

## Effect of Educational Program on Activities of Daily Living among Post Liver Transplantation Patients

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### Abstract

**Background:** Physical activity after liver transplantation is an important determinant of long-term health and is as important as the value of pre-transplant activity for withstanding the immediate stress of transplantation. **The study aimed to** evaluate the effect of educational program on activities of daily living among patients with post-liver transplantation. **Research design:** A quasi-experimental research design was used. **Setting:** The study was conducted in the Liver Transplantation Unit of the National Liver Institute, Menoufia University, Egypt. **Study subjects:** A purposive sample of patients (n= 50) who attended the previously mentioned unit through 12 months were taken from both genders, their ages ranged from 20 to 60 years old during 12months. **Tools of data collection:** Three tools were used; **Tool (1):** The structured interview Questionnaire, **Tool (2):** The Recipients' practical level needs observational checklist and **Tool (3):** Barthel Index Scale. **Results:** The mean score of total information of the studied recipients was  $13.92 \pm 2.30$  pre-educational program implementation which improved to  $41.56 \pm 7.26$  and  $41.24 \pm 8.57$  immediately post and at discharge respectively. Also, there was a statistically significant improvement in patients' practices post-educational program implementation compared with before ( $p = <0.001$ ) Also, there was an improvement in patients' independence in their activities of daily living post implementing the educational program ( $p = <0.001$ ). **Conclusion:** The degree of independence among post liver transplantation patients significantly improved post program implementation which reflects that program was effective in improving patients' daily activity performance with high statistically significance differences. **Recommendations:** Providing a rehabilitation plan for recipients of liver transplantation that includes providing social support post-transplantation, preparing for the return of occupational activities, coping strategy with working sites, self-care management, and nutrition for maintaining the ideal body weight.

**Keywords:** Activities of Daily Living, Educational Program, Liver Transplantation

### Introduction:

Liver transplantation (LT) may be prescribed as a curative or life-prolonging for appropriately selected patients with acute liver failure, advanced cirrhosis, hepatic malignancy, or inborn metabolic disorders. Given vast improvements in surgical technique, organ preservation and procurement, and immunosuppression over the past several

decades, modern LT is characterized by remarkable improvements in post-transplant patient survival, graft survival, and quality of life (Mahmud, 2020)

Some indications of liver transplantation include acute liver failure which is caused by acute viral hepatitis A, B, C, D, autoimmune hepatitis, acute fatty liver, drug or toxin-induced hepatotoxicity, cirrhosis from chronic

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liver disease as chronic viral hepatitis B and C, Wilson's disease, alcoholic liver disease, non-alcoholic state hepatitis, cirrhosis with Model for End-Stage Liver Disease (MELD) score  $\geq 15$ , malignant disease of the liver (hepatocellular carcinoma, cholangiocarcinoma, carcinoid tumor), metabolic liver disease (glycogen storage disease, hereditary and neonatal hemochromatosis, cystic fibrosis), cholestatic liver disease (primary biliary cirrhosis, secondary biliary cirrhosis, biliary atresia) miscellaneous (adult polycystic liver disease, hepatic trauma, nodular regenerative hyperplasia) (Shah et al., 2023).

Physical activity after liver transplantation is an important determinant of long-term health and is as important as the value of pre-transplant activity for withstanding the immediate stress of transplantation. Although transplantation usually enables rapid recovery of synthetic liver function and metabolism, recovery of physical capacity and performance to normal levels is delayed and often is incomplete (Dunn et al., 2020).

The basic activities of daily living (ADL) include the following categories: Ambulating (The extent of an individual's ability to move from one position to another and walk independently), feeding (The ability of a person to feed oneself), dressing (The ability to select appropriate clothes and to put the clothes on), personal hygiene (The ability to bathe and groom oneself and maintain dental hygiene, nail, and hair care), continence (The ability to control bladder and bowel function) and toileting (The ability to go to and from the toilet, use it appropriately, and clean oneself) (Carmona-Torres et al., 2019).

Activities of daily living (ADL) comprise the basic actions that involve caring for one's self and body, including personal care,

mobility, grooming/personal hygiene, dressing, toileting/continence, transferring/ambulating, and eating (Dixe et al., 2020)

### **Significance of the study:**

Egypt is ranked the first line in the world in liver transplantation that considered the only chance of cure and long-term survival for patients in recent decades. On the other hand, with Liver Transplantation Recipients (LTRs), the patients are at risk for common complications in this critical period of post-transplantation. So, patients' education is important in preventing expected complications and achieving the best possible practice for improvement and recovery then promoting their daily living activities.

According to National Liver Institute records, Shebin ELkoom, Menoufia Governorate, the total number of cases of liver transplantation during the year 2020 was around 40-45 cases, and about 60-70 cases followed in the institute after liver transplantation in other centers (Statistical Office at Shebin ELkoom, Menoufia University Hospital, 2023). After liver transplantation, physical activity levels generally improve. Recipients' expectations and intensity of motivation are important determinants of their achieved level of physical performance, which may reach that of most non-transplanted individuals (Magyar et al., 2024). Therefore, this study was conducted to improve the activity of daily living for post-transplanted patients.

### **Aim of the study:**

The study aimed to evaluate the effect of educational program on activities of daily living among post-liver transplantation patients.

**Research hypotheses:**

**H1:** There is supposed of an improvement in the patient's knowledge and practice scores post-educational program implementation than before.

**H2:** There is supposed of an improvement in post-liver transplantation patients' dependency level post-educational program implementation than before.

**Subjects and Method:**

**Research design:**

A Quasi-experimental research design was utilized to achieve the aim of this study.

