Research Article (Araştırma Makalesi)

Evaluation of Quality of Life in Donors After Living Liver Transplantation

Canlı Karaciğer Donörlerinde Yaşam Kalitesinin Değerlendirilmesi

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Özet

Amaç: Bu çalışmada, canlı karaciğer donörlerinin transplantasyon sonrası yaşam kalitelerinin değerlendirilerek, transplantasyonun donörlerin fiziksel, ruhsal ve psikososyal sağlıklarına etkisinin incelenmesi amaçlanmıştır.

Gereç ve Yöntemler: Ege Üniversitesi Tıp Fakültesi Organ Nakli ve Araştırma Merkezi'nde 3 grupta çalışma yürütüldü. 2017 yılında opere olan 43 canlı karaciğer donörü ve 2007-2016 yılları arasındaki 43 canlı donörü çalışmaya katılmak üzere rastgele seçildi. Ayrıca topluluktan rastgele 43 kontrol örneği seçildi. Çalışma 01.02.2018-31.05.2018 tarihleri arasında tek görüşmeci tarafından telefon veya e-posta yoluyla gerçekleştirildi. Tüm katılımcılara araştırmacılar tarafından hazırlanan sosyodemografik veri anketi, Kısa Form-36 (KF-36) ve Hastane Anksiyete-Depresyon Ölçeği (HADS) uygulandı.

Bulgular: Katılımcıların yaş ortalaması 38.04±9.84 yıl olup, bu katılımcıların %48.1'i (n=62) kadındı. Donör ve kontrol grubu yaşam kaliteleri açısından değerlendirildiğinde fiziksel rol, enerji (canlılık) ve ruh sağlığı alt grupları arasında anlamlı fark bulunmadı. Ancak donörlerin fiziksel işlevsellik, emosyonel yön, sosyal işlevsellik, ağrı ve genel sağlık alt gruplarında daha iyi bir yaşam kalitesi vardı. Yaşam kalitesinin yaş, cinsiyet, medeni durum, eğitim durumu, ekonomik durum, iş kaybı, komorbidite veya ameliyat skarının varlığından etkilenmediği belirlendi. Sadece cinsel sorunlar ve donörün hayatını kaybetmesinin yaşam kalitesini olumsuz etkilediği gözlemlendi. Anksiyete ve depresyon açısından gruplar arasında anlamlı fark yoktu ($p<0.05$).

Sonuç: Çalışmamızda donörlerin yaşam kalitesinin transplantasyondan olumsuz etkilenmediği belirlendi. Ancak nakil sonrası takiplerin gerektiği gibi yapılmadığı görüldü. Herhangi bir tıbbi gereksinim duymadan majör cerrahi geçiren canlı donörlerin fiziksel, ruhsal ve psikososyal sağlıklarını izleyen bağımsız birimlerin yanı sıra biyopsikososyal yaklaşımı benimseyen aile hekimliği disiplini ile yaşam kalitesinin takibi konusunda farkındalık artırılmalıdır.

Anahtar kelimeler: Canlı donörler, Karaciğer nakli, Yaşam kalitesi

Abstract

Objective: In this study, it was aimed to examine the effect of transplantation on physical, mental and psychosocial health of donors by evaluating the quality of life of living liver donors after transplantation.

Material and Methods: The study was conducted with three groups at Ege University Faculty of Medicine Organ Transplantation and Research Center. 43 living donors from 2017 and 43 living donors from 2007-2016 who underwent liver transplantation were randomly selected to participate in the study. Also 43 control subjects were selected randomly from the community. The study was conducted by a single interviewer between 01.02.2018 and 31.05.2018 by telephone or e-mail. The socio-demographic data questionnaire, Short Form-36 (SF-36) and Hospital Anxiety-Depression Scale (HADS) prepared by the researchers were applied to all participants.

Results: The mean age of the participants was 38.04±9.84 years, and of these participants 48.1% (n=62) of them were female. When donors and control group were evaluated in terms of their quality of life, no significant difference was found between physical role, energy (vitality) and mental health subgroups. However, donors have a better quality of life in physical functioning, emotional aspect, social functioning, pain and general health subgroups. It was detected that the quality of life was not affected by age, gender, marital status, educational status, economic status, job loss, comorbidity or disturbance by presence of operational scar. Only sexual problems and the loss of the recipient's life were observed to have a negative impact on the quality of life. There was no significant difference between the groups in terms of anxiety and depression ($p<0.05$).

