

Importance of depression and active coping in liver transplant candidates' quality of life

Objective—To investigate the importance of psychiatric and psychological factors such as depression, anxiety, personality traits, and coping strategies in liver transplant candidates' quality of life.

Methods—A total of 131 consecutive liver transplant candidates attending outpatient clinics at a liver transplantation central unit were assessed by means of the Medical Outcomes Study Short Form quality-of-life questionnaire, psychiatric diagnostic criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*, a personality inventory (NEO Five-Factor Inventory), the Hospital Anxiety and Depression Scale, and the Brief COPE scale.

Results and Conclusions—Both physical and mental components of quality of life are far more correlated with depression and active coping strategy than with clinical and sociodemographic factors. Neuroticism was also strongly correlated with the mental component of quality of life, and employment was correlated with the physical component of quality of life. (*Progress in Transplantation*. 2009;19:85-89)

**Diogo Telles-Correia, MD,
A. Barbosa, MD, PhD,
I. Mega, E. Monteiro, MD,
PhD, FRCP**

Curry Cabral Hospital (DT-C, IM, EM),
Faculty of Medicine, University of Lisbon
(DT-C, AB, EM)

Corresponding author: Dr. Diogo Telles-Correia, Rua Sacadura Cabral n° 55, 4° B, 1495 Cruz Quebrada-Dafundo, Portugal (e-mail: tellesdiogo@gmail.com)

To purchase electronic or print reprints, contact:

The InnoVision Group
101 Columbia, Aliso Viejo, CA 92656
Phone (800) 809-2273 (ext 532) or
(949) 448-7370 (ext 532)
Fax (949) 362-2049
E-mail reprints@aacn.org

Most patients listed for a liver transplant have an end-stage liver disease associated with a marked reduction in their quality of life (QOL).^{1,3} Among different kinds of transplant candidates, liver transplant candidates could be the ones with the lowest QOL.⁴

Poor psychological adjustment to the uncertainty of the waiting period can produce high rates of anxiety and depression.⁵⁻⁷ Using suitable coping strategies could be very important to patients' psychological adjustment to this period.⁸

It has been demonstrated repeatedly that QOL can be improved after transplantation.^{5,9,10} Psychiatric and psychological correlates of QOL (eg, depression, anxiety, personality traits, and coping strategies) have also been explored in the period after transplantation.^{11,12}

Anxiety and depression,¹³ coping strategies,¹⁴ and personality traits¹⁵ in transplant candidates are also important factors in the period before transplantation. No data were found about the influence of these factors on liver transplant candidates' QOL.

Although some studies³ have shown reduced QOL in transplant candidates, correlates and determinants of QOL in these patients have not yet been explored. Because some patients remain on the waiting list for a long time, it is important to study the correlates of liver transplant candidates' QOL, so that specific interventions can be designed to improve QOL in these patients. In this article, we aim to describe the relationship between psychological factors (eg, depression, anxiety, personality traits, and coping strategies) and liver transplant candidates' QOL.

Methods Participants

We studied a sample of 131 transplant candidates attending the weekly outpatient clinics of 2 hepatologists at Curry Cabral Hospital's Liver Transplantation Center in Lisbon between March 1, 2006, and December 1, 2007. Participants, all of whom were 18 years old or older and read and spoke Portuguese, agreed to

participate in our study and signed the informed consent form. The institutional review committee at Curry Cabral Hospital approved the study protocol.

QOL Evaluation

We used the Portuguese-validated version of the Short Form (SF-36), a self-rating questionnaire developed by the Medical Outcome Trust,^{16,17} to investigate certain primary aspects of QOL. The SF-36 has been widely used under a range of different medical conditions and has adequate reliability and validity. The first 4 subscales refer to physical aspects, and the last 4 scales refer to mental aspects: physical functioning, physical role limitation, bodily pain, general health, vitality, social functioning, emotional role limitation, and emotional well-being. Physical aspects mostly refer to physical ability to perform normal daily activities. The mental dimension mostly refers to social aspects of life, the degree to which illness interferes with emotional well-being, and social roles. Total values were computed for physical and mental components of health-related QOL by calculating the mean of the 8 weighted subscales by using the coefficients generated by Hays et al¹⁸ in the Medical Outcomes Study.

