

## Original Article

## The Effects of Individualized Education on Depression, Anxiety, Quality of Life in Liver Transplant Recipients

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### Abstract

**Background:** Liver transplantation is a life-saving treatment, but recipients experience many problems like depression and anxiety. These problems can affect the recipients' quality of life. This study is one of the limited interventional study on post-operative individualized education and counseling for liver transplant recipients.

**Objective:** To examine the effects of post-operative individualized education and counseling on depression, anxiety and quality of life in recipients of living liver transplantation.

**Method:** The study has a quasi-experimental design with a control group, pre-test and post-test. The study was conducted with 30 recipients in the intervention group and 31 in the control group. Data were collected with a personal information and clinical characteristics form, Hospital Anxiety and Depression Scale, SF 36 The Quality of Life Scale at baseline and one month and three months after the patients were discharged. Recipients in the intervention group were individually trained twice using the quality living guidebook and CD. Individualized counseling was also provided by telephone whenever needed. The control group received standard care in the clinic. However, after the data were completed, the same interventions were applied to the patients in the control group.

**Results:** Recipients in the intervention group had significantly lower depression and anxiety scores one month and three months after discharge than the control group, and their quality of life was higher ( $p < 0.05$ ).

**Conclusions:** Individualized education and counseling through a quality living guidebook and CD had a positive effect on patient care outcomes by reducing anxiety and depression levels and by increasing the quality of life.

**Keywords:** Anxiety, Counseling, Depression, Education, Quality of Life, Transplantation.

### Introduction

Liver transplantation (LT) saves lives of patients with liver failure (Moayed et al., 2018). In America, a total of 18452 transplants were performed by 2020, only 2518 from live donors (OPTN, 2020). By October 2020, 973 liver transplants were performed in Turkey, 855 of which were from live donors (T.C. Ministry of Health, 2020). Organ transplantation has four important health outcomes: a decrease in morbidity, mortality, graft survival and an increase in the quality of life (Murray and Caither, 2005). Although LT is a life-saving treatment, the recipients experience physical problems like

organ rejection, continuous immunosuppressive therapy, psychological problems such as the feeling of guilt due to fear of causing damage to donors and social problems like inability to work, changes in roles and habits (Tarabeih, Bokek-Cohen and Azuri, 2020; Iseri, Karayurt and Yilmaz, 2018; Moayed et al., 2018; Aguiar et al. 2016). All these problems lead to anxiety and depression in the recipients, disrupt their adaptation and affect the quality of their lives (Tarabeih, Bokek-Cohen and Azuri, 2020; Moayed et al., 2018; Aguiar et al. 2016;). The rate of psychiatric disorders in liver transplant recipients before and after transplantation is quite

high (Cannova et al., 2019; Annema et al., 2018). It has been reported that physiological changes appearing after LT are caused by infections, side-effects of immunosuppressive drugs, fear of organ rejection and changes in lifestyle (Annema et al., 2018; Aguiar et al. 2016; Chen, Yan and Wang, 2012). Therefore, a close follow-up of the patients and giving psychosocial support are important in terms of increased graft survival, decreased mortality and enhanced quality of life (Gingenti et al., 2020; Benson et al., 2018; Stepien-Slodkawska, Niewiadamska and Kotarska, 2017). Individualized patient education and counseling are important interventions which fulfill patients' needs after LT. Offering planned education reduces stress experienced by recipients and helps them to acquire knowledge and skills needed to adapt to their new lives (İşeri, Karayurt and Yılmaz, 2018). In addition, it can prevent complications and increases the quality of their lives (Girgenti et al., 2020; Stiavetti et al., 2013). Several studies have been performed to evaluate the effects of education programs such as psychosocial support (Benson et al., 2018), psychoeducation (Sharif et al., 2005), physical activity and supervised exercise program (Tanaka et al., 2020; Totti et al., 2019) and counseling for individual diets (Daphnee et al., 2018). It has been emphasized that nurses' using an educational CD and booklet to offer education, providing individual counseling and support group meetings and evaluating their effects can greatly contribute to reduction of physical and psychosocial problems (Girgenti et al., 2020; Benson et al., 2018; Chen, Yan and Wang, 2012). It has been underlined in the literature that it is necessary to perform studies to examine the effects of the interventions offered after LT on the quality of lives of recipients (Tarabeih, Bokek-Cohen and Azuri, 2020; Tome et al., 2008). However, there have been few interventional studies (Tanaka et al., 2020; Totti et al., 2019; Benson et al., 2018; Ordin and Karayurt, 2015). The aim of this study was to investigate the impact of the individualized education and counseling offered through with the quality living guidebooks and CDs on depression, anxiety and the quality of life in living liver transplant recipients.