Conclusion: In our study, it was determined that donors' quality of life was not adversely affected by transplantation procedure. But it was observed that post-transplant follow-ups had not been performed properly. In addition to independent units that monitor physical, mental, and psychosocial health of living donors who undergo major surgery without any medical need, awareness should be increased to follow the quality of life by family medicine discipline which adopts biopsychosocial approach.

Keywords: Liver transplantation, Living donors, Quality of life

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INTRODUCTION

Liver transplant is curative and the most effective treatment of liver failure due to many genetic, environmental, metabolic and neoplastic reasons. While liver transplantation is needed for reasons such as biliary atresia, hapatoblastoma, and Wilson disease in the pediatric age group, causes such as alcoholic liver cirrhosis, viral hepatitis and hepatocellular carcinoma are the leading ones in adults (1). Since the liver transplant performed for the first time by Dr. Thomas Starzl in 1967, new surgical techniques, immunosuppressive treatments, improvements in intensive care conditions and success in fighting infection have increased the 1-year survival rate from 50% to 90% (2,3). In the past, liver transplantation, was used as a last resort to save the life of a patient, is now accepted as a radical treatment method applied to improve the quality of life in earlier stages of liver failure.

Due to insufficient organ donation, today's organ need is mostly provided by living donors. It is known that organ transplantation from a living donor increases survival time and quality of life of recipient compared to organs taken from a cadaver due to the fact that they are healthy organs taken from completely healthy individuals, organ hypoxicity is kept to a minimum, elective surgery and the possibility of being applied in the early stage of diseases (4). However, an operation of a healthy individual without any health benefit is contrary to the principle of "Primum non nocere (First, do no harm)" accepted in the medical world.

The primary and most important purpose of organ transplants from living beings should be the protection of the health and life quality of a donor. Since notifications are not mandatory, the number of living donors who lost their lives due to transplantation worldwide and the causes of death are unknown. According to those reported in the limited studies conducted in different countries, the morbidity rates of liver donors vary from 8.6% to 59% (5). The average mortality rate is stated as 0.2% (6). Some studies have focused on the changing quality of life of a donor after partial hepatectomy (7,8).

The World Health Organization defines quality of life as individuals' perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns (9,10).

The aim of this study is to compare the quality of life of donors in living donor liver transplants with each other and with individuals reflecting the normal population of the society by grouping them according to the time elapsed after transplantation.

MATERIALS AND METHODS

Our study, which was planned in a descriptive cross-sectional type, was conducted between 01.02.2018 and 31.05.2018 at Ege University Faculty of Medicine Hospital Organ Transplantation Center. Before starting the study, the ethical approval was obtained from Izmir Katip Celebi University Non-Interventional Ethics Committee with the decision number 4 dated 17.01.2018. At the same time, necessary permissions were obtained from Ege University Faculty of Medicine Hospital Organ Transplantation Center, dated 23.01.2018 and numbered 6133. The study was based on Helsinki declaration.

The frame of the study consists of donors in living liver transplant operations performed between 01.01.2007 and 31.12.2017. The study is planned over a total of 3 groups, 2 groups of donors and a control group for comparison. The first group (group 1) consists of donors who underwent surgery in 2017 and the second group (group 2) consists of donors who underwent surgery between 2007 and 2016. The third group (group 3) consists of randomly selected individuals from the society that constitutes the control group.

The sample size was calculated to be at least 43 people for each group, and 129 people for three groups in total, assuming that 95% power, 5% error level and the effect size of the difference between the two groups would be moderate (d=0.57). The sample consisted of individuals who accepted to participate in the research and were able to communicate verbally and in writing, and cognitively able to answer the questions in the questionnaires. Incomplete questionnaires are not included in the study.

The data were obtained from a single interviewer using a 31-question socio-demographic data questionnaire, a 36-item Short Form-36 (SF-36) general quality of life questionnaire, a 14-item Hospital Anxiety-Depression Scale (HADS), and a 5-item Decision Regret Scale (DRS). by phone or e-mail.