**Study setting:**

This study was carried out at the Liver Transplantation Unit of the National Liver Institute, Menoufia University, Egypt which was considered the first center in the Middle East where liver transplantation takes place. It differentiates from other transplantation centers by high attendance and following of patients from all over Egypt and the Middle East.

**Study subjects:**

A purposive sample consisted of 50 patients with liver diseases who underwent liver transplantation surgery in the liver transplantation unit at the National Liver Institute, Menoufia University. Patients were enrolled in the study over twelve months from the beginning of December 2022 to the end of November, 2023.

The sample size was calculated according to the following formula: **Stephen Thompson's equation (Fearon et al., 2017):**

$$n = \frac{N \times p (1 - p)}{\left( (N - 1) \times (d^2 \div z^2) \right) + p (1 - p)} = 50$$

**Data collection tools:**

Three tools were used to collect data of this study as the following:

**Tool (I): A structured Interview Questionnaire:**

It was adopted from **Mahmud, (2020)** to assess recipients' demographic characteristics and medical history for patients with liver transplantation. It was collected by the researcher and included the following parts:

**Part I: Demographic characteristics of recipients:**

It was concerned with the assessment of patients and demographic characteristics as age, gender, marital status, level of education, nature of work, residence, and treatment costs.

**Part II: Recipients' medical history:** This part aimed to assess patients' medical data of past and current diseases, associated disorders, and previous hospitalization as well as their lifestyle in physical activity, and smoking. (5 questions)

**Part III: Recipients' Knowledge Needs Assessment Questionnaire.**

It was adapted from **Craig & Heller, (2021)** and aimed to assess patients' informational needs about liver transplantation and early post-operative ambulation. It included 27 open ended questions.

**Scoring system:**

The correct and complete answers were given (2) score, correct incomplete answers were given (1) score, and the wrong answers were given (zero) score. These scores were summed-up and converted into a percentage, the total score was 54 marks equal to 100%, and categorized as the following

- A score of > 80% referred to a good level of knowledge.
- Score 65% - ≤ 80% referred to the average level of knowledge.
- Score < 65% referred to a poor level of knowledge.

**Tool (II): Recipients' practical Level Needs Observational Checklist (pre and post-educational strategy implementation).** It was

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adopted from **Shedeed et al., (2021)** and aimed to assess the recipients' practices of different exercises used post-liver transplant that promote the patient recovery and actively tolerated. It was observed by the researcher and included; early gradual ambulation, deep breathing, and coughing exercises.

#### **Scoring system:**

One mark was given for each step correctly done and a zero mark for not done

**Tool (III): Barthel Index for Activities of Daily Living (ADL):** This tool was adopted by **Donna et al., (2012)** to assess the patient's ability to perform activities of daily living independency. The scale was composed of 10 dimensions namely; bowels control, bladder control, grooming, toileting, feeding, transferring, mobility, dressing, stairs climbing and bathing. Each category has 3 items; "completely dependent, needs assistance, and independent".

#### **Level of mobility:**

It included five levels as follows

Level 1: Ability to walk quickly without support.

Level 2: One hand needs support to walk quickly.

Level 3: Both hands need support to walk quickly.

Level 4: Bedridden but not sedentary 100%, able to use a self-propelled wheelchair.

Level 5: Bedridden and 100% immobile, high risk of bed sores.

#### **Scoring system for Barthel Index:**

The scores responses for every item were as follows:

- Completely dependent was scored zero
- Need assistant was scored 1
- Independent was scored 2.

The total scores of independence level ranged from 0-20, the higher scores reflect the

higher independence level. It was categorized as the following:

- 0-6: was considered "completely dependent".
- 7-13: was considered "needs assistance".
- 14-20: was considered "independent".

#### **Administrative design:**

An official permission to conduct the study was obtained from the Hospital Directors and Head Managers of the Liver Transplantation Unit at Menoufia University Hospital by the submission of a formal letter from the Dean of the Faculty of Nursing at Benha University. The researcher explained the purpose and the methods of the data collection. Before conducting the study, an exploratory visit was done to the transplantation unit and ICU at the National Liver Institute to determine a suitable time for collecting data. Besides, personal communication was done with patients and physicians to explain the purpose of the study and gain best possible cooperation.

#### **Tools validity:**

The face and content validity of the tools were checked by a Jury consisting of five experts in the field of Medical-Surgical Nursing from the Faculty of Nursing, at Benha University. The experts reviewed the tools to check the relevancy, simplicity, clarity, comprehensiveness, and applicability of the questions. The consensus among experts regarding the questionnaire was 98 %, and the observational checklist and patients' health outcomes assessment sheet were 99 % for most items. Also, a designed program which covered all items related to liver transplantation care for post liver transplantation patients based on recent current literature, it was revised by the same experts

then all required modifications were done consequently and the final form of the tools was used for data collection.

**Reliability of the tools:**

In the present study, reliability was tested using Cronbach's Alpha Coefficient Reliability as the following:

**Table (1):** Alpha Cronbach reliability analysis for the study tools (as general).

Tools	Alpha	P
General Data Questionnaire	0.835	<0.001
Barthel Index scale	0.81	<0.01

**Ethical considerations:**

The ethical research considerations in the study included the following:

- The study approval was obtained from the Scientific Research Ethical Committee at the Faculty of Nursing/ Benha University before initiating the study work.
- The researcher clarified the purpose and aim of the study to patients included in the study before data collection.
- Written consent was obtained from the patients to participate in the study.
- The researcher assured of maintaining anonymity and confidentiality of data.
- The patients were informed that they were allowed to choose their participation in the study and they have the right to withdraw from the study at any time.