## Methods

**Research design, Sample and setting:** The study has a quasi-experimental design pretest-posttest with a control group. It was carried out in the organ transplantation clinic and general surgery organ transplantation outpatient clinic of a

university hospital in Turkey. Study inclusion criteria were receiving transplant from live donors, experiencing LT for the first time and not being diagnosed as neurological and psychiatric disorders. Child transplant recipients, transplant recipients undergoing re-transplantation, multiple organ transplant recipients and patients becoming ill or dying during the study period were excluded. The power of the study was found to be 0.95 at the 0.05 significance level in the power analysis made by utilizing the GPOWER Package Program. A total of 38 transplant recipients were assigned into the control group. Out of 38 recipients, two were excluded from the analyses because they wanted to leave the study and five died; hence the analyses were completed with 31 patients. A total of 35 recipients were assigned into the intervention group. Out of 35 transplant recipients, four could not be accessed during the follow-up period and one died; hence the analyses were completed with 30 patients (Figure 1).

**Data Collection:** To prevent contamination, data were first collected from the control group. *The control group* was offered standard nursing care given in the clinic. This care involved monitoring fluid intake, administration of medications etc. Spontaneous and unplanned education was offered by nurses and doctors upon the request of the patients and involved effects and side-effects of medications without using any educational material. The scales were administered at baseline and in the first and third months after discharge from the hospital. The quality living guidebook and CD were given to the patients and their questions were answered. *The intervention group* was provided with individualized education by using the quality living guidebook and CD in the patient training room twice. The mean duration of education was 60-120 minutes. They were also offered counseling on the phone when they had questions. The mean duration of the phone calls was 20 minutes. The patients asked questions about sexual life, nutrition, prevention of infections etc. they experienced. They completed scales in the first and third months after discharge. The quality living guidebooks and CDs were prepared by the researchers in light of the findings from a qualitative study performed to determine counseling needs of recipients (İşeri, Karayurt and Yılmaz, 2018). Expert opinion about them were obtained from six experts. The revised versions of the materials were given to two recipients and their opinions about were also requested. The guidebook was printed in color and had 83 pages. It is composed of ten sections; containing

information about the structure/functions of the liver, causes of liver failure, liver diseases and their symptoms, LT process, life at home including nutrition, exercise, travelling, taking alcohol, smoking, sexuality, pregnancy, breastfeeding, menstruation, use of medications, side-effects of medications, complications likely to appear after LT like diabetes, organ rejection, psychological problems and important reminders etc. All the information available in the guidebook was voiced recorded by the first researcher in the CD and presented with 3D animations and videos. The CDs given to the patients were prepared by an expert information technology firm under the guidance of the researchers (Figure 2).

**Data Collection Tools:** The data in this study were collected using the Personal Information and Clinical Features Form, HADS and SF 36 Scale.

**Personal Information and Clinical Features Form:** The form was composed of six questions.

**HADS:** The scale was developed by Zigmond and Snaith in 1983. It was adapted to Turkish culture by Aydemir in 1997. It has 14 items, of which seven are about depression and seven are about anxiety. Items 1, 3, 5, 7, 9, 11 and 13 show a decreasing severity of anxiety and depression and are scored from three to zero. Items 2, 4, 6, 8, 10, 12 and 14 are scored in the reverse order. The total score for anxiety is obtained by adding scores for the items 1, 3, 5, 7, 9, 11 and 13 and the total score for depression is obtained by adding scores for the items 2, 4, 6, 8, 10, 12 and 14. The cut-off values for the subscales anxiety and depression in the Turkish version of the scale were reported to be 10 and 7 respectively. People getting scores higher than these cut-off values are considered at risk (Aydemir, 1992).

**SF-36 Scale:** The scale was developed by Ware in 1987. It is composed of 35 items and eight subscales, i.e., physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental functioning. The physical component summary score is predominantly derived from scores on physical functioning, role-physical, bodily pain and general health. The mental component summary score is derived from scores on role emotional, mental functioning, vitality and social functioning. In addition, two questions are used to determine to what extent health changes occur compared to the previous year (Ware, 2008; Kocyigit et al., 1999). The Turkish version of SF-36 The Quality of Life Scale is valid and reliable (Kocyigit et al., 1999).

**Ethical considerations:** For the research, ethics committee approval was obtained from the ethical review committee of clinical research at the university where the study was performed (No: 222). Written permission was obtained from the hospital administration. All recipients included in the study were informed about the aim, time, confidentiality of data to be collected and their right to drop out the study, their written and oral consent was obtained. All of the protocols conformed to the ethical guidelines of the 1975 Helsinki Declaration.

**Data Analysis:** Data analysis was performed by using Statistical Package Program for Social Sciences 20.0. Kolmogorov-Smirnov test was utilized to test whether the data had a normal distribution. As the data were normally distributed, the parametric tests numbers, percentages, mean, standard deviation, Chi-square test and two-way variance analysis for repeated measures were employed for analyses. Statistical significance was set at  $p < 0.05$ .