SF-36 Quality of Life Scale

SF-36, which is the most widely used scale among the quality of life scales because of its shortness and easiness to apply; was developed in 1992 by Ware et al

(11). The validity and reliability of the Turkish form was studied by Koçyiğit et al. in 1999 (12). In the reliability study of the scale, Cronbach alpha coefficient for each subscale was obtained between 0.73 and 0.76. The scale consists of 36 items and these provide the measurement of 8 dimensions. These are; physical function (10 items), social function (2 items), role limitations due to physical functions (4 items), pain (2 items) and general perception of health (5 items). Subscales assess health between 0 and 100, and "0" indicates the worst health status, while "100" indicates the best health status.

Hospital Anxiety-Depression Scale (HADS)

Developed by Zigmond et al in 1983, HADS; is designed to screen mood disorders in a population with a medical illness. It is easily being used in community and hospital samples. In this scale; In order to differentiate psychiatric symptoms from physical disorders, subjective destruction of mood is emphasized instead of physical symptoms.

Seven questions (odd numbers) measure anxiety and the other seven questions (even numbers) measure depression in the HADS, which consists of 14 questions in total. It provides a quadruple Likert type measurement. It is short and straightforward, therefore it is easy to apply. Turkish validity and reliability was determined by Aydemir et al in 1997 (13). As a result of the studies, the cut-off score of the anxiety subscale was 10 and above; the cut-off score of the depression subscale was found to be 7 and above, and those above these scores were accepted as having anxiety/depression. According to this scale, while the lowest score that can be obtained in subgroups is 0, the highest score is 21. As the score increases, the severity of anxiety/depression increases.

Statistical evaluation was performed using the SPSS (Statistical Packet for the Social Science) 15.0 package program. In the evaluation of the data obtained; continuous variables in the study were expressed as mean±standard deviation or median (minimum-maximum) values, and categorical variables were expressed as frequency and related percentage values. Age, SF36 quality of life subgroups and HAD Scale scores were evaluated using the Kolmogorov-Smirnov test. Mann-Whitney U test and Kruskal Wallis test were used for intergroup comparisons of these parameters. Comparison of categorical variables was made using the chi-square test or Fisher's exact chi-square test. Relationships between continuous variables were evaluated using Spearman correlation test and linear regression analysis. $p<0.05$ was considered as statistically significant.

RESULTS

A total of 129 individuals participated in the study. The socioeconomic distributions of the participants according to the groups are given in **Table 1**.

It was observed that all the donors (group 1 and group 2), 41.9% (n=36) of whom were female and 58.1%

Table 1. Socioeconomic distribution of the participants according to the groups

		Group 1 (Donors of 2017) (n=43) 33.3%	**Group 2** (Donors of 2007-2016) (n=43) 33.3%	**Group 3** (Control group) (n=43) 33.3%	**Total** (n=129) 100%	**p**
Age		34.58±10.13	39.13±7.34	40.4±10.92	38.04±9.84	0.022
Gender	Female	19 (30.6%)	17 (27.4%)	26 (41.9%)	62 (100%)	0.123
	Male	24 (35.8%)	26 (38.8%)	17 (25.4%)	67 (100%)	
Education Status	Primary education and before	22 (36.7%)	29 (48.3%)	9 (15.0%)	60 (100%)	0.000
	Secondary education (Highschool)	8 (27.6%)	5 (17.2%)	16 (55.2%)	29 (100%)	
	University graduate	13 (32.5%)	9 (22.5%)	18 (45%)	40 (100%)	
Maritial Status	Married	24 (25%)	36 (37.5%)	36 (37.5%)	96 (100%)	0.04
	Not Married	19 (57.6%)	7 (21.2%)	7 (21.2%)	33 (100%)	
Income Level	Less income than expense	17 (30.9%)	22 (40.0%)	16 (29.1%)	55 (100%)	0.591
	Equal income and expense	18 (34.0%)	14 (26.4%)	21 (39.6%)	53 (100%)	
	More income than expense	8 (38.1%)	7 (33.3%)	6 (28.6%)	21 (100%)	

*p<0.05

(n=50) were male individuals, were liver donors for their children with a rate of 29.1% (n=25) at most. The least 2.3% (n=2) were found to be donors for unrelated individuals. When we look at the groups separately, the highest rate in group 1 is 27.9% (n=12) for their fathers; the highest rate in group 2 with 46.5% (n=20) is seen to be liver donors for their children. They donated to at least one person (2.3%) in each of the two groups (n=1) to unrelated people. There was no statistically significant difference between the groups.

