

# Comparison of Health Anxiety Levels and Quality of Life of Living Donors before and after Liver Transplant Surgery: A Cross-sectional Study

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## ABSTRACT

**Background:** Partial liver transplantation is one of the standard methods for liver transplantation. This surgical procedure is performed from a living person to a sick person, which can lead to physical and mental challenges affecting the quality of life of donors.

**Objective:** To compare the level of health anxiety and quality of life of liver donors before and after liver transplant surgery.

**Methods:** This descriptive cross-sectional study was performed on 45 liver donors referred to Shiraz Organ Transplant Hospital between 2019 and 2020. Standard questionnaires of demographic information, health anxiety and quality of life were used to collect data by convenience sampling. Descriptive and inferential statistics tests were used to analyses the data. A significance level was considered  $P < 0.05$ .

**Results:** Patients' quality of life score (in comparison with the overall score and with the subgroups) decreased significantly ( $P = 0.001$ ) after liver donation. Also, patients' health anxiety scores (in comparison with the overall score and with the subgroups) increased significantly after surgery ( $P = 0.001$ ).

**Conclusion:** The implementation of awareness programs before and after surgery and purposeful and long-term follow-up, as well as the use of empowerment programs to increase the level of health and quality of life of these people can be a comprehensive and appropriate approach for hospital officials in order to improve health and quality of life after organ donation.

**KEYWORDS:** Life quality; Living donors; Liver transplantation

## INTRODUCTION

Liver transplantation is considered as the final treatment for patients with end-stage liver cirrhosis, chronic liver

failure, fulminant disease, as well as newborns with metabolic problems [1]. Live donor liver transplantation (LDLT) is a widespread treatment for end-stage liver disease due to severe liver deficiency from the donor (corpse) [1], which has recently been used in Europe [2] and Asia [3] has had a significant increase. However, there are concerns about the consequences (medical, psychological, socio-economic) for donors, because the transplant process involves performing extensive surgery

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with potential risks to the donor. Knowing these results enables physicians to provide a better and clearer picture of what this practice entails for the organ donor, recipient, and family [4].

Anxiety is one of the most common preoperative psychological problems and despite many advances in surgical techniques, most patients still experience preoperative anxiety [5]. Health-related anxiety is defined as excessive fear due to misinterpretation of common emotions or physical symptoms [6, 7]. Because liver transplantation is a complex procedure that causes psychological reactions in patients and their relatives, different aspects of this surgery can affect the anxiety of transplant candidates and cause stress symptoms, which these symptoms can be seen in different forms in the liver donor [8].

Live organ donors experience health-related anxiety because they will undergo major surgery and may have a long recovery period after surgery, which can reduce the willingness to donate [9, 10]. Some donors may choose to hide their concerns because the idea of restoring a family's health may outweigh their concerns about themselves, or if they do not donate an organ, they may be afraid of being embarrassed in front of others. All of these problems may lead to post-transplant regrets or psychological complications in donors [11].

Studies have shown that there is a significant relationship between psychological complications and quality of life disorders [12]. Quality of life refers to a person's perception of their place in life, according to the cultural context of society and the goals, criteria and concerns of the individual, and arises from variables such as physical health, psychological status, independence and social relations [13]. The fact that the benefits and risks of liver transplant surgery can be expected on the quality of life related to the health of donors as an important issue, has led to studies in this field [14, 15].

A number of systemic studies have evaluated the effect of liver transplantation on mortal-