## Results

Descriptive characteristics and clinical features of the liver transplant recipients in the control and intervention groups are presented in Table 1. The recipients in the control group were aged 20-68 years with a mean of  $48.48 \pm 13.23$  years. Of 31 recipients in the control group, 58.10% were male, 87.10% were married, 93.50% were unemployed, 58.00% were primary school graduates, 29.10% had hepatitis B virus as an etiological agent, 45.20% received liver transplants from their children and 100% received treatment with Tacrolimus+Mycophenolate Mofetil (MMF)+steroids (Table 1). The recipients in the intervention group were aged 24-65 years with a mean of  $48.67 \pm 12.30$  years. Of 30 recipients in the intervention group, 73.30% were male, 96.70% were married, 60.10% were primary school graduates, 86.70% were unemployed, 33.30% had cryptogenic liver cirrhosis as an etiological factor, 56.70% received liver transplants from their children and 100% received treatment with Tacrolimus+MMF+steroids (Table 1). There was no significant difference in baseline age, gender, education, employment status, marital status and mean scores for anxiety, depression and subscales of SF-36 Scale except for pain between the groups ( $p > 0.05$ ) (Table 1; Table 2).

In the intervention group, the mean scores for anxiety at baseline and in the first and third months after discharge were  $10.50 \pm 5.22$ ,

8.20±3.52 and 5.60±3.47 respectively. In the control group, the mean scores for anxiety at baseline and in the first and third months after discharge were 10.61±4.96, 9.74±4.74 and 9.94±4.86 respectively. Two-way variance analysis of repeated measures was performed to determine whether there was a difference in the mean scores for anxiety between the groups. The analysis showed no significant difference in group (F=4.601, p=0.001), time (F=10.978, p=0.001) and group-by-time interactions (F=6.471, p=0.004) (p < 0.05) (Table 3). Analysis of differences in mean scores for depression between the groups and across time showed that the intervention group got the mean scores of 8.83±5.00, 5.73±3.58 and 2.90±3.39 at baseline, in the first month and in the third month after discharge respectively. The control group received the mean scores of 7.13±5.27, 5.55±3.91 and 5.90±4.59 at baseline, in the first month and in the third month after discharge respectively; Two-way variance analysis for repeated measures was performed to determine whether depression scores differed between the groups. Results of the analysis did not show a significant difference between the groups (F=0.436, p=0.512) (p>0.05), but revealed a significant difference in time (F=4.869, p=0.009) and group-by-time interactions (F=7.662, p=0.024) (p<0.05) (Table

4). Comparison of mean scores for the quality of life at baseline and in the first and third months after discharge between the groups is presented in Table 5. Two-way variance analysis for repeated measures was utilized to determine whether there was a difference in the mean scores for the quality of life. There was a significant difference in physical functioning (F=13.625, p=0.001) and group interactions (p<0.05), but other subscales did not differ significantly (p>0.05). Physical functioning (F=64.477, p=0.001), pain (F=23.350, p=0.001), general health (F=7.587, p=0.002), vitality (F=12.359, p=0.001), social functioning (F=3.813, p=0.035), mental functioning (F= 13.725, p= 0.001) and mental role (F=20.419, p=0.001) significantly differed in terms of time interaction (p<0.05). Physical functioning (F=11.506, p=0.001), role physical (F=6.415, p=0.002), pain (F=9.918, p=0.001), vitality (F=3.519, p=0.040), social functioning (F=10.388, p=0.001), mental functioning (F= 6.210, p= 0.003) and mental role (F=4.461, p=0.014) significantly differed in terms of group-by-time interaction (p<0.05). Mean scores for physical component summary and mental component summary were significantly different in terms of time and group-by-time interactions (p<0.05), but they were not significantly different in terms of group interaction (p>0.05) (Table 5).

**Table 1. Comparison of Descriptive and Clinical Features of the Patients in the Intervention and Control Groups**

| Variables                               | Control Group<br>n=31<br>$\bar{X}\pm SD^{**}$ | Intervention Group<br>n=30<br>$\bar{X}\pm SD^{**}$ | t*             | p     |
|---|---|--|----------------|-------|
| Age (year)                              | 48.48±13.23<br>(min:20-max 68)                | 48.67±12.30<br>(min:24- max:65)                    | 0.056          | 0.956 |
|   | n(%)  | n(%)   | x <sup>2</sup> | p     |
| <b>Gender</b>                           |   |  |                |       |
| Female                                  | 13(41.90)                                     | 8 (26.70)  | 0.971          | 0.324 |
| Male                                    | 18(58.10)                                     | 22(73.30)  |                |       |
| <b>Education</b>                        |   |  |                |       |
| Literate                                | 6 (19.40)                                     | 1 (3.30)   |                |       |
| Primary education                       | 18(58.00)                                     | 18(60.10)  | 6.647          | 0.156 |
| High School                             | 5 (16.10)                                     | 7 (23.30)  |                |       |
| University or higher level of education | 2 (6.50)                                      | 4 (13.30)  |                |       |
| <b>Employment</b>                       |   |  |                |       |
| Employment                              | 2 (6.50)                                      | 4 (13.30)  | 0.814          | 0.367 |

