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Determining the Relationship Between Quality of Life and Perceived Stress in Liver Transplant Patients Receiving Immunosuppression Therapy

İmmunsupresyon Tedavisi Alan Karaciğer Nakli Hastalarında Yaşam Kalitesi İle Algılanan Stres Arasındaki İlişkinin Değerlendirilmesi

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ABSTRACT

Objective: This study was conducted to evaluate the relationship between quality of life and perceived stress in liver transplant patients receiving immunosuppression therapy.

Materials and Methods: This study is a cross-sectional study with the participation of 124 liver transplant patients hospitalized in the liver transplantation center of a university hospital.

Results: The results of the correlation analysis between the perceived stress scale (PSS) and the 36-item Short Form Health Survey (SF-36) subscales of the participants: A negative and weak significant relationship was found between physical function, physical role difficulty, emotional role difficulty, energy/vitality, social functioning, general health perception, and pain sub-dimensions (r=-0.209 and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension (r=-0.563). As a result of the regression analysis, the effect of the PSS total score average on SF-36 sub-dimensions was examined, and it was found that it had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% (R2=.317; B=-1.962; p<0.001).

Conclusions: Our study results revealed that patients' quality of life was low level in the early period after liver transplantation and that stress negatively affected their quality of life.

Keywords: Immunosuppressive therapy, liver transplantation, quality of life, stress

ÖZ

Amaç: Bu çalışma immunsupresyon tedavisi alan karaciğer nakli hastalarında yaşam kalitesi ile algılanan stres arasındaki ilişkinin değerlendirilmesi amacıyla yapılmıştır.

Materyal ve Metot: Bu çalışma, bir üniversite hastanesinin karaciğer nakli merkezinde yatan 124 karaciğer nakli hastasının katılımıyla gerçekleştirilmiş kesitsel bir çalışmadır.

Bulgular: Katılımcıların algılanan stres ölçeği (ASÖ) ile SF-36 Yaşam Kalitesi Ölçeği (SF-36) alt ölçekleri arasındaki korelasyon analizi sonucu; fiziksel fonksiyon, fiziksel rol güçlüğü, emosyonel rol güçlüğü, enerji/canlılık/vitalite, sosyal işlevsellik, genel sağlık algısı, ağrı alt boyutları arasında negatif yönde, zayıf düzeyde anlamlı bir ilişki bulunmuştur (r=-0,209 ile -0,480). ASÖ ile ruhsal sağlık alt boyutu arasında ise negatif yönde, orta düzeyde ve anlamlı bir ilişki saptanmıştır (r=-0,563). Yapılan regresyon analizi sonucunda ASÖ toplam puan ortalamasının SF-36 alt boyutlarına etkisi bakılmış ve %31,7 oranı ile en fazla ve negatif yönlü olarak ruhsal sağlık alt boyutu üzerine etkisinin olduğu bulunmuştur (R2=0,317; B= -0,962; p<0,001).

Sonuç: Çalışma sonucu, karaciğer transplantasyonu sonrası erken dönemde hastaların yaşam kalitesinin ciddi düzeyde düşük olduğunu ve stresin yaşam kalitesini olumsuz yönde etkilediğini ortaya koymuştur.

Anahtar Kelimeler: İmmünsüpresif tedavi, karaciğer nakli, yaşam kalitesi, stres

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INTRODUCTION

Liver transplantation (LT) is the only treatment option for patients with end-stage liver disease, acute liver failure and hepatocarcinoma and provides excellent survival and complete recovery of liver function.[1-4] Today, thanks to the improvement in pre-and post-operative care in organ transplantation, the improvement of transplantation techniques and organ preservation, better surgical techniques and the development of powerful immunosuppressive drugs, patients have extended life expectancy, better graft survival, and better functional condition.[4-6] On the other hand, both short- and long-term studies after transplantation have shown that compared to the rest of the population, patients with LT have a poor quality of life (QoL) and need to be improved.[7-10]