Psychiatric and Psychological Evaluation

Psychiatric current diagnosis and psychiatric lifetime disorders were assessed by 2 experienced psychiatrists by using the classification from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*¹⁹ and the Mini International Neuropsychiatric Interview.²⁰

Levels of anxiety and depression were assessed by means of the Hospital Anxiety and Depression Scale,²¹ which measures anxiety and depression in physically ill patients, in particular. A total score of 11 or greater on each scale is regarded as indicative of a clinical diagnosis of anxiety or depression; a total score in the range of 8 to 10 is borderline; and values of 8 or less are interpreted as clinically insignificant or normal.²¹ This instrument was validated for use in the Portuguese population by Pais-Ribeiro et al.²²

Personality traits were assessed by means of the NEO Five-Factor Inventory (NEO-FFI). The NEO-FFI is a shortened version of the revised NEO Personality Inventory,²³ validated for use in Portuguese by Bertoquini and Pais-Ribeiro,²⁴ which was designed to give quick, reliable, and valid measures of the 5 domains of adult personality (openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism). The 60 items are rated on a 5-point scale from 1 (“I completely disagree”) to 5 (“I completely agree”).

Coping strategies were assessed by means of the Brief COPE. This instrument is a shortened version of COPE,²⁵ validated for use in the Portuguese population

by Pais-Ribeiro and Rodrigues,²⁶ designed to give quick, reliable, and valid measures of the 14 domains of coping strategies: self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. Responses are rated on a 4-point scale ranging from 1 (“I haven’t been doing this at all”) to 4 (“I’ve been doing this a lot”).

Medical Evaluation

Paramyloidosis was diagnosed by a neurologist and confirmed by a hepatologist. Chronic liver diseases were diagnosed by a hepatologist.

Statistical Methods

Statistical analyses were performed with the SPSS 13.0 for Windows software package. Descriptive data were presented in absolute frequencies, percentages, mean values, standard deviations, and modes. QOL correlates were assessed by means of Pearson correlation test and multiple linear regression.

Results

Demographic and Medical Data

Males comprised 69.8% of the participants, compared with 30.2% for females. We found that 50.6% of the patients were less than 50 years old (mean age, 48.5 years), 34.3% lived alone (single, divorced, or widowed), 87.1% had less than a high school education, and 68% were unemployed.

Regarding medical diagnosis, 29% of the patients (n=38) had familial amyloid polyneuropathy, and the remaining patients had chronic liver disease. Among the patients with chronic liver diseases, 34 had mixed diagnoses (2 had liver cancer plus alcoholic liver disease, 15 had alcoholic liver disease plus hepatitis C, 10 had hepatitis C plus liver cancer, 3 had liver cancer plus hepatitis C plus alcoholic liver disease, 1 had liver cancer plus hepatitis B, 1 had alcoholic liver disease plus hepatitis B, 1 had hemochromatosis plus liver cancer, and 1 had hemochromatosis plus alcoholic liver disease plus hepatitis C), 5 had rare liver diseases (3 had primary biliary cirrhosis, 1 had familial progressive cholestasis, and 1 had sclerosing cholangitis), 4 had liver disease of unknown cause, and 1 had an iatrogenic case of liver disease (Table 1).

Psychiatric and Psychological Description

Among the 131 patients, only 20 had not had any lifetime psychiatric disorder, 36 had had a major depressive disorder, 23 an anxiety disorders, 42 had problems with alcohol abuse or dependence, 23 had mixed alcohol and other substance abuse or dependence, 4 had other substance abuse or dependence, and 15 had adjustment disorders (comorbid diseases present).

Table 1 Characteristics of sample (N = 131)

Medical diagnosis	No. of patients	%
Familial amyloid polyneuropathy	38	29
Chronic liver diseases		
Alcoholic liver disease	35	27
Hepatitis C	12	9
Liver cancer	2	2
Mixed diagnoses	34	26
Rare liver diseases	5	4
Other	5	4
Age, mean (SD), y	39.5 (15)	
Months on waiting list, mean (SD)	12.5 (6)	

Fifty-five patients did not have any current psychiatric diagnosis, 34 had a major depressive disorder, 22 had an anxiety disorder, 2 had problems with alcohol abuse or dependence, 2 had other substance abuse or dependence, and 15 had adjustment disorders (comorbid diseases present).