**Pilot study:**

A pilot study was conducted on 10% (5 patients) of the study subjects to test the clarity and applicability of the study tools and the program, also to estimate the time required for each tool to be filled by the researcher as well as to identify any possible obstacles that may hinder data collection. Based on the results of the pilot study, the

necessary modifications were done for more applicable tools to collect data. The patients selected for the pilot study were excluded from the study subjects. The pilot study was done two weeks before starting the study.

**Field work:**

Data collection for the current study was carried out over twelve months, from the beginning of December 2022 to the end of November 2023. The researcher attended the setting four days (Saturday, Monday, Tuesday, and Thursday) per week during afternoon shifts. Each interview took about 30-40 minutes. The precautionary practice measures for infection control as maintaining physical distance, wearing facemasks, and gloves, and using alcohol aseptic solution for both the researcher and the patients included in the study. The study was conducted through four phases:

**Assessment phase:**

It was carried out for all studied patients by the researcher to collect data regarding recipients' sociodemographic characteristics, medical history and lifestyle, then the researcher collected and observed the recipients' knowledge assessment using tool I, and II pre-operative preparation period and pre-implementing educational strategy, and Barthel Index for Activities of Daily Living (ADL) using tool III as a baseline data assessment before implementing the instruction and practicing by the study patients postoperatively (post-liver transplantation).

**Planning phase:**

Once the initial assessment was finished, an educational program was designed based on the individual learning needs. The researcher set up a teaching plan covering general and specific objectives. This program was developed from recent literatures, revised and modified based on the experts' comments, in



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order to be implemented using various methods. The program resources and facilities were allocated (printed material and location or site of session that best serves the learner). The researcher determined the timetable of sessions with the patients for starting program sessions.

#### **Implementation phase:**

The program implementation was carried out in the liver transplantation unit two days preoperatively and was conducted in 3 sessions (two theoretical sessions and one practical session). Each session lasted about 30-45 minutes/day for one patient/session considering the timetable for the operation, including periods of discussion according to the patient's progress and feedback. Motivation, problem-solving, and reinforcement techniques were used to enhance the active participation of the patient in the educational sessions.

➤ **1<sup>st</sup> session:** (Introductory session) explanation of reasons and importance of the program and explain the definition of the liver, function causes of liver failure, and liver transplantation.

➤ **2<sup>nd</sup> session:** Instructions about liver transplantation complications, prevention of complications, and discharge plan.

➤ **3<sup>rd</sup> session:** Application of early movement from bed, breathing & coughing exercises, grooming, bathing, and dressing.

Different teaching and learning methods were used during the sessions which included; discussion, demonstration, and re-demonstration. Instructional media included mobile videos and printed handouts with pictures, which were presented in clear and concise form to learn patients' postoperative liver transplantation care techniques. The program-colored booklet was given to each studied patient to help them review and support teaching.

At the beginning of the first session, patients were oriented regarding the program's contents, its purpose and impact on their condition, and expected outcomes. Patients were informed about the time of the next session at the end of the session.

Each session started with a summary of what had been discussed in the previous session and the objectives of the new session, using simple Arabic language. Also, the session ended with a summary of its contents, and feedback was obtained from the patients to ensure that getting the maximum benefit.

At the end of all sessions, the researcher asked them about their opinion on the program and their benefits from the subject. The researcher asked the recipients to follow them on the telephone and to be evaluated in the outpatients' clinic

#### **Evaluation phase:**

This phase aimed to evaluate the effectiveness of the educational program on activities of daily living among post-liver transplantation patients. The researcher evaluated the recipient's informational and practice needs immediately after the sessions and at discharge by the same tools of data collection of preprogram implementation. Also, the activity of daily living was evaluated on the 2<sup>nd</sup> day as a baseline assessment and then the follow-up evaluation was done on the 1<sup>st</sup> and 3<sup>rd</sup> month post-discharge using tool III (Barthel index scale).

#### **Statistical analysis:**

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) software (version 25). Qualitative data was presented as a number and percent. Furthermore, quantitative data was described as mean or standard deviation, as appropriate. The Chi-square test was used to examine the

difference and relation between qualitative variables during different periods. Fisher's exact test was applied on smaller sample sizes, an alternative to the Chi-square test when the frequency count is  $< 5$  for more than 20% of cells. Freidman test for differences in dependent quantitative variables between more than two related groups. Cochran test for differences in a dichotomous dependent variable between three or more related groups for comparing the mean scores in two groups, Mann Whitney test for non-parametric quantitative data, and Kruskal Wallis for more than two groups. The Spearman-Rho method was used to test the correlation between numerical variables. Linear regression was used for multivariate analyses on the activity of daily living as a dependent factor. A p-value  $< 0.05$  was considered significant, and  $< 0.001$  was considered highly significant.

**Results:**

**Table (1)** reveals that 60% of recipients were in the category 40- 60 years old, with mean age  $46.20 \pm 0.98$ . Males were more prevalent and constituted 80% of the studied patients and 90% of them were married. Regarding their educational level, 50 % had secondary education. Also, 60% of them had manual work and 82% lived in rural areas. Concerning treatment costs, it was found that 60% of them were treated at state's expense.

**Table (2)** reveals that, 42% of the studied patients had been diagnosed with liver failure more than 10 years ago. Sixty percent of them had viruses C and B as the main cause of liver failure, and 62% had no family history of liver disease. Regarding their hospitalization, 60% reported that they were hospitalized for one week last year due to liver disease.

**Table (3)** shows that, there was a statistically significant difference between

information pre and post-educational program implementation at  $P < 0.001$  as evidenced by the mean score of total information was  $13.92 \pm 2.30$  pre-educational program implementation which improved to  $41.56 \pm 7.26$  and  $41.24 \pm 8.57$  immediately post and at discharge, respectively.