LT can cause complications such as acute and chronic rejection, malignancies, life-threatening infection, recurrent organ failure and death.[2,5,11,12] Therefore, following any organ transplant, it is essential to initiate treatments immediately to promote optimal graft and patient survival.[13] Against the graft taken into the body after transplantation, the immune system perceives it as a foreign substance and creates an immune response to destroy it by attacking it. This protective mechanism plays an active role in the rejection of transplanted organs.[14] Immunosuppressive therapy inhibits the innate immune system in the host, preventing an exaggerated and harmful reaction to graft taken into the body after transplantation and thus facilitates the host's organ acceptance.[15] However, immunosuppressive therapy has several complications and causes a number of psychosocial problems, such as stress and depression in these patients.[16] Complications of immunosuppressive therapy can be listed as an increased risk of infection because it suppresses the immune system[17,18] malignancies due to oncogenic effects,[1,19] an increase in morbidity and mortality rate,[20] lower QoL and toxicity affecting each organ.[21] LT patients are in the psychosocially risky group due to the nature of the end-stage liver disease, surgical operation and the side effects of immunosuppressive therapy received after surgical operation. Determination of the psychosocial problems of the patients and the planning and implementation of the necessary psychosocial interventions should be examined in terms of stress and QoL.[5]

In this study, the relationship between immunosuppressive therapy on QoL and perceived stress after LT was investigated. This study aims to evaluate the relationship between quality of life and perceived stress in liver transplant patients receiving immunosuppression therapy.

MATERIALS AND METHODS

Ethics Committee Approval: Prior to the study, the ethical approvals were obtained from Malatya Turgut Özal Medical Center Liver Transplant Institute and Malatya Turgut Özal University Ethics Committee (Date: 26/07/2022, decision no: 2022/127). After the participants were informed about the voluntary submission of answers in the research, the purpose of the research and how to use the results to be obtained from the research, their consent (informed consent principle) was obtained orally and in writing. The patients who participated in the study were explained that the information about them would not be disclosed to anyone else and the "confidentiality principle" was complied with. The research was conducted following the Principles of the Declaration of Helsinki.

In line with the aim of the research, the following research questions were sought to be answered:

RQ1. What is the level of quality of life in patients receiving immunosuppression therapy after liver transplantation?

RQ2. What is the perceived stress level in patients receiving immunosuppression therapy after liver transplantation?

RQ3. Is there a significant relationship between quality of life and perceived stress in patients receiving immunosuppression therapy after liver transplantation?

Research Design and Participants: This study is descriptive and cross-sectional. This research was carried out with patients with LT who were hospitalized at the Liver Transplantation Institute of a university hospital in Turkey after obtaining the permission of the ethics committee. The universe of the study consisted of 130 patients who underwent liver transplantation between August and December 2022 when the study was conducted. After the power analysis, 124 patients were included in the study with an effect size of 0.58, a margin of error of 0.05, a confidence level of 0.95, and a universe representation power of 0.95, and the study was conducted using the purposeful sampling method. The data were collected by face-to-face interview technique. The data collection form was read to the patients by the researcher, and the answers given were marked and recorded on the form.

Inclusion Criteria:

- Having a liver transplant,
- To volunteer to participate in the study,
- Be 18 years of age or older,
- No communication barriers.

Exclusion Criteria:

- Not having a liver transplant,
- Patients under 18 years of age,

- Speak no Turkish, have communication barriers,
- Not willing to participate in research.

Data Collection Tools: The study data were collected using a personal information form, the SF 36 quality of life scale (SF 36) and the perceived stress scale (PSS).

SF 36 Quality of Life Scale (SF 36): The scale, developed by Ware and Sherbourne in 1992, consists of 36 items.[22] It evaluates the QoL, especially in individuals with physical diseases, and provides a measurement of QoL in 8 dimensions: physical function (10 items), social function (2 items), physical role difficulties (4 items), emotional role difficulty (3 items), mental health (5 items), energy/vitality (4 items), pain (2 items) and general perception of health (5 items). Not a single total score is obtained from the scale. A total score is given separately for each subscale, and scores range from 0-100. "100 points" indicates good health, while "0 points" indicates poor health. Turkish adaptation of the scale, validity and reliability studies were conducted by Pınar et al.[23] In the reliability study of the scale, Cronbach's alpha coefficient was obtained between 0.73 and 0.76 for each subscale. In this study, the internal consistency of the SF-36 was re-examined; Cronbach's alpha coefficient was found to be 0.90.