Psychiatric Correlates of QOL Components

The QOL subscale that had the higher score was social functioning (68.11), and the subscale with the lowest score was general health (41.08). We used the 2 components of QOL generated by Hays et al¹⁸ (mental health and physical-related QOL) to find the psychiatric correlates of QOL (Table 2).

Correlates of Mental Component of QOL.

Spearman correlation coefficients between the SF-36 mental component score and psychiatric variables (anxiety and depression, from the Hospital and Anxiety Depression Scale; coping mechanisms, from the Brief COPE; and personality dimensions, from the NEO-FFI) were calculated.

The SF-36 mental component correlated (at a significant level) with anxiety ($r = -0.46, P < .01$) depression ($r = -0.62, P < .01$), active coping ($r = 0.26, P < .01$), denial ($r = -0.32, P < .01$), behavior disengagement ($r = -0.24, P < .01$), venting ($r = -0.28, P < .01$), self-blame ($r = -0.21, P < .01$), neuroticism ($r = -0.54, P < .01$), extroversion ($r = 0.22, P < .01$), and conscientiousness ($r = 0.23, P < .01$).

A multiple regression model was estimated by using the SF-36 mental component as the dependent variable and anxiety, depression, active coping, denial, behavior disengagement, self-blame, neuroticism, extroversion, conscientiousness, and some demographic variables (age, sex, education level [more/less than 12 years], employment [with/without job]) and clinical variables (with familial amyloid polyneuropathy/with chronic liver disease) as independent variables. We included the sociodemographic variables

Table 2 Quality-of-life subscales

Subscale	Score		
	Mean	SD	Díaz-Domínguez et al ⁴
Physical functioning	58.49	29.12	28.50
Role limitations, physical	41.79	43.63	6.25
Bodily pain	63.96	28.61	59.50
General health	41.08	14.91	26.00
Vitality	43.77	21.95	22.05
Social functioning	68.11	25.13	36.58
Role limitations, emotional	46.19	44.84	24.50
Emotional well-being	56.75	18.49	47.02
Mental	51.37	18.73	
Physical	49.79	19.62	

supported by other studies in transplant recipients.¹² Regarding clinical factors, we found 2 major groups in our samples: patients with chronic liver disease and patients with familial amyloid polyneuropathy. Familial amyloid polyneuropathy is an autosomal dominant multisystemic fatal disorder. The most consensual way to treat familial amyloid polyneuropathy is liver transplantation in the initial stage of the disease. Patients with familial amyloid polyneuropathy are almost asymptomatic when they receive a transplant, unlike other liver transplant candidates (who generally have a disabling chronic liver disease).²⁷ Therefore, we decided to include the following variable in our regression analysis: familial amyloid polyneuropathy/chronic liver disease.

A backward elimination method was first applied, leading to the elimination of all the independent variables except depression, active coping, neuroticism, and age. By means of this multiple linear regression model, we found that the mental component of QOL correlated significantly with depression, active coping, neuroticism, and age (Table 3). This model explained 50.8% of the variance of QOL's mental component. The correlations between the selected independent variables, as well as the tolerance and variance inflation factor statistics, indicate that the model has no multicollinearity problems.

Correlates of Physical Component of QOL.

Spearman correlation coefficients between SF-36 physical health dimension score and psychiatric variables (anxiety and depression, from the Hospital and Anxiety Depression Scale; coping mechanisms, from the Brief COPE; and personality dimensions, from the NEO-FFI) were calculated.

We found that the SF-36 physical health dimension correlated (at a significant level) with anxiety ($r = -0.31, P < .01$) depression ($r = -0.52, P < .01$), active coping ($r = 0.25, P < .01$), denial ($r = -0.25, P < .01$),

Table 3 Correlates of the mental component of quality of life^a

Psychiatric/psychosocial variables	Beta	t	P
Depression	-0.38	-3.95 ^b	.000
Active coping	0.27	3.26 ^b	.002
Neuroticism	-0.26	-2.78 ^b	.007
Age	-0.17	-1.99 ^c	.049

^a $R = 0.71$, $R^2 = 0.51$, adjusted $R^2 = 0.48$.

^b Linear regression, $P < .01$.

^c Linear regression, $P < .05$.

behavior disengagement ($r = -0.22$, $P < .05$), neuroticism ($r = 0.39$, $P < .01$), and conscientiousness ($r = 0.20$, $P < .05$).