|   |           |           |   |       |
|---|-----------|-----------|---|-------|
| Unemployed                                    | 29(93.50) | 26(86.70) |   |       |
| <b>Marital status</b>                         |           |           |   |       |
| Single  | 4 (12.90) | 1 (3.30)  | - | 0.354 |
| Married                                       | 27(87.10) | 29(96.70) |   |       |
| <b>Etiology</b>                               |           |           |   |       |
| PVT +Autoimmune hepatitis                     | 4(12.90)  | 1 (3.30)  |   |       |
| HCV   | 7(22.60)  | 6 (20.00) |   |       |
| HBV   | 9(29.10)  | 6 (20.00) |   |       |
| Cryptogenic                                   | 6(19.30)  | 10(33.30) |   |       |
| HCC   | 3(9.70)   | 5 (16.80) |   |       |
| Budd Chiari                                   | 1(3.20)   | 1 (3.30)  |   |       |
|   | 1(3.20)   | 1 (3.30)  |   |       |
| <b>Use of immunosuppressants</b>              |           |           |   |       |
| Takrolimus+MMF***+                            |           |           |   |       |
| Steroids                                      | 31(100)   | 30(100)   |   |       |
| <b>Degree of relation with the live donor</b> |           |           |   |       |
| Mother, father, sibling                       | 9 (29.00) | 7 (23.30) |   |       |
| Children (Daughter, son)                      | 14(45.20) | 17(56.70) |   |       |
| Other****                                     | 8 (25.80) | 6 (20.00) |   |       |

\*t test for independent groups, \*\* SD: standard deviation, \*\*\*MMF: Mycophenolate Mofetil, \*\*\* Other: nephew/niece, daughter in law, grandchildren or colleague

**Table 2. Comparison of Mean Scores for Anxiety, Depression and the Quality of Life at Baseline between the Control and Intervention Groups**

| Variables         | Control              | Intervention         | t**   | p*    |
|-------------------|----------------------|----------------------|-------|-------|
|                   | (n=31)               | (n=30)               |       |       |
|                   | $\bar{X} \pm SD$ *** | $\bar{X} \pm SD$ *** |       |       |
| <b>Anxiety</b>    | 10.61±4.96           | 10.50±5.22           | 0.194 | 0.847 |
| <b>Depression</b> | 7.13±5.27            | 8.83±5.00            | 0.143 | 0.887 |

| <b>The Quality of Life</b>   | $\bar{X} \pm SD^{***}$ | $\bar{X} \pm SD^{***}$ | <b>t**</b> | <b>p*</b> |
|------------------------------|------------------------|------------------------|------------|-----------|
| <b>Physical Functioning</b>  | 21.13±15.42            | 22.17±13.31            | 0.281      | 0.780     |
| <b>Role Physical</b>         | 14.52±34.63            | 5.00±15.26             | 0.910      | 0.408     |
| <b>Pain</b>                  | 38.26±29.86            | 20.47±17.48            | 2.851      | 0.006*    |
| <b>General Health</b>        | 58.03±16.23            | 55.93±14.73            | 0.529      | 0.599     |
| <b>Vitality</b>              | 45.65±22.16            | 45.83±18.80            | 0.036      | 0.972     |
| <b>Social Functioning</b>    | 54.03±32.98            | 39.17±30.75            | 1.820      | 0.074     |
| <b>Role Mental</b>           | 41.94±50.16            | 25.56±43.49            | 1.364      | 0.178     |
| <b>Mental Functioning</b>    | 50.19±13.81            | 50.40±11.91            | 0.062      | 0.950     |
| <b>Summary Health Status</b> | $\bar{X} \pm SD^{***}$ | $\bar{X} \pm SD^{***}$ | <b>t**</b> | <b>p*</b> |
| Mental Component Summary     | 29.75±7.01             | 26.76±5.46             | 1.856      | 0.068     |
| Physical Component Summary   | 43.34±10.12            | 40.65±10.22            | 1.031      | 0.307     |

\* p < 0.05, \*\* t test for independent groups, \*\*\* SD: Standard Deviation

**Table 3. Comparison of Mean Anxiety Scores at Baseline and in the First and Third Months after Discharge Across Time and Between Groups**

| <b>Baseline</b>       | <b>1<sup>st</sup> month</b> | <b>3<sup>rd</sup> month</b> | <b>F &amp;</b> | <b>* p</b> |
|-----------------------|-----------------------------|-----------------------------|----------------|------------|
| $\bar{X} \pm SD^{**}$ | $\bar{X} \pm SD^{**}$       | $\bar{X} \pm SD^{**}$       |                |            |

|              |            |           |           |            |        |        |
|--------------|------------|-----------|-----------|------------|--------|--------|
| Control      | 10.61±4.96 | 9.74±4.74 | 9.94±4.86 | Group      | 4.601  | 0.001* |
| Intervention | 10.50±5.22 | 8.20±3.52 | 5.60±3.47 | Time       | 10.978 | 0.001* |
|              |            |           |           | Group*Time | 6.471  | 0.004* |