The Perceived Stress Scale (PSS): The Perceived Stress Scale (PSS) was created by Cohen et al.[24] Adaptation of the PSS to Turkish, reliability and validity analysis was conducted by Eskin et al. in 2013.[25] It consists of a total of 14 items. Participants evaluate each item based on 5 Likert-type items ranging from "Never (0)" to "Very often (4)". In line with this information, at least 0 and at most 56 points can be obtained from the scale. A high score indicates that the person's perception of stress is high. The internal consistency coefficient of Turkish PSS-14 is 0.84, and the test-retest reliability coefficient is 0.87.[25] The Cronbach's alpha coefficient of PSS-14 in this study was 0.80.

Statistical Analysis: After the data were coded by the researchers, data analysis was performed by using IBM SPSS (Statistical Package for the Social Sciences) Statistics 25. Descriptive statistics were used in the analysis of the data. Mann Whitney U test was used for intergroup evaluations of nonparametric data, and the Kruskall Wallis test was used for evaluation between more than two groups. Student t-test was applied in parametric intergroup evaluations, and the one-way ANOVA test was applied in more than two group evaluations. Pearson correlation test was performed to determine the direction of the relationship between perceived stress level and QoL. Linear regression analyses were used to evaluate the effect of perceived stress levels on QoL subdimensions. In this direction, a model was established, and the dependent variables were the subdimensions of QoL, while the independent variable, perceived stress level, was determined as the total average score. In the evaluation of the obtained results, a 95% confidence interval and p-value less than 0.05 were taken into account.

RESULTS

73.4% of the participants were male, 87.1% were married, 40.3% were primary school graduates, and 59.7% were not working. 62.1% of the participants had a different chronic disease, 12.9% had Diabetes (DM), and 12.6% had Hypertension (HT). 65.3% of them had 33 days or more after transplantation, and 51.6% of them had previously undergone surgery. Regarding the post-transplantation treatment of the participants, 63.7% of them used calcineurin inhibitors, 61.3% had side effects from the drugs used, and 21.8% of these side effects were determined to be infections (Table 1).

Table 1. Participants' demographic and disease characteristics (n = 124).

Demographic and disease characteristics		n (%)
Age	18-47 years	37 (29.8)
	48- 57 years	43 (34.7)
	58- 85 years	44 (35.5)
	Female	33 (26.6)
Gender	Male	91 (73.4)
	Married	108 (87.1)
Marital status	Single	16 (12.9)
	Literate	16 (13.0)
Education	Primary school graduate	50 (40.3)
	Middle school	19 (15.3)
	High school graduate	21 (16.9)
	University and above	18 (14.5)
Employment	Yes	47 (37.9)
	No	77 (59.7)
Chronic diseases	Yes	47 (37.9)
	No	77 (62.1)

Table 1. Continue.

Existing chronic diseases	DM	16 (12.9)
	HT	16 (12.9)
	Other	7 (5.6)
	DM+HT	11 (8.9)
Time after transplantation	1-10 day	20 (16.1)
	11-21day	16 (12.9)
	22-32 day	7 (5.6)
	33 days or more	81 (65.3)
Previous surgical	Yes	64 (51.6)
	No	60 (48.4)
Immunosuppressive drug used	Calcineurin inhibitör, Calcineurin inh+ steroid ted	79 (63.7)
Side effects of drugs	No	48 (38.7)
	GIS	17 (13.7)
	Infection	27 (21.8)
	Other (vision, sleep, renal problems)	32 (25.8)

When the SF 36 QoL scale and PSS scale score averages of the participants were examined, the SF 36 QoL scale, physical function sub-dimension score average 54.52±32.67, physical role difficulty sub-dimension score average 3.03±16.12, emotional role difficulty sub-dimension score average 1.88±12.96, energy/vitality sub-dimension score average 32.62±18.37, mental health sub-dimension score average 46.64±13.90, social functioning sub-dimension score average was 49.89±17.92, pain sub-dimension score average was 42.43±31.27, general health perception sub-dimension score average was 52.54±14.75 and PSS scale total score average was 27.90±4.42 (Table 2).