**Table (4)** shows that there were statistically significant differences regarding the overall practices related to gradual movement and getting out of bed after the operation, deep breathing exercises, coughing exercises at pre implementing educational program, compared to immediate post implementing educational program and at discharge as p-value  $< 0.001^{**}$ .

**Table (5)** shows that, 32% and 28% of the studied recipients had correct practices regarding sitting on the bed with a backrest and inhaling air through the nose with keep the mouth close pre-educational program implementation, which increased to 82%, 80%, 76%, and 78% immediate post and at discharge, respectively. Regarding coughing exercise, 32% of the studied recipients had correctly practiced regarding lean forward, pressing hands on the abdomen, and coughing napkin pre-educational implementation, which improved to 86% and 90% immediately post and at discharge respectively.

**Table (6)** reveals that, there was a highly statistically significant difference regarding activities of daily living concerning their bowels, bladder, toilet use, feeding, transfer, mobility, dressing, and grooming.

**Figure (1)** shows that 86% of them were dependent on 2<sup>nd</sup> day post-transplantation, while 14% of them were very dependent at 1<sup>st</sup> month post-transplantation. Also, 20% of them were minimally dependent while 80% were independent. At 3<sup>rd</sup> month post-transplantation, 8% of them were minimally dependent and

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92% were independent. It also shows that, there was an improvement in the level of dependency between pre and post-educational implementation

**Table (7)** shows that, there was a positive correlation between total information and total practice at pre & post-educational

implementation. However, there was no correlation between daily activity with total knowledge, and practice pre-program implementation. There was a negative statistical correlation between total information and practice with the moving ability at  $P \leq 0.05$  post 3 months.

**Table (1): Frequency distribution of the studied recipients regarding their demographic characteristics (n=50).**

<b>Demographic characteristics</b>	<b>No.</b>	<b>%</b>
<b>Age /year</b>		
20-< 40	20	40.0
40-60	30	60.0
<b>Mean ± SD</b>	46.20 ± 0.98	
<b>Gender</b>		
Female	10	20.0
Male	40	80.0
<b>Marital status</b>		
Married	45	90.0
Single	5	10.0
<b>Educational Level</b>		
Can't read and write	15	30.0
Secondary education	25	50.0
University education	10	20.0
<b>Nature of Work</b>		
Manual work	30	60.0
Mental work	10	20.0
No work/ Household	10	20.0
<b>Residence</b>		
Rural	41	82.0
Urban	9	18.0
<b>Treatment costs</b>		
Treatment at his own expense	10	20.0
Health insurance	10	20.0
At the state's expense	30	60.0



**Table (2): Frequency distribution of the studied recipients regarding their medical history (n=50).**

<b>Recipients' medical history</b>	<b>No.</b>	<b>%</b>
<b>Onset of diagnosis for liver failure</b>		
< One year	12	24.0
1-<5 years	17	34.0
5- <10 years	0	0.0
≥ 10	21	42.0
<b>Mean ± SD</b>	<b>5.60 ± 1.26</b>	
<b>Associated disorders#</b>		
None	10	20.0
Diabetes mellitus	31	62.0
digestive disorders	20	40.0
<b>Causes for liver failure#</b>		
Schistosomiasis	20	40.0
Viruses (hepatitis B or C)	30	60.0
Non-alcoholic fatty liver	20	40.0
Autoimmune disease	10	20.0
<b>Family history of liver failure #</b>		
None	30	60.0
Fatty liver	20	40.0
Hepatitis B and C	10	20.0
<b>Previous hospitalization last year due to current disorder</b>		
No	10	20.0
One week	30	60.0
two weeks	5	10.0
Three weeks	5	10.0
<b>Smoking</b>		
No	10	20.0
Yes	20	40.0
Stopped smoking	20	40.0

(#) Not mutually conclusive

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**Table (3): Mean score, standard deviation, and significant differences of the studied recipients' information pre and post-educational strategy implementation (n=50)**

Recipients' information	Pre-educational strategy (n=50)	Post educational strategy		Fr test p-value	Post Hoc Test (Dunn's)		
		Immediately Post educational strategy (n=50)	At discharge Post educational strategy (n=50)		P-value (1)	P-value (2)	P-value (3)
		Mean ± SD	Mean ± SD				
<b>General concept about the liver (Total Score 6)</b>							
Mean ± SD	1.22 ± 0.41	5.24 ± 1.13	4.52 ± 1.11	90.043 <0.001**	<0.001**	<0.001**	<0.001**
<b>Patient information about liver transplantation (Total Score 8)</b>							
Mean ± SD	3.10 ± 1.38	5.12 ± 1.53	4.20 ± 0.75	33.531 <0.001**	<0.001**	<0.001**	<0.001**
<b>Post-liver transplantation complications (Total Score 8)</b>							
Mean ± SD	2.00 ± 1.10	5.94 ± 1.54	4.96 ± 1.70	80.978 <0.001**	<0.001**	<0.001**	<0.001**
<b>Preventing complications (Total Score 10)</b>							
Mean ± SD	1.60 ± 0.80	6.94 ± 1.44	6.26 ± 1.96	85.870 <0.001**	<0.001**	<0.001**	<0.001**
<b>Hospital discharge plan (Total Score 22)</b>							
Mean ± SD	6.00 ± 1.80	19.24 ± 2.74	20.38 ± 3.05	96.136 <0.001**	<0.001**	<0.001**	<0.001**
<b>Total information ( Total score 54)</b>							
Mean ± SD	13.92 ± 2.30	41.56 ± 7.26	41.24 ± 8.57	77.184 <0.001**	<0.001**	<0.001**	<0.001**

\* Significant at p ≤0.05.

\*\*Highly significant at p <0.001.