\*p < 0.05, \*\* SD: Standard Deviation, F<sup>&</sup> = Two-Way variance analysis for repeated measures

**Table 4. Comparison of Mean Depression Scores at Baseline and in the First and Third Months after Discharge across Time and Between Groups**

|              | Baseline              | 1 <sup>st</sup> month | 3 <sup>rd</sup> month |            | F &   | p*     |
|--------------|-----------------------|-----------------------|-----------------------|------------|-------|--------|
|              | $\bar{X} \pm SD^{**}$ | $\bar{X} \pm SD^{**}$ | $\bar{X} \pm SD^{**}$ |            |       |        |
| Control      | 7.13±5.27             | 5.55±3.91             | 5.90±4.59             | Group      | 0.436 | 0.512  |
| Intervention | 8.83±5.00             | 5.73±3.58             | 2.90±3.39             | Time       | 4.869 | 0.009* |
|              |                       |                       |                       | Group*Time | 7.662 | 0.024* |

\*p < 0.05, \*\*SD: Standard Deviation, F<sup>&</sup> = Two-way variance analysis for repeated measures

**Table 5. Mean Scores for the Quality of Life at Baseline and in the First and Third Months after Discharge across Time and Between Groups**

| Group                | Time                   |                        |                        | F**         | p*      |        |
|----------------------|------------------------|------------------------|------------------------|-------------|---------|--------|
|                      | Baseline               | 1 <sup>st</sup> month  | 3 <sup>rd</sup> month  |             |         |        |
|                      | $\bar{X} \pm SD^{***}$ | $\bar{X} \pm SD^{***}$ | $\bar{X} \pm SD^{***}$ |             |         |        |
| <b>Physical</b>      |                        |                        |                        |             |         |        |
| <b>Functioning</b>   |                        |                        |                        | Group       | 13.6256 | 0.001* |
| Control              | 21.13±15.42            | 37.26±16.73            | 39.03±19.68            | Time        | 4.477   | 0.001* |
| Intervention         | 22.17±13.31            | 46.17±17.70            | 65.83±23.20            | Group*Time  | 11.506  | 0.001* |
| <b>Role Physical</b> |                        |                        |                        | Group       | 0.034   | 0.854  |
| Control              | 14.52±34.63            | 12.90±34.08            | 6.45±24.97             | Time        | 0.825   | 0.441  |
| Intervention         | 5.00±15.26             | 4.17±18.67             | 21.67±40.86            | Group* Time | 4.842   | 0.010* |

|                     |             |             |             |             |        |        |
|---------------------|-------------|-------------|-------------|-------------|--------|--------|
| <b>Pain</b>         |             |             |             | Group       | 0.163  | 0.688  |
| Control             | 38.26±29.86 | 49.90±34.91 | 46.19±26.24 | Time        | 23.350 | 0.001* |
| Intervention        | 20.47±17.48 | 46.27±18.24 | 61.8±19.37  | Group* Time | 9.918  | 0.001* |
| <b>General</b>      |             |             |             | Group       | 2.218  | 0.142  |
| <b>Health</b>       | 58.03±16.23 | 58.61±18.06 | 59.29±15.47 | Time        | 7.587  | 0.002* |
| Control             | 55.93±14.73 | 63.43±16.09 | 71.50±16.87 | Group* Time | 5.487  | 0.008* |
| Intervention        |             |             |             |             |        |        |
| <b>Vitality</b>     |             |             |             | Group       | 3.520  | 0.066  |
| Control             | 45.65±22.16 | 51.45±20.86 | 50.81±16.79 | Time        | 12.359 | 0.001* |
| Intervention        | 45.83±18.80 | 58.33±14.10 | 64.17±13.71 | Group* Time | 3.519  | 0.040* |
| <b>Social</b>       |             |             |             |             |        |        |
| <b>Functioning</b>  |             |             |             | Group       | 0.498  | 0.483  |
| Control             | 54.03±32.98 | 47.98±23.74 | 47.18±27.33 | Time        | 3.813  | 0.035* |
| Intervention        | 39.17±30.75 | 53.75±20.01 | 67.08±20.63 | Group* Time | 10.388 | 0.001* |
| <b>Mental</b>       |             |             |             |             |        |        |
| <b>Functioning</b>  |             |             |             | Group       | 3.238  | 0.077  |
| Control             | 50.19±13.81 | 56.13±19.17 | 53.16±17.92 | Time        | 13.725 | 0.001* |
| Intervention        | 50.40±11.91 | 59.87±12.58 | 66.53±14.54 | Group* Time | 6.210  | 0.003* |
| <b>Mental Roles</b> |             |             |             | Group       | 0.604  | 0.440  |
| Control             | 41.94±50.16 | 66.67±47.14 | 61.29±49.51 | Time        | 20.419 | 0.001* |
| Intervention        | 25.56±43.49 | 76.67±43.02 | 86.67±34.57 | Group* Time | 4.461  | 0.014* |