A multiple regression model was estimated by using the SF-36 physical health dimension as the dependent variable and anxiety, depression, active coping, denial, behavior disengagement, neuroticism, conscientiousness, and the sociodemographic and clinical variables used for the mental component of QOL as independent variables.

A backward elimination method was first applied, leading to the elimination of all the independent variables except depression, active coping, employment, and sex. By means of this multiple linear regression model, we found that the physical component correlated significantly with depression, active coping, employment, and sex (Table 4). This model explained 43.6% of the variance of the physical component of QOL. The correlations between the selected independent variables, as well as the tolerance and variance inflation factor statistics, indicate that the model has no multicollinearity problems.

Discussion

Our results confirm a high prevalence of mental disorders (mostly anxiety and depression disorders) in patients waiting for liver transplantation, as supported by several previous studies.^{5,28} As for QOL, assessed with the SF-36 scale, we found that the QOL subscale with the highest score was social functioning and the subscale with the lowest score was general health. This result could mean that although patients have a poor general health (supported by other studies³), they manage to function socially.

We compared QOL scores from this study with scores from another recent study⁴ (Table 2). Scores on all of the subscales are higher in our study, possibly because of the presence of patients with familial amyloid polyneuropathy in our sample (almost without symptoms).

We tested the extent to which psychiatric issues and coping strategies show a relation to self-reported QOL (mental and physical components). As we expected, psychiatric factors such as depression and

Table 4 Correlates of physical component of quality of life^a

Psychiatric/psychosocial variables	Beta	t	P
Depression	-0.41	-4.69 ^b	.000
Active coping	0.31	3.57 ^b	.001
Employment	-0.28	-3.15 ^b	.002
Sex	-0.20	-2.22 ^c	.029

^a $R = 0.66$, $R^2 = 0.51$, adjusted $R^2 = 0.41$.

^b Linear regression, $P < .01$.

^c Linear regression, $P < .05$.

personality traits (neuroticism) were very relevant in the mental component of QOL. Nevertheless, just as important as these factors was the active coping strategy, showing that coping strategies can be important in the maintenance of mental health before transplantation, as supported by other authors.⁸ Depression and neuroticism, together with active coping and age (lower QOL in older patients), can explain 50.8% of this component.

Surprisingly, the most important factor that correlated with the physical component of QOL was depression, followed by active coping. Depression and active coping along with employment (lower QOL in unemployed patients) and sex (lower QOL in women) explained 43.6% of the variance of the physical component of QOL. The correlation of physical QOL with employment is supported by other studies.¹¹ Contrary to our expectations, no decisive role was played by clinical factors (diagnosis).

Interestingly, for both physical and mental QOL, depression and active coping were the strongest influencing factors. We found one study that supports the importance of depression in mental and physical components of QOL in patients who have already received a transplant.¹¹

Conclusions

According to our results, physical and mental well-being in liver transplant candidates are influenced far more by psychiatric factors such as depression and by coping strategies than by clinical and sociodemographic factors.

Further studies are needed to identify the extent to which early and continued psychotherapeutic interventions can improve not only mental but also health-related QOL in patients at risk, for example, patients with high scores for depression and low scores for active coping. An important limitation of this study is that it is a cross-sectional study and thus we could find only correlations and not determinants.

Financial Disclosures

None reported.