When complications due to the operations were evaluated, it was stated that 9.3% (n=8) of all donors participating in the study developed complications. These complications; all of them are acute period complications including intra-abdominal bleeding (n=3), wound infection (n=2), pleural effusion (n=2) and liver abscess. None of the donors in our study reported that they experienced late complications.

When the donors were questioned whether they have any problems in their postoperative sexual life, 7% (n=6) of them stated that they have problems. All of these people are in the group 1 consisting of donors who have not yet exceeded 1 year after surgery. The remaining 93% (n=80) stated that there is no difference in their sexual life compared to pre-surgery.

The participants who stated that they experienced job loss after surgery constitute 7% (n=6) of all donors. While 2 (33%) of these people are in group1, 4 (66%) of them are in group2.

When they were asked about how the relationship of donors with their recipient patients is affected after transplant surgery, 61.6% (n=53) stated that it is better, while 37.2% (n=32) stated that there is no difference, and 1.2% (n=1) stated that it is worse.

When the donors were asked to rate their postoperative and preoperative predicted pain severity between 0 and 10, the mean score of their postoperative pain severity was 6.59±2.30 (min: 1, max: 10), the mean score of the estimated preoperative pain severity was 5.38±1.83 (min: 0, max: 10). There was a statistically significant difference between them ($p<0.05$).

When we examined the condition of the donors being disturbed by the appearance of the scar tissue covering the abdominal area completely, 19.8% (n=17) of the total 86 donors stated that they feel uncomfortable. When we group the donors according to their age, 40% of those under the age of 30 and only 13.6% of those over the age of 30 are disturbed by their scar. There was a statistically significant difference on this situation ($p<0.05$). Also, 47.7% (n=41) of the donors stated that they experienced more severe pain, while 41.9% (n=36) stated they experienced the same pain and 10.4% (n=9) stated they experienced less pain compared to their estimates.

According to their gender 30.6% (n=11) of the female donors and 12.0% (n=6) of the male donors; according to marital status 13.3% (n=8) of the married donors, 34.6% (n=9) of the unmarried donors, according to their educational status 40.1% (n=9) of the donors who are university graduates and 12.5% (n=8) of donors who are not, reported that they are uncomfortable with the surgical scar on their bodies.

While the situation of the donors being uncomfortable with the surgical scar in group 1 is 23.2% (n=10); in group 2, it is 16.2% (n=7). There was no significant difference between them.

The presence of a physical and/or mental illness was investigated in all the participants in the study. Accordingly, it was determined that 19.4% (n=25) of all the participants have at least one disease. When we evaluate it by separating them into groups; 4.7% (n=2) of the donors in group 1; 17.8% (n=8) of the donors in group 2 and 36.6% (n=15) of the individuals in group 3 that make up the control group have at least 1 (one) physical and/or mental illness. There was a significant difference between the groups ($p<0.05$).

The process of returning of the donors participating in the study to their old life after transplant surgery was examined in 4 steps. When all the donors are taken into consideration, the average length of hospital stay was 7.73±3.56 (min: 4 max: 27) days, returning to daily activities; 3.01±1.93 (min: 1, max: 12) weeks, returning to previous health; 3.51±1.69 (min: 1, max: 12) months and the average time of returning to work was determined as 4.16±2.34 (min: 1, max: 18) months.

It was determined that 77.9% (n=67) of the donors' (participating in our study who gave their livers) recievers were still alive. 89.5% (n=77) of all the donors stated that liver transplantation was beneficial for their reciepients, 94.2% (n=81) did not regret being a donor at all and 93.0% (n=80) stated that they would like to be a donor again.