**Fr: Friedman test, Sig. bet. Periods were done using the Post Hoc Test (Dunn's)**

P1: p-value for difference between information pre, and immediate post-educational strategy implementation

P2: p-value for the difference between information pre-educational strategy and at discharge

P3: p-value for the difference between information immediately post-educational strategy and at discharge

**Table (4): Mean score, standard deviation, and significant difference of the studied recipients' practices pre and post-educational strategy implementation (n=50)**

Recipients' practice	Pre-educational strategy (n=50)	Post educational strategy		Fr test p-value	Post Hoc Test (Dunn's)		
		Immediately Post educational strategy (n=50)	At discharge Post educational strategy (n=50)		P value (1)	P value (2)	P value (3)
	Mean ± SD	Mean ± SD	Mean ± SD				
<b>Gradual movement and getting out of bed after the operation (Total Score 15 )</b>							
Mean ± SD	3.90 ± 4.87	10.46 ± 2.71	13.30 ± 2.35	73.519 <0.001**	<0.001**	<0.001**	<0.001**
<b>Deep breathing exercise (Total Score 6)</b>							
Mean ± SD	1.48 ± 2.00	4.48 ± 1.07	5.66 ± 1.27	59.845 <0.001**	<0.001**	<0.001**	<0.001**
<b>Coughing exercise (Total Score 7)</b>							
Mean ± SD	1.76 ± 2.36	5.66 ± 1.33	6.82 ± 1.17	84.339 <0.001**	<0.001**	<0.001**	<0.001**

\* Significant at  $p \leq 0.05$ .

\*\*Highly significant at  $p < 0.001$ .

Fr: Friedman test, Sig. bet. Periods were done using the Post Hoc Test (Dunn's)

P1: p-value for the difference between practice pre and immediate post-educational strategy implementation

P2: p-value for the difference between practice pre-educational strategy and at-discharge

P3: p-value for difference between practice immediately post-educational strategy implementation and at discharge

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**Table (5): Frequency distribution of the studied recipient's practice level regarding deep breathing exercises and coughing exercises pre and post-educational strategy (n=50).**

Recipients' practices	Pre educational strategy (n=50)				Post educational strategy							
					Immediately Post educational strategy (n=50)				At discharge Post educational strategy (n=50)			
	Correctly Done		Not done		Correctly Done		Not done		Correctly Done		Not done	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Deep breathing exercise</b>												
Sit on the bed with a backrest	16	32.0	34	68.0	41	82.0	9	18.0	43	86.0	7	14.0
Inhaling air through the nose while keeping the mouth closed	14	28.0	36	72.0	38	76.0	12	24.0	39	78.0	11	22.0
Place the hand on the diaphragm to feel fullness Chest with air	12	24.0	38	76.0	35	70.0	15	30.0	37	74.0	13	26.0
Hold your breath for 0-5 seconds	10	20.0	40	80.0	40	80.0	10	20.0	41	82.0	9	18.0
Exhale as much as possible through the mouth	13	26.0	37	74.0	37	74.0	13	26.0	38	76.0	12	24.0
Repeat these steps at least 5 times a day	11	22.0	39	78.0	33	66.0	17	34.0	35	70.0	15	30.0
<b>Coughing exercise</b>												
Have tissues next to you	12	24.0	38	76.0	42	84.0	8	16.0	46	92.0	4	8.0
Sit on the bed with a backrest, or sit on A chair in a comfortable reclining position	16	32.0	34	68.0	40	80.0	10	20.0	46	92.0	4	8.0
Support the wound by placing a pillow or folded blanket	12	24.0	38	76.0	37	74.0	13	26.0	42	84.0	8	16.0
Take a deep breath through the nose and exhale slowly through the mouth with lips pressed together	16	32.0	34	68.0	40	80.0	10	20.0	44	88.0	6	12.0
Lean forward, pressing your hands on the abdomen and coughing napkin	16	32.0	34	68.0	43	86.0	7	14.0	45	90.0	5	10.0
Take a deep breath through the nose and hold it for 3 seconds	8	16.0	42	84.0	40	80.0	10	20.0	41	82.0	9	18.0
Relax for 5-11 minutes	11	22.0	39	78.0	39	78.0	11	22.0	40	80.0	10	20.0

**Table (6): Frequency distribution and significant difference of the studied recipients according to their activity of daily living pre and post-educational implementation (n=50)**

Barthel index scale		Baseline		Follow up				χ <sup>2</sup> test	P-value
		2 <sup>nd</sup> day of operation		1st-month post operation		3rd-month post operation			
		No.	%	No.	%	No.	%		
<b>Bowels</b>	Completely dependent	18	36.0	0	0.0	0	0.0	4.771	0.029*
	Needs assistance	32	64.0	5	10.0	0	0.0		
	Independent	0	0.0	45	90.0	50	100.0		
<b>Bladder</b>	Completely dependent	42	84.0	0	0.0	0	0.0	12.333	<0.001**
	Needs assistance	8	16.0	5	10.0	0	0.0		
	Independent	0	0.0	45	90.0	50	100.0		
<b>Toilet Use</b>	Completely dependent	40	80.0	0	0.0	0	0.0	22.222	<0.001**
	Needs assistance	10	20.0	18	36.0	7	14.0		
	Independent	0	0.0	32	64.0	43	86.0		
<b>Feeding</b>	Completely dependent	38	76.0	0	0.0	0	0.0	5.915	0.015*
	Needs assistance	12	24.0	15	30.0	5	10.0		
	Independent	0	0.0	35	70.0	45	90.0		
<b>Transfer (bed to chair and back)</b>	Completely dependent	42	84.0	0	0.0	0	0.0	6.036	0.014*
	Needs complete assistance	8	16.0	5	10.0	0	0.0		
	Partial assistance	0	0.0	20	40.0	16	32.0		
	Independent			25	50.0	34	68.0		
<b>Mobility</b>	Completely dependent	40	80.0	0	0.0	0	0.0	10.340	0.006*
	Needs complete assistance	10	20.0	7	14.0	0	0.0		
	Partial assistance	0	0.0	17	34.0	10	20.0		
	Independent	0	0.0	26	52.0	40	80.0		
<b>Dressing</b>	Completely dependent	36	72.0	0	0.0	0	0.0	9.133	0.003*
	Needs assistance	14	28.0	23	46.0	7	14.0		
	Independent	0	0.0	27	54.0	43	86.0		
<b>Grooming</b>	Completely dependent	44	88.0	15	30.0	0	0.0	7.179	0.028*
	Needs assistance	6	12.0	35	70.0	3	6.0		
	Independent	0	0.0	0	0.0	47	94.0		
<b>Stairs</b>	Completely dependent	50	100.0	16	32.0	0	0.0	N.A	N.A
	Needs assistance	0	0.0	34	68.0	6	12.0		
	Independent	0	0.0	0	0.0	44	88.0		
<b>Bathing</b>	Completely dependent	50	100.0	14	28.0	4	8.0	N.A	N.A
	Needs assistance	0	0.0	36	72.0	46	92.0		
	Independent	0	0.0	0	0.0	0	0.0		