The results of the correlation analysis between the PSS scale and the SF-36 scale of the participants are shown in Table 3. A negative, poorly significant relationship was found between the PSS and SF-36 sub-dimensions of physical function, physical role difficulty, emotional role difficulty, energy/vitality, social functioning, general health perception, and pain sub-dimensions of the participants (r=-0.209 and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension (r=-0.563) (Table 3).

As a result of the regression analysis, the average PSS total score had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% (R2=.317; B=-1.962; p<0.001); it was also found to have a negative effect on the energy sub-dimension with a rate of 23% (R2=.230; B=-1.792; p<0.001) (Table 4).

Table 2. Distribution of patients' SF-36 QoL's sub-dimension scores and PSS scores (n=124).

Scores	X±SD	Min-Max
Physical Function	54.52±32.67	0.00-100.00
Physical Role Difficulties	3.03±16.12	0.00-100.00
Emotional Role Difficulty	1.88±12.96	0.00-100.00
Energy/Vitality	32.62±18.37	0.00-90.00
Mental Health	46.64±13.90	12.00-80.00
Social Function	49.89±17.92	0.00-100.00
Pain	42.43±31.27	0.00-100.00
General Perception of Health	52.54±14.75	15.00-85.00
PSS total	27.90±4.42	10.00-42.00

PSS: The perceived stress scale; SF 36: Quality of Life Scale (SF 36); X: Mean; SD: Standard Deviation; Min: Minimum; Max: Maximum.

Table 3. Correlation analysis between patients' SF-36 QoL's sub-dimensions and PSS (n=124).

		Physical Role Difficulties	Emotional Role Difficulty	Energy/ Vitality	Mental Health	Social Function	General Perception of Health	Physical Function	Pain
PSS total	r	-0.209*	-0.247**	-0.480**	-0.563**	-0.333**	-0.338**	-0.235**	-0.317**
	p	0.020	0.006	0.001	0.001	0.001	0.001	0.008	0.001

r: Pearson correlation coefficient; PSS: The perceived stress scale; SF 36: Quality of Life Scale (SF 36).

Table 4. Regression analysis between SF-36 QoL's sub-dimensions and PSS (n=124).

Scales	PSS total						
SF-36	**B**	**SD**	**ß**	**R^2**	**t**	**F**	**p**
Physical Role Difficulties*	-0.763	0.322	-0.209	0.044	-2.365	5.593	0.020
Emotional Role Difficulty*	-0.724	0.257	-0.247	0.061	-2.818	7.940	0.006
Energy/Vitality*	-1.792	0.330	-0.480	0.230	-6.045	36.544	0.000
Mental Health*	-1.969	0.235	-0.563	0.317	-7.530	56.698	0.000
Social Function*	-1.349	0.346	-0.333	0.111	-3.901	15.220	0.000
General Perception of Health*	-1.126	0.284	-0.338	0.114	-3.965	15.721	0.000
Physical Function*	-1.738	0.650	-0.235	0.058	-2.676	7.158	0.008
Pain*	-2.236	0.607	-0.317	0.100	-3.686	13.585	0.000

*: Dependent variables; Independent variable: PSS total; SD: Standard Deviation.