References

1. Tarter RE, Switala J, Arria A, et al. Impact of liver disease on daily living transplantation candidates. *J Clin Epidemiol*. 1991;44:1079-1083.
2. Johnson CD, Hathaway DK. The lived experience of end stage liver failure and liver transplantation. *J Transpl Coord*. 1996;6:130-133.
3. Goetzmann R, Wagner-Huber R, Klaghofer B, et al. Waiting for a liver transplant: psychosocial well being, spirituality, and need for counseling. *Transplant Proc*. 2006;38:2931-2936.
4. Díaz-Dominguez R, Pérez-Bernal J, Perez-San-Gregorio MA, Martín-Rodríguez A. Quality of life in patients with kidney, liver or heart failure during the waiting list period. *Transplant Proc*. 2006;38:2459-2461.
5. O'Carroll R, Couston M, Cossar J, Masterton G, Hayes PC. Psychological outcome and quality of life following liver transplantation: a prospective, national, single-center study. *Liver Transplant*. 2003;9(7):712-720.
6. Singh N, Gayowski T, Waggener MM, Marino IR. Depression in patients with cirrhosis, impact on outcome. *Digest Dis Sci*. 1997;42(7):1421-1427.
7. Rodrigue JR, Davis GL, Howard RJ, et al. Psychological adjustment of liver transplant candidates. *Clin Transpl*. 1993; 7:228-229.
8. House R. Transplantation surgery. In: Stoudemire A, Fogel S, Greenberg D, eds. *Psychiatric Care of the Medical Patient*. 2nd ed. New York, NY: Oxford University Press; 2000.
9. Caccamo L, Azara V, Doglia M, et al. Longitudinal prospective measurement of quality of life before and after liver transplantation among adults. *Transplant Proc*. 2001;33:1880-1881
10. Karam V, Castaing D, Danet C, et al. Longitudinal prospective evaluation of quality of life in adult patients before and after liver transplantation. *Liver Transplant*. 2003;9:703-711.
11. Nickel R, Wunsch A, Egle U, Lohse A, Otto G. The relevance of anxiety, depression and coping in patients after liver transplantation. *Liver Transplant*. 2002;8(1):63-71.
12. Myaskovsky L, Dew MA, Switzer GE, et al. Avoidant coping with health problems is related to poorer quality of life among lung transplant candidates. *Prog Transplant*. 2003;13: 183-192.
13. Hjermstad MJ, Loge JH, Evensen SA, Kvaløy SO, Fayers PM, Kaasa S. The course of anxiety and depression during the first year after allogeneic or autologous stem cell transplantation. *Bone Marrow Transplant*. 1999;24(11):1219-1228.
14. Myaskovsky L, Dew MA, Switzer GE, McNulty ML, DiMartini AF, McCurry KR. Quality of life and coping strategies among lung transplant candidates and their family caregivers. *Soc Sci Med*. 2005;60:2321-2332.
15. Telles-Correia D, Barbosa A, Mega I, Monteiro E. Psychiatric differences between liver transplant candidates with familial amyloid neuropathy and those with alcoholic liver disease. *Prog Transplant*. 2008;18(2):134-135.
16. Ware J. *SF-36 Health Survey Manual & Interpretation Guide*. Boston, MA: Nimrod Press; 1993.
17. Development of the Portuguese version of MOS SF-36. Part II: validation tests [in Portuguese]. *Acta Med Port*. 2000;13(3): 119-127.
18. Hays R, Marshall GN, Wang EYI, Sherbourne CD. Four-year cross-lagged associations between physical and mental health in the Medical Outcomes Study. *J Consult Clin Psychol*. 1994;62:441-449.
19. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)*. Washington, DC: American Psychiatric Publishing, Inc; 2000.
20. Sheehan BV, Lecrubier Y, Sheenan KH, et al. The Mini International Neuropsychiatric Interview (MINI): the development and validation of structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatr*. 1998; 59(suppl 20):22-33.
21. Zigmond AS, Snaith AP. The Hospital Anxiety Depression Scale. *Acta Psych Scand*. 1983;67:361-370.
22. Pais-Ribeiro J, Silva I, Ferreira T, Martins A, Meneses R, Baltar M. Validation study of a Portuguese version of the hospital anxiety and depression scale. *Psychol Health Med*. 2007;12(2):225-237.
23. Costa PT Jr, McCrae RR. *NEO PI-R Professional Manual*. Odessa, FL: Psychological Assessment Resources, Inc; 1992.
24. Bertoquini V, Pais-Ribeiro JL. Estudo de Formas reduzidas do NEO-PI-R. *Psicologia Teoria Investigação Prática*. 2006; 85: 102-111.
25. Carver C. You want to measure coping but your protocol's too long. Consider the brief COPE. *Int J Behav Med*. 1997; 4(1):92-100.
26. Pais-Ribeiro J, Rodrigues A. Questioning coping: a propos of the adaptation study of the Brief COPE [in Portuguese]. *Psicologia Saúde Doença*. 2004;5:3-15.
27. Monteiro E, Freire A, Barroso E. Familial amyloid polyneuropathy and liver transplantation. *J Hepatol*. 2004;41(2):188-194.
28. Rothenhausler HB, Ehrentraut S, Kapfhammer HP. Psychosocial screening and selection of candidates for liver transplantation [in German]. *Psychother Psychosom Med Psychol*. 2003; 53(9-10):364-375.