**Physical****Component****Summary**

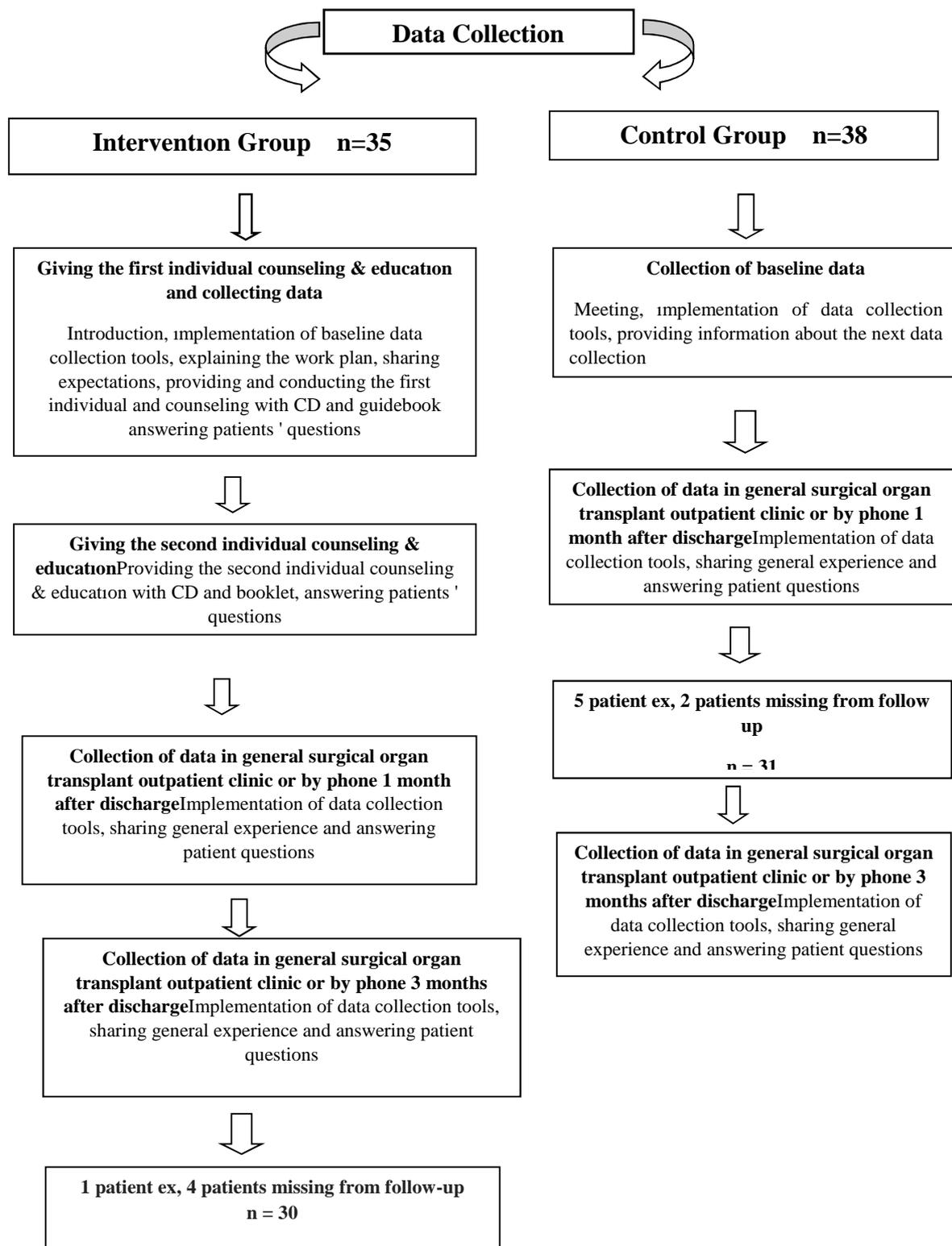
|              |             |             |             |             |        |        |
|--------------|-------------|-------------|-------------|-------------|--------|--------|
|              |             |             |             | Group       | 1.458  | 0.232  |
| Control      | 43.34±10.12 | 46.07±11.72 | 44.60±11.70 | Time        | 11.186 | 0.001* |
| Intervention | 40.65±10.22 | 49.40±9.33  | 51.45±8.59  | Group* Time | 5.624  | 0.005* |

**Metal****Component****Summary**

|              |            |            |            |             |        |        |
|--------------|------------|------------|------------|-------------|--------|--------|
|              |            |            |            | Group       | 0.913  | 0.343  |
| Control      | 29.75±7.01 | 32.15±8.82 | 32.06±7.16 | Time        | 22.637 | 0.001* |
| Intervention | 26.76±5.46 | 32.03±6.36 | 39.22±8.99 | Group* Time | 11.364 | 0.001* |

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\*p<0.05, \*\*F = Two-way variance analysis for repeated measures ,\*\*\* SD: Standard Deviation