When the quality of life subgroups were compared between the three groups, a statistically significant relationship was found between physical function, emotional role difficulties, social functionality, pain, and general health subgroups. When post-hoc subgroup

analyzes are made in terms of these parameters; for the physical function subgroup of SF 36 quality of life scale, the difference between the groups stems from group 2; for emotional role difficulties and social functionality subgroups, the difference stems from group 3 and it was determined that all three groups were found out to be statistically different from each other in pain and general health groups ($p<0.05$). A significant difference was found between the groups in terms of Physical Component Score (PCS) and Metal Component Score (MCS) ($p<0.05$). According to the post hoc subgroup analysis, there was no significant difference only between the groups 1 and 2 in MCS. All other subgroups were determined differently ($p<0.05$) (**Table 2**).

When the donors (group 1 and group 2) and the control group (group 3) were evaluated in terms of quality of life, a statistically significant difference was found between the subgroups of the scale, such as physical function, emotional role difficulties, social functionality, pain and general health ($p<0.05$). When the donors and control groups were evaluated in terms of Physical Component Score (PCS) and Mental Component Score (MCS), a significant difference was found ($p<0.05$) (**Table 3**).

The differences that could affect the quality of life were examined. A low level of inverse correlation was observed between only age and energy (vitality) subgroups ($r=-0.271$, $p<0.05$). No significant difference was found between age and quality of life in all the other subgroups.

All participants were evaluated in the subgroups of the SF-36 Quality of Life scale according to their gender and a statistically significant difference was found only in the energy vitality and general health subgroups ($p<0.05$).

When it is examined whether the marital status of the participants affects their quality of life; significant differences were found in energy (vitality) and mental health subscales ($p<0.05$). No difference was found between being married and not being married in the other subscales.

When we divided the participants into those who have at least university education and those who do not and evaluated their quality of life, a significant difference was found only in physical role difficulties and general health subscales ($p<0.05$).

Table 2. Comparison of the groups according to SF-36 subscales

	Group 1 (n=43)			**Group 2 (n=43)**			**Group 3 (n=43)**				**1-2**	**1-3**	**2-3**
Kruskal Wallis	**Med**	**Min**	**Max**	**Med.**	**Min**	**Max**	**Med**	**Min**	**Max**	**p**	***Mann-Whitney U***		
Physical function	90.00	65.0	100.0	100.0	85.0	100.0	90.0	40.0	100.0	**0.000**	**0.000**	0.243	**0.000**
Physical role challenge	100.0	00	100.0	100.0	00	100.0	100.0	00	100.0	.057	-	-	-
Emotional role challenge	100.0	00	100.0	100.0	00	100.0	100.0	00	100.0	**0.001**	0.642	**0.008**	**0.001**
Energy vitality	75.00	10.0	100.0	65.00	10.0	95.00	65.00	35.0	100.0	0.255	-	-	
Mental health	76.00	20.0	100.0	72.00	20.0	96.00	72.00	28.0	92.00	0.368	-	-	-
Social functionality	100.0	37.5	100.0	100.0	25.0	100.0	87.50	50.0	100.0	**0.013**	0.515	0.026	**0.008**
Pain	100.0	45.5	100.0	100.0	65.0	100.0	77.50	22.5	100.0	**0.000**	**0.005**	**0.000**	**0.000**
General health	90.00	30.0	100.0	95.00	55.0	100.0	65.00	30.0	95.00	**0.000**	**0.004**	**0.000**	**0.000**
PCS	69.82	-29.37	91.83	82.16	-29.89	90.13	43.85	-48.68	88.62	**0.000**	**0.006**	**0.001**	**0.000**
MCS	62.42	-11.27	86.46	62.38	-20.25	79.81	44.82	4.19	78.11	**0.013**	0.776	**0.010**	**0.012**

* Significant difference was taken as $p<0.05$ according to Kruskal Wallis measurement and $p<0.017$ according to Mann-Whitney U measurement in Post Hoc subgroup analysis.
PCS: Physical Component Score, MCS: Metal Component Score

Table 3. Comparison of the donors and the control group according to SF-36 subscales