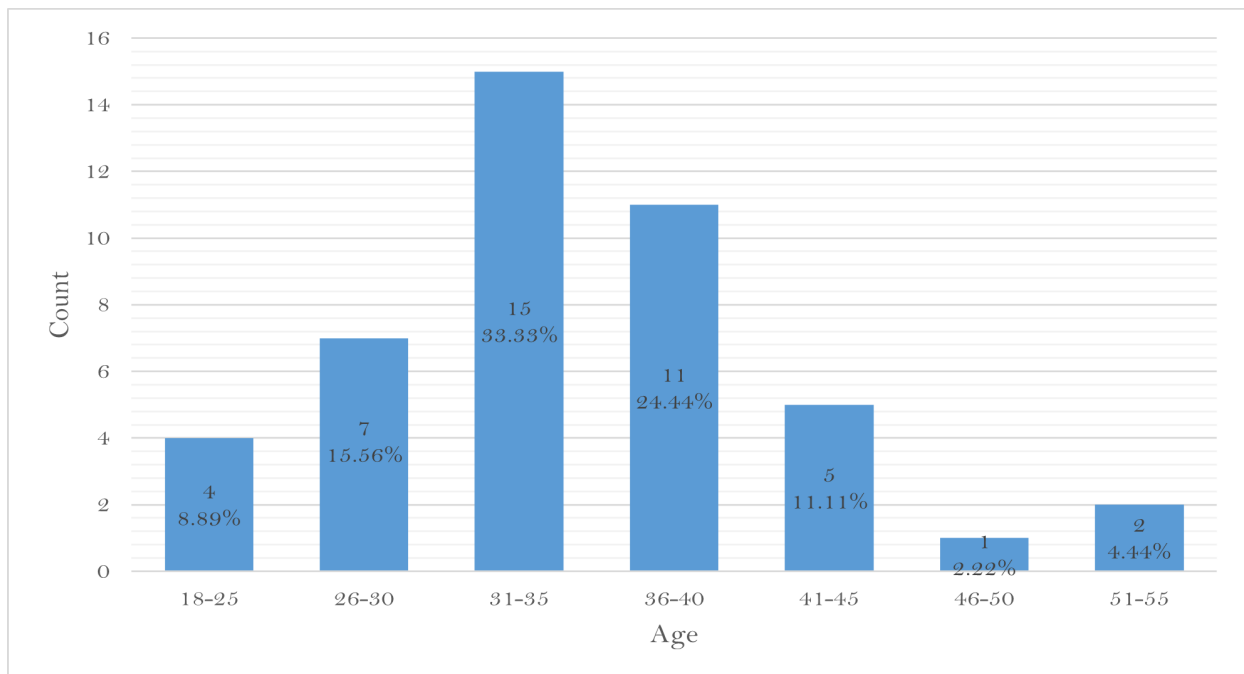
ity, psychosocial well-being and health-related quality of life in the living donor [16]. The results showed that the quality of life related to health in donors was comparable or even higher than the normal population, however, various factors such as donor age, postoperative complications can affect the quality of life related to donor health [17].

Improvements in donor survival have increased interest in measuring quality of life and anxiety scores [18], so anticipating problems such as those related to donors' mental health may be the basis for making the right decision to protect them. Despite extensive studies on the psychological effects of organ transplants on the quality of life and mental health of liver donors, few studies have examined the simultaneous level of quality of life and health anxiety of patients before and after surgery. The aim of this study was to compare health anxiety levels and quality of life of living donors before and after liver transplant surgery.

## MATERIALS AND METHODS

This descriptive-analytical cross-sectional study was performed on 45 patients calculating by Cochran's formula [19], between October 2019 and 2020 who donated liver (before organ donation), referred to the Shiraz Organ Transplant Hospital (Abu Ali Sina) and 45 donors (after organ donation), who in terms of age, sex, body mass index, income level and education, were homogeneous and met the inclusion criteria, were included in the study by convenience sampling method.

Inclusion criteria included having the approval of the hospital organ transplant commission (Transplantation surgeons, anesthesiologists, pulmonologists and cardiologists), addiction Not addicted to drug and alcohol, and not having psychiatric disorders approving by psychiatrist. Exclusion criteria included the patient's unwillingness to fill out a questionnaire or lack of access to it. For sample size at 95% confidence level and 80% test power, 45 people were considered.



**Figure 1:** Assessing the frequency of age (in number and percentage) of participants in the study.

To collect information from standard questionnaires of demographic information (including age, sex, marital status, underlying disease, addiction, weight and height (to assess body mass index), health anxiety (HAI-18) and quality of life (WHOQOL- BREF) was used as a comparison before and after (6 months to one year after surgery).

The Health Anxiety Inventory is an 18-item self-report questionnaire developed in 2002 by Salkowski & Warwick. Each item has four options, and each option includes a description of the person's health and illness components as a news item that the subject should choose one of the items that best describes them. Each item is scored from zero to 3. Select option a (0), option b (1), option c (2), option d (3), where a high score indicates higher health anxiety. The questionnaire has three main or general sections (questions 1-2-3-4-7-10-14), general health concerns (questions 5-6-8-9-11-12) and negative consequences (questions 13-15 -16-17-18). Test-open test validity was 0.90 and Cronbach's alpha coefficient was 0.70 to 0.82. The score range of this questionnaire is between zero and 54 [20].

WHOQOL-BREF questionnaire has 26 ques-

tions that measure the quality of a person's general and general life. This questionnaire was created in 1996 by a group of experts from the World Health Organization and by modifying the items of the 100-question form of this questionnaire. This questionnaire has 4 subscales and a general score. These subscales include: physical health (questions 3-4-10-51-16-17-18), mental health (questions 5-6-7-11-19-26), social relations (questions 20-21-22), the health of the environment (questions 8-9-12-13-14-23-24-25) and an overall score. Questions 1 and 2 are not included in the scoring and are intended only to assess the extent to which clients perceive their quality of life. The calculation of questions 3-4-26 is done in reverse. The reliability of the questionnaire was assessed using Cronbach's alpha and intra-cluster correlation, which was obtained as follows: physical health 0.77, mental health 0.77, health 0.75 and social relations 0.84 [21].