**Figure 1.** Data collection process.

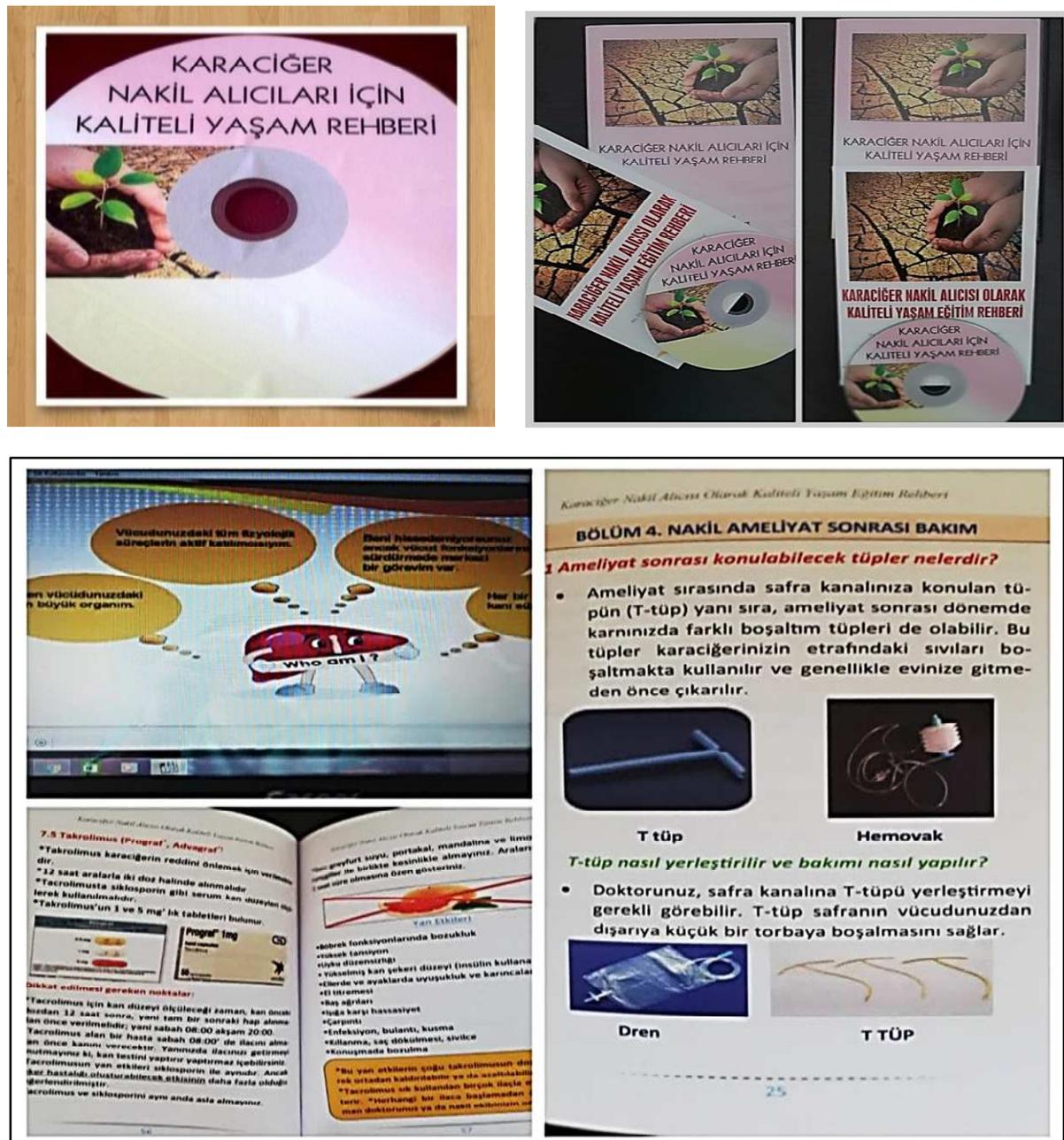


Figure 2. Quality Living Guidebook and CD examples.

## Discussion

In this study, anxiety, depression and the quality of life were compared between the liver transplant recipients in the intervention group offered individualized education and counseling and the recipients in the control group at baseline and in the first and third months after discharge. Age, gender, education, employment and marital status, mean scores for anxiety, depression and the quality of life except for pain at baseline did not significantly differ between the groups. This

shows that the groups were similar in terms of these features. In a study by Jin et al. (2013) on the quality of life and psychological distresses of liver transplant recipients, perceived health status and the quality of life were shown to affect their daily activities (Jin et al., 2013). In the current study, the intervention group had higher scores for role physical, physical functioning, pain and general health and physical component summary than the control group. Besides, although the intervention group had a significant increase in their scores for the abovementioned subscales in

