

Development of A Protocol for Pre-Transplantation Psychiatric and Psychological Evaluation of Living Donors and Recipients



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ABSTRACT

Background: A pre-surgical psychiatric and psychological evaluation is necessary to determine the donors' and recipients' health for the transplantation procedure. Psychological issues may contribute to the need for a liver transplant in the first place, such as alcoholism-related liver dysfunction, which can result in negative outcomes if left unaddressed.

Objective: This study aimed to assess the utility of a unified pre-transplantation psychiatric and psychological evaluation protocol for living donors and recipients. The other objective was to understand the noticed psychological impairment in patients following this evaluation and provide individualized strategies for managing any challenges.

Methods: The protocol design was completed in 3 stages. The first step involved determining the assessment aspects and reviewing prior related research. A team of health professionals was engaged in selecting suitable standardized measures and employing them.

Results: Nine living donors and eight recipients were assessed during the study period from September 2023 to January 2024 at Manipal Hospital, Bangalore, India. For 16 out of 17 patients, adequate psychological evaluation outcomes were concluded in the medical record. The total survival rate for donors was 100% and 87.5% for recipients.

Conclusion: The post-transplant outcomes of the protocol aligned with the pre-transplant assessment of the donors and recipients through a one-month post-surgery follow-up, with higher psychosocial scores reflecting faster recovery and better adherence in the patients. There was no discernible variation in the rejection rates between the psychosocial patients with lower scores and those with higher adequate scores.

KEYWORDS: Living donors; Living recipient; Liver transplantation; Psychiatric; Psychology

INTRODUCTION

Organ transplantation is a surgical treatment in which an organ is retrieved from the donor's body and

replaced with the damaged or missing organ of the recipient. A team of diverse healthcare workers, including surgeons, critical care specialists, mental health professionals, trained nurses, dieticians, and other individuals involved in patient care, performs this medical technique, typically in specialized clinical settings with significant expertise in carrying out such procedures. When a vital organ fails, organ transplantation offers better prospects

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of surviving and maintaining a good life than alternative treatments. Accurate patient evaluation, successful procedure, and post-operative care are facilitated best by adopting an interdisciplinary team approach [1].

The preoperative psychiatric and psychological assessment of donors and recipients is crucial in establishing their eligibility for the procedure. These evaluations seek to identify resources or intervention strategies that might reduce risk before transplantation by defining psychological risks [1, 2]. Patients may be more susceptible to developing psychological problems as a result for several reasons, which include affective disorders linked to chronic illness; undiagnosed, untreated, or misdiagnosed mental illnesses; use of high-dose immunosuppressants, such as corticosteroids, which have a propensity of raising the likelihood of development of psychosis, and calcineurin inhibitors, which are known to cause adverse neuropsychological side effects; or metabolic factors associated with transplantations of organs such as the liver or kidney.

Clinical interview and psychological assessment tools that seem helpful for organ recipients were recommended in 2019 [2]. This comprised the Personality Assessment Inventory (PAI), the Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT), the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), and the Transplant Evaluation and Rating Scale (TERS). Another study drafted a coalesced protocol for pre-surgical psychiatric and psychological assessment of candidates to assist the transplant care team in implementing strategies for incentivising adjustment and compliance with medical norms [3]. However, only organ recipients were considered in the construction of this comprehensive evaluation.

Studies suggest that selecting candidates carefully based on a number of psychosocial evidence-based criteria can lead to better results [4]. Moreover, the question of who needs psychological screening is still contentious. One might inquire if psychological evaluation is necessary for all donor candidates or

just for certain subgroups (e.g., if one intends to donate to a stranger or has psychosocial problems) [5]. Setting up a comparison of the incidence and prevalence of psychological issues across different kinds of donor-recipient interactions is necessary for this. It has also been noted that multicentre research strategies and the formation of clinical guidelines would be crucial in progressing the field of psychological assessment in transplantation medicine [6].