Sampling began after obtaining the necessary permits from the university ethics committee and receiving the ethics code number. The researcher referred to the transplant coordination office and prepared a list of patients waiting to receive a liver from the recipient. Then, in coordination with them by phone and ex-

**Table 1:** Determining and comparing the average total score of health anxiety and its dimensions, before and after surgery.

| Domains                 | Mean score (before surgery) | Mean score (After surgery) | Statistical test result |           |
|-------------------------|-----------------------------|----------------------------|-------------------------|-----------|
| Main area (general)     | 4.75 ±2.78                  | 7.44±3.19                  | P≤ 0.0001               | z= -5.75  |
| General health concerns | 1.55±1.71                   | 2.66±2.51                  | P≤ 0.0001               | z= -4.34  |
| Negative consequences   | 1.51±1.47                   | 2.23±2.23                  | P≤ 0.0001               | z= -4.45  |
| Overall score           | 7.82±4.23                   | 12.64±5.87                 | P≤ 0.0001               | z= -5.794 |

Data present as Mean ± SD and Statistical test was Wilcoxon

plaining the objectives of the study and receiving their consent by phone, due to the limitations of Corona, send the link of pre-designed electronic questionnaires to the research samples using WhatsApp or SMS. Eventually, the answers were returned to Google Drive for the researcher.

### Ethical Consideration

This research project with the ethical code IR.SUMS.MED.REC.1399.458 has been approved by Shiraz University of Medical Sciences. Written consent has been taken from all research samples, and they have been assured of confidential information.

### Statistical Analysis

Data were analyzed by descriptive and inferential statistics using SPSS version 20.

## RESULTS

Between 45 participants, 26 persons were in the age range of 30 to 40 years (Figure 1). 25 persons were women and 20 persons were men. 15 persons had a diploma, 11 persons had a bachelor's degree and the rest had other degrees. 37 persons were married, and the rest were single. Donors' body mass index average was 22.9 with a standard deviation of 3.76.

The mean score of health anxiety in general and in all areas increased significantly after surgery ( $P \leq 0.001$ ) (Table 1). In addition, there was no significant relationship between the difference of the mean score of health anxiety before and after surgery in general and in three areas with demographic variables ( $P > 0.05$ ).

Also, the quality of life score in general and in all areas decreased significantly ( $P \leq 0.001$ ) (Table 2). In addition, no significant relationship was seen between the mean score of quality of life before and after surgery in general and in four areas with demographic variables ( $P > 0.05$ ).

Pearson correlation test showed a significant relationship between the two variables of health anxiety and quality of life before and after surgery ( $P = 0.004$ ,  $r = -0.45$ ) (Table 3).

The following results were also obtained from statistical analysis of data. There was a significant relationship between the mean score of health anxiety and gender so that the mean score of health anxiety was higher in women than men ( $P = 0.01$ ,  $z = -2.55$ ). There was a significant relationship between the mean score of quality of life and the level of education so that the highest mean score of quality of life belonged to the uneducated group and then the master ( $P = 0.03$ ). Significant relationship between the mean score of quality of life and marital status so that the highest mean score of quality of life belonged to married people ( $P = 0.01$ ,  $z = -2.34$ ).

## DISCUSSION

The present study investigated the extent of changes in health anxiety and quality of life before and after liver donation from a living person. The results of this study show that after surgery, the liver donors' health-anxiety level increased and their quality of life decreased. There is also a significant relationship between the two variables.

**Table 2:** Determining and comparing the average total score of quality of life and its dimensions, before and after surgery.

| Domains                                   | Mean score (before surgery) | Mean score (After surgery) | Statistical test result |          |
|---|-----------------------------|----------------------------|-------------------------|----------|
| Physical health                           | 60.79±11.07                 | 57.61±12.22                | P= 0.002                | t= 3.31  |
| Mental health                             | 69.53±8.96                  | 65.46±10.97                | P≤ 0.0001               | z= -3.19 |
| Health of social relations                | 75.18±17.72                 | 67.77±18.76                | P≤ 0.0001               | z= -4.65 |
| The health of the surrounding environment | 71.94±15.46                 | 59.02±18.88                | P≤ 0.0001               | t= 9.73  |
| Overall score                             | 68.49±9.75                  | 61.31±12.78                | P≤ 0.0001               | t= 8.16  |

Data present as Mean ± SD and Statistical tests were Paired-Samples T Test or Wilcoxon.