	Donor Group (Group1-2) (n=86)			**Control Group (Group 3) (n=43)**			
Mann-Whitney U	**Med.**	**Min**	**Max**	**Med.**	**Min**	**Max**	**p**
Physical function	100.00	65.00	100.00	90.00	0.00	100.00	**0.000**
Physical role challenge	100.00	00	100.00	100.00	00	100.00	0.085
Emotional role challenge	100.00	00	100.00	100.00	00	100.00	**0.000**
Energy vitality	75.00	10.00	100.00	65.00	35.00	100.00	0.149
Mental health	76.00	20.00	100.00	72.00	28.00	92.00	0.507
Social functionality	100.00	25.00	100.00	87.50	50.00	100.00	**0.004**
Pain	100.00	45.00	100.00	77.50	22.50	100.00	**0.000**
General healt	95.00	30.00	100.00	65.00	30.00	95.00	**0.000**
PCS	77.24	-29.89	91.83	43.85	-48.68	88.62	**0.000**
MCS	62.40	-20.25	86.46	44.82	4.19	78.11	**0.003**

* Significant difference was taken as p <0.017 according to the Mann-Whitney U measurement.
PCS: Physical Component Score, MCS: Metal Component Score

There was no significant difference between the economic status and chronic disease presence of all participants and their quality of life.

The quality of life of the donors was examined in the subgroups according to their discomfort with the scar image covering the abdominal areas after surgery. Accordingly, no significant difference was found in any subgroups of the SF-36 Quality of Life scale.

The quality of life of the donors was examined in the subgroups according to the unemployment they experienced after surgery. Accordingly, no significant difference was found in any subgroups of the SF-36 Quality of Life scale.

A significant difference was found in the physical function, physical role difficulties, emotional role difficulties, energy vitality, social functionality, pain, and general health subgroups of the SF-36 Quality of Life scale among the donors who did and did not experience sexual problems, which is another factor affecting the quality of life after surgery (p<0.05).

When we evaluated SF-36 Quality of Life of the donors according to whether their recipients were alive or not after the transplantation; significant differences were observed in emotional role difficulties, energy vitality and mental health subscales (p<0.05).

When we examined the participants with anxiety, the distribution rates between the groups were found to be 32.1% (n=9), 39.3% (n=11) and 28.6% (n=8), respectively. Those with depression are distributed as 30% (n=9), 33.3% (n=10) and 36.7% (n=11). There was no significant difference between the groups in terms of anxiety and depression. (**Table 4**).

The presence of anxiety and depression was investigated in the donor groups (groups 1 and 2) according to the complications experienced, problems in sexual life, job loss due to transplantation, the condition of the re-

Table 4. Cross-group comparison of anxiety and depression

		Group 1	**Group 2**	**Group 3**	**Total**	x^2	**p**
Anxiety	Present	9 32.1%	11 39.3%	8 28.6%	28 100%	0.639	0.727
	Absent	34 33.7%	32 31.7%	35 34.7%	101 100%		
Depression	Present	9 30%	10 33.3%	11 36.7%	30 100%	0.261	0.878
	Absent	34 34.3%	33 33.3%	32 32.3%	99 100%		

* p<0.05

cipient, and the condition of being uncomfortable with the surgical scar. According to the findings obtained; no significant relationship was found between the presence of anxiety and depression in the donors and these conditions. There was a significant difference only with whether the recipient was alive or not (p<0.05).

In **Table 5**, the relationship of SF-36 Quality of Life subscales with the presence of anxiety is examined. Accordingly, a significant difference was found in physical function, physical role difficulties, emotional role difficulties, energy vitality, mental health, social functionality and general health subgroups (p<0.05). A significant relationship could not be established only with the pain subscale. It showed a significant difference with all the subscales except for the presence of depression and pain (p<0.05) (**Table 6**).

DISCUSSION

The biggest problem of liver transplantation, which is a life-saving treatment of end-stage liver failure, have always been the inadequacy of organ supply since the first application. Today, the most effective solution to this problem for now is to obtain organs from living donors. In liver and kidney transplants from living donors application in the world rankings, Turkey is located in the 1st and 2nd row (14). In our country, where 75% of liver transplants are made from living donors, the number of the studies on donors is very low.