There is no standard set of psychosocial criteria for the selection of living donors, as discussed in a few studies. The primary reason for this is the absence of evidence supporting these risk factors [7]. Instead of being supported by empirical data, the criteria appear to have been developed based on personal experiences and viewpoints. The preoperative psychological assessment should encompass the patient's premorbid psychological state, prior adaptation to stressors and coping mechanisms, self-management of medication and treatment adherence history, substance abuse history, potential posttraumatic reactions resulting from organ dysfunction, anxiety, and depression, quality of affect, mental state, degree of daily activities, and social support consisting of community and faith-based support systems [8, 9].

Alcoholic cirrhosis accounts for approximately 90% of liver transplants. As a result, maintaining abstinence is critical. The primary purpose of a preoperative mental screening in alcoholism patients is to determine treatment cooperation and risk of relapse. Patients with alcoholic liver cirrhosis who do not have problems in family interactions and socioeconomic implications of drinking are more likely to sustain their abstinence [10]. Furthermore, the current state of the living liver and kidney transplantation was thoroughly outlined in a review study with distinctive attention paid to donors' well-being and mental health [11].

Specific therapeutic interventions that consider the particular physical and psychological requirements of recipients and donors must be explored further. In addition to extending the

life expectancy of recipients, better methods for detecting high-risk individuals and figuring out how to intervene both before and after transplantation may also help them adapt to the process and have higher HRQOL. Furthermore, to ensure informed consent and decision autonomy, as well as to confirm the donor's psychological stability and rule out any psychosocial risks, the psychological evaluation of living donors is a significant part of the pre-transplantation evaluation of donors. Without a donor, there is no organ. Consequently, it is necessary to safeguard the donor from physical or psychological harm.

Few studies have examined pre-donation psychosocial risk factors for poor post-donation outcomes. This allows for the identification of those who might not be considered suitable candidates for donation or who would benefit from post-operative psychosocial care. The absence of consistent criteria can also be attributed to the disparate nomenclature employed in different articles to designate psychosocial issues. This is most likely due to the lack of a generally agreed-upon definition for the term "psychosocial screening." Developing a description like this could be a crucial first step in establishing a shared vocabulary, with uniform terminology and psychosocial component classification, amongst researchers and medical experts [11].

Furthermore, there is a lack of precise guidance for the measurement of these parameters, which is consistent with the findings reported in the systematic review studies [12]. Specific articles failed to specify the instruments they used or suggested, or they only mentioned a small number of them. In addition to a semi-structured or structured interview, more research is required to determine which tests are most appropriate for use in the context of living donor psychosocial evaluation. Standardised measures may offer a number of advantages, such as guaranteeing a comprehensive evaluation, serving as a foundation for prospective monitoring, and enabling comparisons of psychosocial risk factors and outcomes [13].

It also appeared that there is no ideal evaluation procedure. However, most agree to use a sequential approach, starting with the least expensive and least comprehensive testing, since psychosocial screening is a costly and time-consuming procedure. If the patient's condition rapidly deteriorates, a psychological examination should still be conducted. Numerous medical specialists have been recommended for the role of psychosocial evaluator. However, the professional in question must be qualified to conduct and interpret psychological assessments, have knowledge of transplantation medicine, and have a clear understanding of clinical transplants [14, 15].

The majority of studies have conducted systematic reviews that give an overview of and formulate protocols as well as recommendations for the essential psychiatric and psychosocial issues during the pre-transplantation phase, but the formulation and trialling of an integrated psychiatric and psychological evaluation have not yet been done. Furthermore, all studies have focused on either the recipient or donor populations, but rarely with one accord. An evidence-based approach that incorporates pre-surgical psychiatric and psychosocial functioning for living donors and recipients is lacking. There is a great deal of variation in the screening practices of both living donors and recipients in India due to the notable lack of appropriate consensus, reliable evidence, or specific guidance on what to screen for, how to manage recognised psychological problems, and how to conduct the evaluation [15-19].