In confirmation of the results of this study, a review study conducted on 13 articles in 2017 in China showed that in these patients, there was significant anxiety in liver donors at 3 months after donation. Also, compared to before donation, the physical performance of donors with a high level of pain decreased in 3 months after donation, which can negatively affect the quality of life of patients after transplantation [22].

Also the results of this study are consistent with the study of Shams *et al.* This study, which was performed on 335 outpatients in Karaj, showed that there is a significant negative correlation between quality of life and health anxiety [23].

In another study, the results indicate the effect of anxiety and depression on the quality of life of neurological patients (such as migraine, multiple sclerosis, and stroke). However, due to the inherently mental nature of quality of life studies, there are potential for psychological distortions that can be associated with anxiety symptoms; The impact of anxiety on quality of life may not be so dramatic. However, many articles have proven the connection between the two [24, 25].

In a study by Bozkurt *et al.*, conducted in Turkey in 2019, 60 volunteers donated kidneys to their relatives (30 in the case group, i.e. people who had organ donations, and 30 in the control group, i.e. people who didn't receive donations due to unfavorable conditions) were assessed before organ donation, which the level of health anxiety in the case group was sig-

nificantly lower than the control group. Also, people who donated organs to their spouses had more anxiety than those who donated organs to their other relatives [11]. According to this research, lower levels of health anxiety before organ donation can result in a pleasant life-giving feeling and save the lives of loved ones, which reduces the level of anxiety. Also, the higher health anxiety of the donor spouse to the spouse can be justified by the fact that the role of spouses in cohabitation and as a parent is very colorful, which certainly brings more anxiety to the donor spouse. Other supportive results were obtained in this regard, so that most liver and kidney donors were satisfied with this operation and did not feel remorse and returned to work very soon, even this statistic among donors the liver accounted for a higher percentage [26]. Other studies have shown similar results, including no remorse and no unpleasant feelings [27].

In general, living organ donors also experience health-related anxiety due to the fact that they will undergo major surgery and may have a longer recovery time. In addition, they may suffer from having an unattractive surgical scar or inability to perform daily physical activities or incompleteness [28]. In this regard, the results of a previous studies showed that the physical performance of donors is impaired for 2 years or more after donation. However, a meta-analysis by Wirken *et al.*, reported a return to baseline 3 to 12 months after donation [29].

Studies have shown that 35% of liver donors were exposed to mild to severe complications

**Table 3:** Relationship between the mean total score of the two questionnaires of health anxiety and quality of life before and after surgery.

| Mean overall score of health anxiety before and after surgery | Mean overall score of quality of life before and after surgery | P-value | Correlation coefficient (r) | Statistical test    |
|---|--|---------|-----------------------------|---------------------|
| 4.82±3.52   | -6.88±5.65   | 0.004   | -0.45                       | Pearson correlation |

Data present as Mean ± SD.

such as bile leakage, pleural effusion, surgical revision, wound infection, occipital pressure ulcers, pain and numbness of the incision area after surgery. In addition, poor appetite, numbness, itching, pain at the surgical site, drowsiness, and gastrointestinal discomfort have been reported in several studies, which may affect the physical performance and, consequently, the quality of life and psychological factors associated with it, in donors [28].

A study by Ogawa *et al.*, conducted in Japan in 2021, shows that there is a significant relationship between the quality of life of living donors and their level of education, which is consistent with our findings in this study [30].

Since high health anxiety leads to behavioral changes in patients, various treatment methods have been recommended to reduce it. Cognitive-behavioral therapy (CBT) has received the most empirical support to reduce health anxiety among the recommended interventions. There are also treatments that help reduce anxiety and have been suggested in various articles, including exercise, relaxation exercises, diet education, medication and medical interventions, educating patients during different stages of the disease, rehabilitation programs, and mass communication. Moreover, good communication with others, exercise, increase awareness, and knowledge about physical and mental health, reduce anxiety in patients [31].

Optimal surgical techniques for liver resection, such as laparoscopic-assisted living donor surgery, which has fewer incision-related complications, may improve the quality of life of living liver donors. Factors related to the quality of life of transplant patients should be

important to the treatment team because factors affecting the quality of life such as anxiety and depression play an important role in post-operative recovery of organ donors. However, studies confirmed that impaired social quality of life is a temporary consequence among liver donors.

In conclusion, the implementation of awareness programs before and after surgery and purposeful and long-term follow-up, as well as the use of empowerment programs to increase the level of health and quality of life of these people can be a comprehensive and appropriate approach for hospital officials in order to improve health and quality of life after organ donation.

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**CONFLICTS OF INTEREST:** None declared.

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