The average age of donors when they became liver donors was determined as 32.75±8.98 in our study, and it is similar to the studies in the literature (8,15). The maximum age is not determined in the criteria on being a donor while being adult determined as obligation, the transplant centers have determined their own policies in this regard. While the oldest donor was 55 years old in our study, the liver donor cases were reported in the literature where the donor was 67 years old (16). As the age increases, reasons such as the possibility of chronic diseases, exposure to infection, and increased fat affect organ quality negatively, thus increasing the risk of morbidity in both donor and recipient, increasing the orientation to young patients in donor selection. When

Table 5. The relationship between the quality of life and the HAD-Anxiety subscale

	Has Anxiety (n=28)			Has not Anxiety (n=101)			
Mann-Whitney U	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**p**
Physical function	90.00	50.00	100.00	100.00	40.00	100.00	**0.025**
Physical role challenge	75.00	0.00	100.00	100.00	0.00	100.00	**0.000**
Emotional role challenge	100.00	0.00	100.00	100.00	0.00	100.00	**0.001**
Energy vitality	47.50	10.00	80.00	75.00	20.00	100.00	**0.000**
Mental health	54.00	20.00	92.00	76.00	20.00	100.00	**0.000**
Social functionality	68.75	25.00	100.00	100.00	37.50	100.00	**0.000**
Pain	90.00	45.00	100.00	100.00	22.50	100.00	0.065
General health	62.50	30.00	100.00	90.00	30.00	100.00	**0.000**

*p<0.05,
HAD: Hospital Anxiety-Depression

Table 6. The relationship between the quality of life and the HAD-Depression subscale

	Has Depression (n=30)			Has not Depression (n=99)			
Mann-Whitney U	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**p**
Physical function	87.50	50.00	100.00	100.00	40.00	100.00	**0.002**
Physical role challenge	100.00	0.00	100.00	100.00	0.00	100.00	**0.005**
Emotional role challenge	83.33	0.00	100.00	100.00	0.00	100.00	**0.000**
Energy vitality	47.50	10.00	85.00	75.00	35.00	100.00	**0.000**
Mental health	54.00	20.00	92.00	76.00	28.00	100.00	**0.000**
Social functionality	68.75	25.00	100.00	100.00	50.00	100.00	**0.000**
Pain	90.00	22.50	100.00	100.00	25.00	100.00	**0.006**
General health	75.00	30.00	100.00	90.00	30.00	100.00	**0.001**

*p<0.05,
HAD: Hospital Anxiety-Depression

the donors are evaluated in terms of gender, unlike the literature, the ratio in our study is in favor of the males (17,18). It was thought that the reason why the number of donors in our country is in favor of men may be that the primary people dealing with home patients and child care are mostly women. In addition, female candidates go through a more detailed and time-consuming process in terms of gynecological malignancies and breast cancer during donor preparation period. For these reasons, male candidates are preferred especially in emergency cases.

In almost all centers where live donor liver transplantation is performed in the world, it is seen that donors mostly donate their livers to their first degree relatives (19). It is quite understandable that a person agreeing to risk his/her own health only in order to improve the health of those closest to his/her. Thus, this is the case in our study. However, the advantages of living donor liver transplants such as short waiting time, optimum surgical conditions, better quality organs and shorter ischemia time compared to transplants from cadavers are increasing the number of non-relative donors, especially in the United States (20,21).

In our study, postoperative complication rates were found to be 9.3%. In a review covering 28 similar studies from many different countries, morbidity rates vary from 8.6% to 59% (5). In the meta-analysis of Middleton et al., mortality and morbidity rates of more than 6000 living liver donors in 214 studies were examined. According to this study, which reported the morbidity rate as 16% and the mortality rate as 0.2%, the vast majority of complications were caused by biliary problems such as bile duct obstruction (6). No donor loss was experienced in liver transplantation from a total of 291 living donors between 2007 and 2017 at Ege University Organ Transplantation and Application Center where we conducted our study. When the morbidity rate was evaluated, although the morbidity rate in our study was found to be compatible with the literature, it was found to be lower than many data in the literature. Since the data were obtained by asking the patients, not from medical records, it was thought that this value does not represent the true result. For a better result, reliable hospital records must be obtained and examined.

In our study, 47.7% of the donors stated that they encountered more severe pain after the surgery than they expected, 41.9% reported that they experienced the same level of pain as they expected, and 10.4% reported that they experienced less pain than they expected. In the study of Beavers et al., 33% of the donors reported that they experienced more pain than they expected due to their surgical experience (22). Also Trotter et al. reported that 66% of the donors experienced more pain in the postoperative period than they expected (23). Pain is unexpected for healthy donors who have never had surgery before. For this reason, it is necessary to provide detailed information to donor about the pain that he/she will experience, before transplantation.