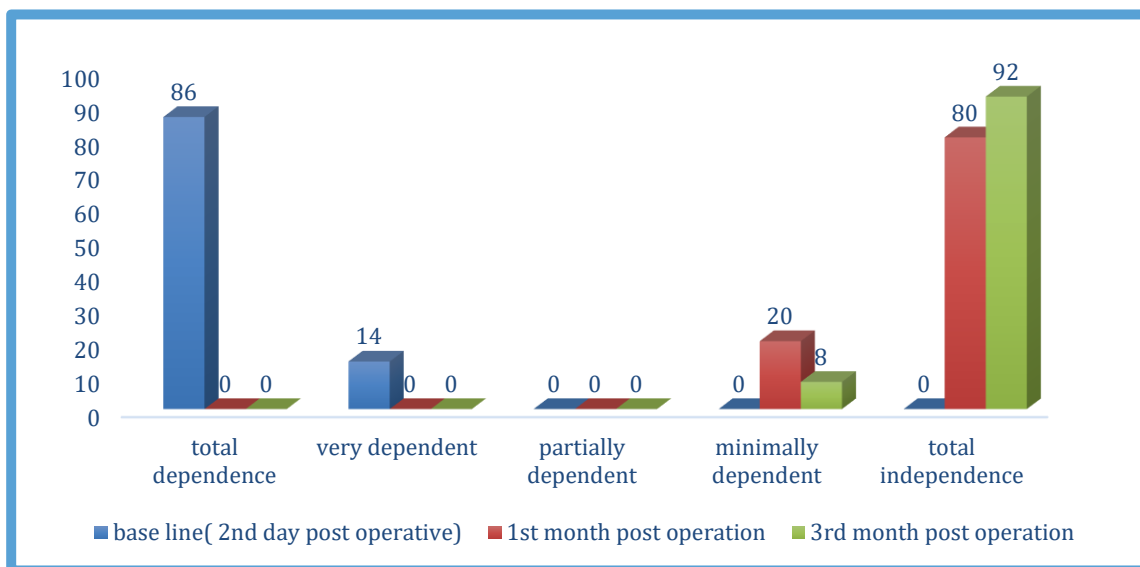
\* Significant at p <0.05.

\*\*Highly significant at p <0.001.

NA: Not applicable



**Effect of Educational Program on Activities of Daily Living among Post Liver Transplantation Patients**



**Figure (1):** Frequency distribution among the studied recipient patients regarding their total activity level of daily living pre and post-educational implementation (n=50)

**Table (7):** Correlation between total knowledge, practice and daily living activity among recipient patients pre and post program implementation post -liver transplantation (n= 50)

Variables \ rs\ p values	Baseline				Post three months
	Total knowledge		Total Practice		Total knowledge
	r-test	P-value	r-test	P-value	r-test
<b>Total Practice</b>	0.359	0.018*	-	-	0.449
Moving ability	-0.264	0.064 <sup>n.s</sup>	-0.124	0.392 <sup>n.s</sup>	-0.393
Daily living activities	0.004	0.978 <sup>n.s</sup>	0.216	-0.130 <sup>n.s</sup>	0.496

rs: Spearman coefficient n.s not significant

\*Statistically significant at  $p \leq 0.05$

\*\*Highly statistically significant at  $p \leq 0.001$

**Discussion:**

Regarding age, the current study revealed that more than half of the studied patients were in the age category of forty to sixty years old, with a mean age of  $46.20 \pm 0.98$  years. From the researcher's point of view, this might be due to end stage of liver disease which is common in old age as a result of chronic cirrhosis and liver failure for long time that necessitates liver transplantation when conventional therapeutic resources are not sufficient to treat liver

disease. This result is in the same line with a study by **Gil et al., (2018)** entitled "Recipient age and mortality after liver transplantation: a population-based cohort study", which showed that most liver transplants were performed on patients in their fifties.

As regards gender, the current study results showed that the majority of the studied patients were males. From the researcher's point of view, that might be due to the nature of life in rural areas, as most men work in agriculture and

are at risk of contact with schistosomiasis and hepatitis, lack of awareness of the proper use of medications, and liver diseases are common in males than females. This finding is in agreement with a study conducted by **Demir & Saritas, (2020)** entitled "Effects of massage on vital signs, pain and comfort levels in liver transplant patients" who stated that less than two-thirds of the studied patients were males.