DISCUSSION AND CONCLUSION

Organ transplantation, although challenging and complex, has been set as the gold standard for end-stage organ failure.[26] In 2020, there were a total of about 129,681 solid organ transplants worldwide, of which 32,586 were liver transplants.[27] As the number of people on the active transplant list continues to grow, the number of solid organ transplants is expected to increase all over the world.[2] QoL after LT is accepted as an increasingly important outcome parameter.[4] In addition to the physical condition of the patients, different psychological parameters (such as depression, stress, sexual function) and sociodemographic elements (occupational status, gender, marital status) seem to affect the QoL.[10] The only purpose of health professionals after transplantation surgery should not only be to try to ensure the survival of patients but also to improve the QoL.[4] In this study, the SF 36 QoL scale physical function sub-dimension score average 54.52±32.67 (medium), physical role difficulty sub-dimension score average 3.03±16.12 (low), emotional role difficulty sub-dimension score average 1.88±12.96 (low), energy/vitality sub-dimension score average 32.62±18.37 (low), mental health sub-dimension score average 46.64±13.90 (medium), social functioning sub-dimension score average was 49.89±17.92 (medium), pain sub-dimension score average was 42.43±31.27 (low), general health perception sub-dimension score average was 52.54±14.75 (medium). Studies comparing the QoL of patients in the period before and after LT have shown that the QoL has increased in the early post-transplantation period compared to before transplantation.[28-29] Some studies in the literature report that QoL is poor early after transplantation but tends to increase rapidly over the next two years and then remains stable after reaching almost normal values. On the other hand, some studies determine that the QoL of transplantation patients is low compared to the rest of the population.[7] It appears that the postoperative periods of the patients included in this study are different. Although LT allows patients to recover their synthetic and metabolic functions quickly, the return of physical capacity and performance to normal levels is delayed and often lacking. In our study, especially the physical role difficulty and the significantly low energy subscale support this information. Apart from this, another finding that draws attention is that the emotional role difficulty sub-dimension is low at a serious level. It is thought that many complex burdens brought by both the transplantation surgery and the treatment protocol after the procedure are effective in the emotional strain of the patients. Mental health and social functioning sub-dimension score averages are relatively higher than other sub-dimensions. Here, transplantation surgery is effective in ending the burden of chronic liver disease and the long-lasting search for donors. Our study result reveals that the QoL of patients after LT is low level and needs to be improved.

Established evidence suggests that stress after LT is detrimental to the well-being of recipients in the long term, and depressive symptoms after LT are associated with an increased risk of long-term death. In this study, when the relationship between the scale score averages was examined, a negative and weakly significant relationship was found between the PSS scale and the SF-36 scale sub-dimensions physical function ($p=0.008$), physical role difficulty ($p=0.020$), emotional role difficulty ($p=0.006$), energy/vitality ($p<0.001$), social functioning ($p<0.001$), general health perception ($p<0.001$), pain sub-dimensions ($p<0.001$) ($r=-0.209$ and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension ($p<0.001$) ($r=-0.563$). As a result of the regression analysis, the average PSS total score had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% ($R2=0.317$; $B=-1.962$; $p<0.001$), it was also found to have a negative effect on the energy sub-dimension with a rate of 23% ($R2=0.230$; $B=-1.792$; $p<0.001$). Our results were consistent with previous studies.[4,30] Chen et al. reported that stress affected all sub-dimensions of the SF-36 QoL scale, physical ($r=-0.397$; $p<0.001$) and mental ($r=-0.401$; $p<0.001$) in a study in which they examined the health-related QoL of 256 recipi-

ents after LT.[30] Patients experience stresses due to many reasons such as temporary and compulsory isolation, a decrease in social activities, the necessity of using many and regular medications and side effects of these drugs, changing the environment to be close to the transplant centers and decreasing support from the family and social environment, lifestyle changes such as work, school life and family dynamics, and immunosuppressive therapy side effects, especially in the first 3 months after transplantation. Our study showed that this situation adversely affects the QoL (especially mental health and energy sub-dimension) of the patients.