Six of the donors (7%) stated that they had problems in their sexual life after the transplantation. All of these people are the donors in group 1, who did not exceed 1 year after transplantation. In the literature, this ratio is between 0% and 10% (24-26) This can be due to pain or loss of sexual desire.

In a surgical procedure performed to obtain grafts from donors, upper abdominal area gets completely opened. For this reason, a large scar remains on donors after surgery. Those who were uncomfortable with the appearance of this scar were determined as 19.8%. Being uncomfortable with surgical scar is more common in women under the age of 30, unmarried people and university graduates. There was no significant difference between the groups. When we searched the literature, no study addressing discomfort of donors from surgical scars was found in the related studies. However, there are studies showing that scar formation is trying to be minimized by new surgical techniques (27). The period of the donors returning to their old life routines is consistent with the similar studies in the literature (8,28).

Donors' quality of life; when evaluated in terms of Physical Component Summary (PCS) and Mental Component Summary (MCS) and eight subgroups, it was determined that it was generally better than the control group. In a study which examined the effects of living donor liver transplantation, the donors were asked to complete the Short Form 36-question Health Survey (SF-36) and the mean±SD score of PCS and MCS were 48.8±14.6 and 50.1±6.9, respectively (29). In another study which assessed the impact of living liver donationin a diverse and aging population up to 20 years after donation, particularly with regard to medical, financial, psychosocial, and overall health-related quality of life (HRQOL). Short-Form 36 survey-measured outcomes were similar between LLDs and the general U.S. (30).

When the other factors affecting the quality of life were examined, a significant inverse correlation was

found with only energy (vitality) among age and quality of life subgroups. There was no difference between age and the other subgroups. The reason for this is that being energetic and full of life increases with decrease in age is considered as a normal situation.

When the relationship between gender and quality of life of the participants was examined; it was observed that men had higher quality of life than women in energy (vitality) and general health subgroups. The level of quality of life related to the other subgroups was not affected by gender. The most uncomfortable issue for the donors after the surgery was the cosmetic appearance of the surgical scar. It was examined whether the quality of life of donors who reported their discomfort in this regard at a rate of 19.8% was affected by this reason or not. However, no significant difference was found in any subgroup. Accordingly, scar is not a factor affecting quality of life.

In selection of donors, attention should be paid to mental health criteria as well as physical health criteria. The psychological state experienced by a person who was decided to be a donor after detailed psychiatric evaluations after transplantation was evaluated using the HAD scale in our study.

When we evaluated the groups with each other according to the anxiety and depression subscales, no significant difference was found. According to a study conducted in Germany where 123 living donors were included, the HAD scale was applied to the donors before transplantation and the scale was repeated periodically afterwards and the values were compared. A significant increase was observed in the anxiety and depression levels of the donors in the first 3 months. It has been shown that the anxiety and depression experienced in donors returning to their pre-transplant values after 3 months are not permanent (31).

In the meta-analysis that deals with the studies conducted until the end of 2018; physical functioning scores at ≤1 month, 3 months, 6 months, 12 months, and ≥24 months post-donation were significantly lower than pre-donation. Significantly higher level of pain was found at 3-month post-donation. Also, a significantly higher level of anxiety was found at 3-month post-donation. But there was no significant change in general psychological state and depression. A significant reduction in donors' social quality of life was found at ≤1-month post-donation, and recovery to pre-donation levels occurred at 3 months post-donation (32).

The presence of anxiety and depression was investigated according to whether the donors' anxiety and depression were affected by the complications, problems in sexual life, job loss due to the transplantation, the condition of the recipient, and discomfort from the surgical scar. According to the findings obtained; no significant relationship was found between the presence of anxiety and depression in the donors and these conditions. There was only a significant difference with whether the recipient was alive or not.

In our study, it was determined that the quality of life of the donors was not negatively affected by the transplantations. Although there are liver transplants from a large number of living donors in our country, it is observed that follow-up after transplantation is not being done regularly. Awareness about following the quality of life of donors should be increased in the family medicine discipline, where the biopsychosocial approach model is adopted, as well as independent units that take care of the physical, mental and psychosocial health of donors after transplantation.

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