Also, **Kothari et al., (2016)**, who studied "Inpatient rehabilitation after liver transplantation decreases risk and severity of 30-day readmissions, California, United States" reported that more than half of the studied patients were males.

Concerning marital status, the result revealed that most of the studied patients were married. This finding is supported by **Demir & Saritas, (2020)** who revealed that the majority of the studied patients were married.

Owing to medical history, the current study revealed that less than half of the studied patients had been diagnosed with liver failure more than 10 years ago. From the researcher's point of view, this might be due to the studied patients suffering from liver disease for a long period becoming a chronic disease that affects functions of the liver. This finding is in agreement with **Shedeed et al., (2021)** in a study entitled "Home Health Care Model to Improve Quality of Life among Post Liver Transplant Recipients" and reported that more than half of the studied patients suffered from liver disease for more than ten years

This finding is contradicted to a study conducted by **Sultan et al., (2022)** entitled "Effect of an Educational Program on the Quality of Life of Patients Undergoing Liver Transplantation" and illustrated that less than

two-thirds were diagnosed with liver disease since more than 5 years

Regarding causes of liver failure, the current study revealed that more than half of the studied patients had hepatitis viruses. This result is similar to **Mukhtar et al., (2014)** in a study entitled "Infection complications and pattern of bacterial resistance in living-donor liver transplantation" and illustrated that less than half of patients were having hepatitis c virus. It is supported by **Mohamed & Mostafa, (2018)** who reported that the majority of the study sample had hepatitis C with liver cirrhosis.

Owing to Previous hospitalization, the current study revealed that more than half of the recipients had been admitted to the hospital for one week. It is contributed to complications of end-stage liver disease such as hepatic coma and ascites which necessitate preparing for liver transplantation. This finding is supported by **Alfauomy et al., (2020)** who studied "Effect of Nursing Interventions on Self-management Behaviors of Female Geriatric Patients with Liver Cirrhosis" and presented that two-thirds of the studied female geriatric patients were hospitalized in the last year either one or more times

In relation to associated disorders, this study showed that more than half of the studied patients have diabetes mellitus. This result is supported by **Demir & Bulbuloglu, (2021)** who revealed that almost one-third of the studied patients have diabetes mellitus. Also, this finding is in the same line with the study done by **Lai et al., (2022)** entitled "Postoperative fever after liver resection: Incidence, risk factors, and characteristics associated with febrile infectious complication"

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and noticed that more than one-quarter of the studied patients have diabetes mellitus.

In relation to previous hospitalization related to liver disease, the current study revealed that more than half of the studied patients were admitted to the hospital for one week last year. It is in the same line with **Shedeed et al., (2021)** who concluded that most of the studied sample was admitted to a hospital related to liver disease more than one time yearly from the onset of the disease.

About smoking, the current study presented that less than half of the patients were smokers. This could be due to that the majority of the studied patients were males. This is in accordance with **Mokbel et al., (2020)** who found that more than one-third of the studied subjects were smokers. While, **El-Shafiey, (2017)** conducted a study entitled "Effect of instructional scheme for patients undergoing liver transplantation surgery on their Performance" and reported that more than half of the studied patients were non-smokers.

The finding of the current study reflected that, there was an improvement in the mean score of total knowledge between pre-educational program implementation and immediate post and discharge. It might contribute to using different educational strategies that help the recipients acquire knowledge about liver transplantation as discussion, demonstration, and re-demonstration, videos for clinical procedures, booklets, and posters. This result is in the same line with **Shedeed et al., (2021)** who revealed that, more than half of the studied patients had poor knowledge pre-implementation of the Home Health Care (HHC) model and more than three-fifths of the studied patients had good knowledge post-implementation of the HHC

model. Also, it is accepted by **Magdy et al., (2023)** who revealed that there was an improvement in mean scores of studied patients' total knowledge regarding self-management post-program implementation compared to pre-program implementation.

Regarding gradual movement and getting out of bed post-transplantation, the current study revealed that there were highly statistically significant differences between pre and post-educational program implementation. In according to **Jones et al., (2022)** whose study entitled "The effect of preoperative education before hip or knee arthroplasty on immediate postoperative outcomes" found statistically significant differences in postoperative outcomes and early movement in patients who attended a preoperative educational class compared with those who did not attend.

Concerning deep breathing and coughing exercises, the present study revealed that; less than two-thirds of them had correct practices regarding deep breathing exercises and cough exercises pre-implementation of educational strategy. From the researcher's point of view, this might be attributed to their thoughts that doing these exercises may make them feel pain at the site of the operation and make them more exhausted. This study finding is in agreement with **Morad & EL-Sharnoby, (2018)** who studied "The predictors of infection and mortality in living donor liver transplantation" and reported that the majority of living donor liver transplantation recipients had poor practice of chest exercise through irregular physiotherapy for breathing and coughing exercise. Also, this result is similar to the study conducted by **Limongi et al., (2016)** entitled "Exercise manual for liver disease patients" and

reported that exercises provide an increase in the inspiratory muscle strength and improve the functional capacity of liver disease patients.

Regarding ADL, the current study showed that there was highly statistically difference regarding activities of daily living post educational instructions implementation. Also, there was an improvement in the level of dependency between pre and post-educational instruction implementation. This result in the same line with **Corriveau et al., (2018)** who studied "ADL and IADL Limitations Resolve but New Cognitive Impairments Develop in Liver Transplant Recipients" and noticed that ADL scores were low and the impairment disappeared by 3 and 12 months post-transplant. Also, this finding is in agreement with **Nader & Hafez, (2018)** who noticed that nearly half of the studied subjects reported dependency on the performance of the daily living activities post-program as compared to nearly one-fifth of them at pre-program implementation phase with statistically significant difference between pre and post-implementation scores. This finding is in agreement with a study done by **Al-Saaid et al., (2019)**, and emphasized a highly significant difference for improving daily living activities post-counseling sessions implementation.