the first and third months after their discharge from hospital, the control group did not experience this increase. This finding suggests that the education and counseling offered helped the recipients to determine their mistakes and change their behavior, which increased their physical wellness and the quality of their lives. In a study by Ordin and Karayurt (2015), a support group intervention was found to have a positive effect on physical health and increase physical adaptation in liver transplant recipients (Ordin & Karayurt, 2015), which is consistent with the results of the present study. Several other studies have also revealed that exercise programs and counseling for physical activity have significant effects on daily life activities, physical functioning, vitality and general health subscale of the quality of life in the recipients (Totti et al., 2019). However, in Cicognani et al.'s study, no significant differences were found in the mean scores for role physical, vitality and general health between the patients doing sports regularly and healthy individuals, though the patients not doing sports had much lower scores for these subscales (Cicognani et al., 2015). Pain after transplantation has a quite negative effect on the quality of life of the patients. In the present study, although the recipients in the intervention group had a much higher pain severity at baseline than the control group, they had lower pain severity in the first and third months after discharge. Lack of a similar change in the control group shows that individualized education and counseling was effective in reduction of pain. During individualized education and counseling, sexual problems and their solutions, contraception, body image, immunosuppressive drugs related emotionality and psychiatric problems like anxiety and depression were dealt with. In addition, during individualized counseling, the recipients expressed their opinions and shared their problems. It has been stated in the literature that recipients frequently have psychological problems after transplantation (Cannova et al., 2019; Annema et al., 2018). The main factor causing these problems was reported to be the feeling of guilt concerning live donors (Tarabaih, Bokek Cohen & Azuri, 2020). In fact, patients receiving live liver transplants think that they might have caused damage to live donors. In the present study, all the patients, who received live transplants, might have had the feeling of guilt before the intervention. The mean scores for anxiety and depression in the intervention group decreased at each follow-up after individualized

education and counseling. Other factors affecting psychological status of patients after LT are fear and anxiety due to possible complications such as infections, and rejections (Annema et al., 2018). Therefore, the recipients should be informed about long-term care. In the current study, individualized education and counseling were found to create a decrease in anxiety and depression levels and an improvement in the subscales role mental, mental functioning and mental component summary of SF 36 Scale. In Girgenti et al.'s study (2020), the patients who reported an unsatisfactory quality of life with specially designed therapeutic programs showed symptoms such as anxiety and depression in their post-transplant phase. In the current study, the fact that the recipients in the intervention group had better general health status and better vitality indicated positive effects of individual education and counseling (Girgenti et al., 2020). Consistent with this finding, mindfulness-based stress reduction was reported to reduce anxiety and depression (Gross et al., 2010) and a support group intervention was reported to increase psychological adaptation (Ordin & Karayurt, 2015). Also, a supervised exercise program was shown to be effective in enhancement of the general health, vitality and mental health in liver transplant recipients (Totti et al., 2019). Patients experience difficulty in continuing to work due to physical and psychological problems, fear of damaging the liver and frequent work leaves to avoid the risk of infections and to have their health status checked (Aguir et al., 2016; Stiavetti et al., 2013; Chen, Yan & Wang 2012). Because of this difficulty, they lose their jobs and their familial roles, and the quality of their life can be affected negatively. The individualized education and counseling involved daily life activities, roles at work, at school and in family and getting medical reports due to inability to work and retirement. It is also stated in the literature that perceived health status and perceived quality of life affect daily activities and social life (Jin et al., 2013). In the present study, the transplant recipients in the intervention group received higher scores for general health, vitality and role physical than the control group. LT is a treatment having biopsychosocial effects on the recipients (Alkatheri et al., 2015). Therefore, it is not sufficient to perform medical treatment protocols only. It is of great importance to provide social support to achieve psychosocial wellbeing (İşeri, Karayurt & Yılmaz, 2018; Moayed et al., 2018; Alkatheri et al., 2015). In the current study,

familial relationships and social isolation due to avoidance of infections were discussed with the patients during individualized education and counseling. In Turkish culture, it is important to visit patients and their families. However, these visits are not allowed after discharge of liver transplant recipients, which affects their social relationships. Multi-faceted changes are necessary to achieve long-term wellbeing and to increase the quality of life (Ordin & Karayurt, 2015). It has been emphasized that family support after LT is important and necessary so that the recipients can survive and manage their life individually in the first year after transplantation (Akazawa et al., 2013). In the present study, individualized education and counseling given through a quality living guidebook and CD were effective in improvement of social functioning of the recipients.

**Acknowledgements;** The authors would like to thank recipients for their participation in the project.

**Funding:** This research was a doctoral thesis. Financial and material support was taken from Inonu University Scientific Research Projects Coordination Unit. Thesis Code: DEU.HSI.PhD-2010970113

**Conclusions:** This study shows that the individualized education and counseling intervention given through a quality living guidebook and CD had a positive effect on patient care outcomes by reducing anxiety and depression and by increasing the quality of life. This intervention should be incorporated into routine nursing care. Patient care after LT requires a multidisciplinary approach. It can also be suggested that nurses, involved in the multidisciplinary team, should improve patient care outcomes by using different educational methods.

**Acknowledgements;** The authors would like to thank recipients for their participation in the project.

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