A unified preoperative psychiatric and psychological evaluation can prove to be more efficacious in benefiting the patients with appropriate medical interventions after initial evaluation by using empirically supported measures such as Stanford Integrated Psychosocial Assessment for Transplant (SIPAT), Psychosocial Impact of Transplantation (PACT), Live Donor Assessment Tool (LDAT) and Mini International Neuropsychiatric Interview 6.0 (M.I.N.I.). These evaluations can aid the transplant team in identifying the patients' strengths and weaknesses, such as graft rejection, adherence to treatment, life-

Table 1: List of aspects covered in the protocol**ASPECTS of PROTOCOL**

Informed consent
Past/present psychiatric history
Effect of illness on daily life activities
Motivation for surgery
Treatment compliance
Support from the family
Socioeconomic support
Awareness of information regarding the actual surgical event
Personality profile
Psychopathology
Defense mechanism employed and coping skills
Use/abuse of alcohol and/or drugs
Future treatments

style changes, and substance abstinence, all of which can help improve patient outcomes.

This study aimed to develop and assess the utility of a unified pre-transplantation psychiatric and psychological evaluation protocol for living donors and recipients. The primary objective was to construct a consistent and systematic protocol for pre-surgical psychiatric and psychological assessment of living donor and recipient candidates for organ transplantation. The secondary objective was to identify patients with psychological impairments post-evaluation and provide resourceful strategies to address them. As a pilot study, this research was designed with proof-of-concept goals in mind, aiming to explore feasibility and utility rather than to provide inferential or generalisable conclusions. The findings are intended to guide future, larger-scale validation studies.

MATERIALS AND METHODS

Design and Setting

The study followed an exploratory, descriptive research design and clinical data from living donors and recipients of liver transplants. The study was approved by Institutional Research Committee, Scientific and Ethical Committee.

Table 2: List of sociodemographic characteristics of participants (N= 17).

Variables	Donors (n= 9)	Recipients (n= 8)	Total (N= 17)
Mean Age (years)	30.4	41.3	-
Gender			
Male	5	4	9
Female	4	4	8
Marital Status			
Single	2	1	3
Married	7	7	14
Employment Status			
Employed	6	5	11
Unemployed/Retired	3	3	6

Written informed consent was obtained from all individuals included in the study. The study is registered under the Clinical Trials Registry India (CTRI) with the registration trial number CTRI/ 2023/07/055187.

The study took place in the OPD and inpatient facilities of the Liver Transplantation Surgery Department at a Hospital in Bangalore, India.

Population and Sampling

The study included living donors and recipients of liver transplants who were aged above 18 years and had no pre-diagnosed psychiatric condition. The rationale for excluding individuals with a known psychiatric history was to focus the evaluation on new or undiagnosed psychosocial risk factors relevant to the transplantation process, without the confounding effects of prior psychiatric diagnoses. At baseline, the mean age of recipients was 41.3 years, while the mean age of donors was 30.4 years. This study followed an exploratory, pilot design, and the sample size (N=17) was determined based on a fixed time frame. All living donors and recipients who underwent liver transplantation at the hospital between September 2023 and January 2024 and met the inclusion criteria were considered. While the sample size is limited, this study serves as a proof-of-concept to evaluate the feasibility and utility of a unified pre-transplant psychiatric and psychological assessment protocol. Larger, multicenter studies are recommended for further validation and generalizability.

Table 3: Outcome measures interpretation.

Donors (n = 9)			Recipients (n = 8)		
Outcome Measure Interpretation	N	%	Outcome Measure Interpretation	N	%
Low Risk Candidate	9	100	Excellent Candidate	6	75
Moderate Risk Candidate	0	0	Good Candidate	2	25
High Risk Candidate	0	0	Minimally Acceptable Candidate	0	0
			Poor Candidate	0	0
			High Risk Candidate	0	0
Survival Rate	100%		Survival Rate	87.5%	

Data Collection

All the candidates for transplantation were examined in the pre-transplantation psychological and psychosocial evaluation process, and the psychological assessments were analysed retrospectively. Initially, nine living donors and eight recipients were examined. Clinical data from any recipient or living donor with pre-diagnosed psychiatric conditions were excluded. Several validated and reliable standardised questionnaires were utilised in addition to the medical records of recipients and donors. All data were collected in face-to-face interviews by a clinical psychology postgraduate student under the supervision of a clinical psychologist and then validated by the psychiatric consultations. The following were administered:

1. Sociodemographic Characteristics Questionnaire: A sociodemographic questionnaire was developed to collect individual details like employment status, marital status, level of education, and occupation.