In relation to Barthel index scale, the current study revealed that there was a statistically significant difference regarding bowels between pre and post-implementation education instruction. This finding is supported by **Mohamed & Mostafa, (2018)** who studied "Recovery of bowel function after liver transplant surgery" and found that there was a statistically significant difference regarding bowel function.

Concerning bowels, dressing, and transferring the current study findings revealed

that there was statistically significant difference improvement compared with before implementing education instructions regarding these items. This finding is contradicted with **Samoylova et al., (2017)** in a study entitled "Disability in patients with end-stage liver disease: results from the functional assessment in liver transplantation study" and revealed that the most prevalent ADL disabilities were continence, dressing, and transferring. **Jin et al., (2023)** who studied "Application of enhanced recovery after surgery following liver transplantation" reported that the Barthel score for 10 days after surgery was significantly higher than pre-surgery.

Regarding the correlation between total knowledge and total practice of the study recipient, it was noticed that there was a positive correlation between total knowledge and total practice at pre & post-educational strategy implementation. From the researcher's point of view, this might be attributed to the fact that knowledge was the basis of practices that affect positively their practices. This study finding agrees with **Elshamy et al., (2018)** who reported that there was a positive association between total patients' knowledge and patient compliance to immunosuppressive therapy post-liver transplantation patient after exposure to instructions was highly statistically significant. In accordance with **El-Mahdy et al., (2018)** who revealed that there was a statistically significant difference between the score of knowledge of the studied group about chronic hepatitis and their educational level.

The present study showed that there was no correlation between daily activity with total information, and practice pre-educational program implementation. This finding disagrees with **Shedeed et al., (2021)** who

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stated that there were positive statistically significant correlations between the studied patients' total quality of life and total practices and total knowledge pre and post-implementation of the model.

Also, there was a negative statistical correlation between total knowledge and practice with the moving ability. This finding is supported by **Reaza & Rodríguez, (2019)** who studied "Effectiveness of nursing educational interventions in managing post-surgical pain. Systematic review" and found that nursing educational interventions reduce mobility problems, improve adherence to treatment after surgery and improve relief of post-surgical pain.

**Conclusion:**

According to the results of this study, it is concluded that, the recipients' learning needs of information and practice scores about post-operative liver transplantation care with a significant difference post-implementing the educational strategy. Their activities of daily living were improved concerning their independence level of ADL post-educational program implementation than before.

**Recommendations:**

- Generalization of the findings, similar studies should be replicated on a large sample size in different centers of liver diseases in Egypt.
- Emphasize the role of the nurse in the multidisciplinary team approach of caring the liver transplant patients' education.

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## تأثير البرنامج التعليمي على أنشطة الحياة اليومية بين مرضى ما بعد زراعة الكبد

روان محمد السيد- حنان جابر محمد - سماح السيد غنيم- راويه على إبراهيم

إن النشاط البدني بعد عملية زراعة الكبد يعد عاملاً مهماً في تحديد الصحة على المدى الطويل، وهو بنفس أهمية النشاط قبل عملية الزرع لتحمل الضغوط المباشرة لعملية الزرع. الهدف من الدراسة: تقييم تأثير البرنامج التعليمي على أنشطة الحياة اليومية بين مرضى ما بعد زراعة الكبد. تصميم الدراسة: تم استخدام تصميم شبه تجريبي لتحقيق هدف الدراسة. مكان البحث: تم تطبيق الدراسة في وحدة زراعة الكبد بمعهد الكبد القومي بشبين الكوم، جامعة المنوفية. عينة البحث: تم استخدام عينة غرضية مكونة من خمسين مريضاً بأمراض الكبد الذين خضعوا لجراحة زراعة الكبد بوحدة زراعة الكبد بمعهد الكبد القومي جامعة المنوفية و تضمنت المرضى على مدار اثني عشر شهراً. أدوات جمع البيانات: تم استخدام ثلاث أدوات لجمع البيانات: الأداة الأولى: استبيان المقابلة: لتقييم الخصائص الديموغرافية والتاريخ الطبي لمرضى زراعة الكبد، الأداة الثانية: قائمة مراجعة الاحتياجات العملية لمرضى زراعة الكبد وتهدف إلى تقييم معلومات وممارسات المريض واحتياجاته العملية والأداة الثالثة: مقياس مؤشر بارثيل: النتائج: كان متوسط درجة المعلومات الإجمالية للمتلقين الذين تمت دراستهم هو  $2.30 \pm 13.92$  قبل تنفيذ البرنامج التعليمي والذي تحسن إلى  $7.26 \pm 41.56$  و  $8.57 \pm 41.24$  فوراً وبعد الخروج على التوالي. كما كان هناك تحسن ذو دلالة إحصائية في ممارسات المرضى بعد تنفيذ البرنامج التعليمي مقارنة مع قبل. كما كان هناك تحسن في استقلالية المرضى في أنشطة حياتهم اليومية بعد تنفيذ البرنامج التعليمي. الاستنتاج: إن درجة الاستقلالية بين مرضى زراعة الكبد تحسنت بشكل كبير بعد تنفيذ البرنامج مما يعكس أن البرنامج كان فعالاً في تحسين أداء النشاط اليومي للمرضى مع وجود فروق ذات دلالة إحصائية عالية. التوصيات: تقديم خطة تأهيل لمتلقي زراعة الكبد تتضمن تقديم الدعم الاجتماعي بعد الزراعة، والتحصير لعودة الأنشطة المهنية، واستراتيجية التكيف مع مواقع العمل، وإدارة الرعاية الذاتية، والتغذية للحفاظ على وزن الجسم المثالي.