatisfactory			
	No.	%	No.	%		
Age /years						
< 40	12	15.0	1	1.2	0.34	0.84
40-	31	38.8	5	6.2		
50+	27	33.8	4	5.0		
Gender						
Male	61	76.2	9	11.3	0.06	0.64
Female	9	11.3	1	1.2		
Marital status						
Single	6	7.5	1	1.2	0.02	0.62
Married	64	80.0	9	11.3		
Education level						
Basic	2	2.5	0	0.00	7.65	*0.02
Secondary	24	30.0	8	10.0		
University	44	55.0	2	2.5		

Table (6): Correlations between Liver Transplant Recipients QOL and their level of Knowledge (n=80).

Items	Quality of Life	
	R	P Value
Level of Knowledge	0.82	*0.01

IV. Discussion

Regarding socio-demographic characteristics of the liver transplant recipients, the present study findingsrevealed thatthe majority of the studied subjects had university education, married and husband/wife was the primary caregivers, and more than half of them their crowding index was 4+. Regarding age and gender near to half were aged 40 years old with the mean age 46.3 ± 6.5,and mostly males. This finding was in accordance with**Mininoand Murphy (2012) [11]** who stated that end stage liver disease is more common among males aged 40 to 65 and considered the fifth leading cause of death among those people.**Mohamed and Mostafa (2018) [12]**also documented that mostof his liver transplant recipient sample were age between 40 to 60 years old and majority of them were male.A studies by**El-Gamal, (2013) and Abdel-Ghanyet al. (2013)[13, 14]**supported this finding;as 90.9% of their studied participant were males. This may be related to high prevalence of Schistosomiasis which considered as the major cause of liver diseases during 1960s - 1980s among Egyptian males more than females as stated by authors.

Regarding to residence, thepresent study findings showed thatabout two third of the studied subjects were from urban area,this result disagree with **Abdel-Ghany et al. (2013) [14]**foundedthat more than three quarters of LT clients were living in rural areas.Also,our findingsagreed with **Mendes et al. (2013) [15]** who conducted a study at Brazil titled; educational intervention for liver transplant candidates, found that most of liver transplant clients were living in urban areas. This may attributed to low socioeconomic status in rural areas and decreased awareness about liver transplantation.

In the present study**,** around three fourth of the studied sample had duration of illness 5 years or more with a mean of 6.3±2.8.This finding disagreed with the findings of the study carried out by **Mohamed and Mostafa (2018) [12]**they reported that most of liver transplant recipients suffering liver diseases within 10 to 12 years.These difference my attributed to change in geographical area and personal traits.

According to the causes of liver failureamong liver transplant recipients,the present study findings revealed that,viral hepatitisisthe common causes of developing liver failure, this was in agreement with **Cuadros et al. (2014), Abdel-Ghany et al. (2013) [16, 14]**they found thatEgypt has the highest prevalence of viral hepatitis C (HCV) in the world and the majority of LT clients had hepatitis C as the primary cause of developing liver failure. In addition **Vinaixa et al. (2013) [17]** who mentioned that among liver transplant clients the most common cause of liver cirrhosis was hepatitis C viruse.From the researcher point of view may be due to improper infection control measures in health care settings.

Regarding to the common complaintsof the studiedsubjects; the present study finding demonstratedthat, the majorities had ascites, and peripheral edema.This finding was in accordance with **Mohamed and Mostafa (2018)[13]**they reported that abdominal ascites and peripheral edema are the most common complications suffered by end stage liver disease patients.

Results of the current study demonstrated obvious improvement in recipient's total knowledge score representing a significant statistical difference after implementation of the educational program, this may attributed to the positive effect of the educational process provided by health professionals to communicate information to recipients to alter their health behaviors and improve their health status in addition to increased patient's concerns related to the illness and treatment.

This finding was in accordance with**Delair et al. (2010) [18]** illustrates that nursing educational intervention improvingself-efficacy and knowledge among patients submitted to liver transplantation. Similar results reported in the study done by **El shafee, (2016) [19]** stated that application of educational programfor liver transplant recipients and their relatives can enhance their understanding and awareness of post-transplant regimens and self-care practiceand improves outcomes. Also, **Volk et al. (2013)[20]** documented obviousenhancement in recipients' knowledge after the application of educational intervention, and Confirmed effectiveness of educational intervention in improving recipient's knowledge score that significantly increased in posttest after simple educational intervention.

Survival is asignificant outcome parameter after liver transplantation. However, once survival is approved,the long term quality of life (QOL)comes as a real outcome parameter to address the success of liver transplantation**[21].**

The present study findings discovered that, a statistically significant improvement in QOL observed after educational program implementation in relation togeneral health, physical functioning, role physical, role emotional, social functioning, bodily pain, vitality and mental health. Also, obvious significant improvement in PCS (physical component summary) and MCS (mental component summary) can be noticed. This significant improvement in QOL

my resulting from educational programs impact on recipients' knowledge regarding their own health problem. Consequently, they may not experience a huge impact in their motivation to complete treatment process.

In the same line with our results studies by**Masala (2012) and Santoset al (2012) [22,23]**founded that QoL was connectedwith regular psychosocial support and follow-up in all stages of treatment after transplantation, because it can affect the recovery process, the QoL, and the adherence to treatment. **Issa, (2018) [24]**highlights that application of educational program improve knowledge and self-care among patients. Such educational programs should be adopted in clinical settings to improve knowledge, self-care behaviors and health related QoL.

In the present study findings, there are statistically significant relation between level of education and knowledge of LT patients, but no statistically significant relations were detected between level of knowledge with age and gender, marital status, income**.**In agreement with the previous study findings**Sayed et al. (2013) [25]**documented statistically insignificant difference between demographic data and recipients level of knowledge. Another study by**Shu Wang et al, (2012) [26]**documented that lower family income and illiteracy are significantissuesconnected to low level of knowledge and poor HRQOL of LT patients.

The current study findings detect that, statistically significant positive correlations between level of knowledge of liver transplant recipient and their QOL**.** These findings are consistent with studies by **Yang, 2014 and Lilhol, Hæsum, Hejlesen, (2015) [3, 27]**documented that after planned educational program the majority of subjects had excellent level of understanding and awareness of their health status, showsignificant effects on self-management, psychological condition, coping ability, and specific long-term enhancements in QOL following liver transplantation. Bodily pain, physical function, mental health and functional status domains benefit most. In particular, functional progresses reflect the significant QOL benefits and patients' ability to return to a normal lifestyle despite ongoing morbidity.

V. Conclusion

Findings from our study speak to the importance of providing individualized health education to liver transplantation patients by nursing staff at different points in their transplantation course, using verbal and written information to improve their level of knowledge and QoL. For that reason, a complete teaching plan should be formulated to include information ranging from disease related information, diet and lifestyle restrictions, to routine follow-up care

VI. Recommendations

Based on the findings of this study, the following recommendations can be suggested:

- Replication of the study on a large sample and different areas in Egypt in order to generalize the results.
- Enforcement ofhealth education programs as a usual care in liver transplantation unitsand during home visits to improve health outcomes and QOL using booklet as a self-care guide for continuity of home health care after transplantation.

Acknowledgements

The authors would like to express their appreciation and gratitude to all patients who willingly participated in the study**.**

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Asmaa Abouda Abdelhamed Soultan "Effect of an Educational Program on the Quality of Life of Patients Undergoing Liver Transplantation" .IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.06 , 2019, pp. 55-64