In conclusion, our study results revealed that the QoL of patients in the early period after LT was low level and that stress adversely affected the quality of life. The perceived level of QoL of patients after transplantation is usually related to their ability to regain their independence in activities of daily living, different psychological parameters (such as depression, stress, sexual function) and sociodemographic elements (occupational status, gender, marital status). Disappointment with the results of surgery after transplantation, the possibility of graft rejection, chronic or acute postoperative complications, immunosuppressive therapy side effects and needing care can lead to stress in patients. Health professionals should screen patients and provide psychosocial support for stress, the impact of which we have proven on patients' QoL. Healthcare professionals should especially inform patients about the immunosuppressive treatment protocol, its side effects and the methods to be used to cope with these side effects. In the literature, the psychological status of transplantation patients has been revealed, but mental treatment methods (cognitive therapy, motivational interviewing, etc.) have not been studied, and their effectiveness has not been revealed. Longitudinal and experimental studies are needed to combat the psychosocial problems of transcription patients. The results obtained from this research are limited to liver patients who have undergone transplantation in a single center within a certain period. Another limitation of the study is that the findings are based on cross-sectional data, which is less informative than that of a longitudinal study. Another limitation is that the data were obtained shortly after the surgery, and the postoperative processes of the patients included in the study were different.

Ethics Committee Approval: Prior to the study, the ethical approvals were obtained from Malatya Turgut Özal Medical Center Liver Transplant Institute and Malatya Turgut Özal University Ethics Committee (Date: 26/07/2022, decision no: 2022/127). The patients were informed by the researchers and the volunteer information form was presented to the patients together with the questionnaire in line with the Helsinki Declaration.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – KK; Supervision – KK; Materials – KK; Data collection and/or processing – KK, HÇ; Analysis and/or interpretation – KK, HÇ; Written – KK.

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REFERENCES

1. Becchetti C, Dirchwolf M, Banz V, Dufour JF. Medical management of metabolic and cardiovascular complications after liver transplantation. World J Gastroenterol. 2020;26(18):2138–54. doi:10.3748/wjg.v26.i18.2138
2. Cajanding R. Immunosuppression following organ transplantation. Part 1: Mechanisms and immunosuppressive agents. Br J Nurs. 2018;27 (16):920–7. doi:10.12968/bjon.2018.27.16.920
3. Girgenti R, Tropea A, Buttafarro MA, Ragusa R, Ammirata M. Quality of life in liver transplant recipients: A retrospective study. Int J Environ Res Public Health. 2020;17(11):1–10.
4. Onghena L, Develtere W, Poppe C, et al. Quality of life after liver transplantation: State of the art. World J Hepatol. 2016;8(18):749–56. doi:10.3390/ijerph17113809
5. Demir B, Bulbuloglu S. The effect of immunosuppression therapy on activities of daily living and comfort level after liver transplantation. Transpl Immunol. 2021;69:101468. doi:10.1016/ j.trim.2021.101468
6. Varo Pérez E, Castroagudín JF. The future of liver transplantation. Transplant Proc. 2010;42 (2):613–6. doi: 10.1016/j.transproceed.2010.02.003
7. Burra P, Ferrarese A, Feltrin G. Quality of life and adherence in liver transplant recipients. Minerva Gastroenterol Dietol. 2018 Jun 1;64(2):180 –6. doi:10.23736/S1121-421X.17.02459-X
8. Duffy JP, Kao K, Ko CY, Farmer DG, Mcdiarmid S V, Hong JC, et al. Long-Term Patient Outcome and Quality of Life After Liver. 2010;252(4):652-61.doi:10.1097/SLA.0b013e3181f5f23a
9. Ohnemus D, Neighbors K, Rychlik K, et al. Health-related quality of life and cognitive functioning in pediatric liver transplant recipients. Liver Transpl. 2020;26(1):45-56. doi:10.1002/lt.25634
10. Burra P, Ferrarese A. Health-related quality of life in liver transplantation: another step forward. Transpl Int. 2019;32(8):792–3. doi:10.1111/tri.13435
11. Åberg F. Quality of life after liver transplantation. Best Pract Res Clin Gastroenterol. 2020;46– 47:101684. doi:10.1016/j.bpg.2020.101684
12. Sen A, Callisen H, Libricz S, Patel B. Complications of Solid Organ Transplantation: Cardiovascular, Neurologic, Renal, and Gastrointestinal.

Crit Care Clin. 2019;35(1):169–86. doi:10.1016/j.ccc.2018.08.011
13. Hampson FA, Freeman SJ, Ertner J, Drage M, Butler A, Watson CJ, et al. Pancreatic transplantation: surgical technique, normal radiological appearances and complications. Insights Imaging. 2010;1(5–6):339. doi:10.1007/s13244-010-0046-3
14. Bulbuloglu S, Kapikiran G. The effect of immunosuppressive therapy after liver transplantation on activities of daily living and fear of death during the COVID-19 pandemic. Transpl Immunol. 2021;69:101470. doi:10.1016/j.trim.2021.101470
15. Dougan C, Ormerod I. A neurologist's approach to the immunosuppressed patient. J Neurol Neurosurg Psychiatry. 2004;75(Suppl 1):i43. doi:10.1136/jnnp.2003.035071
16. Kacmaz N, Barlas GU. The Psychsocial Status Of Liver Transplant Patient And Their Relatives On The Effect Of Quality Of Life. J Psychiatr Nurs. 2014;5(1):1–8. doi:10.5505/phd.2014.98598
17. Kinnunen S, Karhapää P, Juutilainen A, Finne P, Helanterä I. Article Secular Trends in Infection-Related Mortality after Kidney Transplantation. Clin J Am Soc Nephrol. 2018;13:755–62. doi:10.2215/CJN.11511017
18. Romero FA, Razonable RR. Infections in liver transplant recipients. World J Hepatol. 2011;3(4):83–92. doi:10.4254/wjh.v3.i4.83
19. Geissler EK. Post-transplantation malignancies: here today, gone tomorrow? Nat Rev Clin Oncol. 2015;12(12):705–17. doi:10.1038/nrclinonc.2015.186
20. Duncan S, Annunziato RA, Dunphy C, LaPointe Rudow D, Shneider BL, Shemesh E. A systematic review of immunosuppressant adherence interventions in transplant recipients: Decoding the streetlight effect. Pediatr Transplant. 2018. doi:10.1111/petr.13086
21. Moreno R, Berenguer M. Post-liver transplantation medical complications. Ann Hepatol. 2006;5(2):77–85.
22. Ware JE, Sherbourne CD. The MOS 36 item short form health survey (SF 36). Med Care. 1992;30:473–483.
23. Pınar R. Sağlık araştırmalarında yeni bir kavram: yaşam kalitesi - bir yaşam kalitesi ölçeğinin kronik hastalarda geçerlik ve güvenirliğinin incelenmesi. Florence Nightingale Hemşirelik Dergisi. 1995;9:85–95.
24. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385–396.
25. Eskin M; Harlak H; Demirkıran F; Dereboy Ç. Algılanan stres ölçeğinin türkçeye uyarlanması: güvenirlik ve geçerlik analizi. Yeni Symp. 2013;51(3):132–140.
26. Wilhelm MJ. Long-term outcome following heart transplantation: Current perspective. J Thorac Dis. 2015;7(3):549–51. doi:10.3978/j.issn.2072-1439.2015.01.46
27. Global report on organ donation and transplantation 2020. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.transplant-observatory.org/wp-content/uploads/2022/07/2020-Global-report-para-web.pdf. Accessed December 3, 2022.
28. Santos R, Miyazaki MCOS, Domingos NAM, Valério NI, Silva RF, Silva RCMA. Patients undergoing liver transplantation: psychosocial characteristics, depressive symptoms, and quality of life. Transplant Proc. 2008;40(3):802–4. doi:10.1016/j.transproceed.2008.02.059
29. Mclean KA, Drake TM, Sgr A, Camilleri-Brennan J, Knight SR, Ots R, et al. The effect of liver transplantation on patient-centred outcomes: a propensity-score matched analysis. Transpl Int. 2019;32(8):808-819. doi:10.1111/tri.13416
30. Chen PX, Yan LN, Wang WT. Health-related quality of life of 256 recipients after liver transplantation. World J Gastroenterol. 2012;18(36):5114–21. doi:10.3748/wjg.v18.i36.5114