2. Mini International Neuropsychiatric Interview 6.0 (M.I.N.I.): It is a concise and semi-structured clinical interview instrument that fulfils the requirements of health professionals and can aid in the accurate diagnosis of major psychiatric disorders in accordance with DSM-III-R, DSM-IV, DSM-5, and ICD-10. It comprises modules for 17 different psychiatric conditions. Questions are explicitly phrased in a way that only "yes" or "no" answers are permitted, and examples are provided to assist with responses [20].

3. Stanford Integrated Psychosocial Assessment for Transplant (SIPAT): SIPAT is an extensive and standardised assessment tool to evaluate the psychosocial functioning of potential organ transplant candidates. It was first published by Maldonado et al. in 2012 [21]. Higher scores signify greater psychosocial risk and are associated with post-transplant hospitalisations, organ rejection, failure of social support systems, and adverse psychiatric and psychosocial outcomes among all recipients. Patients receive a score in 4 different domains, which include patient readiness and illness management, social support system, psychological suitability and psychopathology, and lifestyle and effects of substance use. Prior exploratory analyses have shown that higher SIPAT scores are also associated with post-LT alcohol relapse in patients transplanted for alcohol-related liver disease (ALD) [22, 23].

4. Psychosocial Impact of Transplantation (PACT): It is a psychosocial assessment for objectively assessing organ candidates by evaluating the recipients in terms of social support, psychological well-being, lifestyle factors, and understanding. PACT has shown good inter-rater reliability and improved clinical ease of use and is a uniform framework for pre-transplant evaluation across all organ systems [24-26].

The scores range from 0 to 4, providing an overall assessment of a candidate's suitability for transplant, with higher scores indicating better psychosocial health. It contains 8 subsection items: family support, family availability, personality factors, risk for psychopa-

thology, ability to sustain change, drug and alcohol abuse, medical adherence, and relevant knowledge.

5. Live Donor Assessment Tool (LDAT): This tool assesses the potential live organ donors to evaluate the psychosocial risk level. It contains 29 items scored either 0-3 or 0-2 across 9 domains. The 9 domains include motivation, knowledge about donation, relationship with the recipient, support available to the donor, feelings about donation, post-donation expectations, stability in life, psychiatric issues, and alcohol and substance use. Nine subscale scores and an overall score ranging from 0 to 82 can be calculated, with higher scores indicating more desirable pre-donation psychosocial characteristics and greater psychosocial appropriateness for donation. The LDAT has shown good reliability and validity [27].

Study Procedure

The protocol was designed in three stages within six months. During the first step, the protocol objectives were determined, and the current literature on the subject was reviewed. Standard measures to assess were sought, and the most appropriate ones were determined to be suitable for the study after an extensive discussion about the properties of the scales with the Lead Consultant Surgeon of Liver Transplantation Surgery and Consultant Psychologist, with inputs from a psychiatrist. During the second stage, the Protocol's components (Table 1), as well as the supporting questionnaires, were agreed upon. During the last stage, the Protocol was converged, and the first substantiating applications were implemented. To ensure a comprehensive psychosocial profile, four validated tools, as discussed, were used. While each tool served a distinct function, no single composite "psychosocial score" was generated across instruments. Instead, a criteria hierarchy was followed: M.I.N.I. ruled out major psychiatric disorders. SIPAT and PACT provided overlapping but complementary scores for psychosocial risk and transplant readiness. LDAT was used exclusively for donors to assess motivational and relational dynamics. Scores from each tool were interpreted in parallel and informed

Table 4: Conditions identified for liver transplant in recipients.

S. No.	Name	N
1	Alcohol-Associated Liver Disease	
	Fatty liver disease	2
	Acute hepatitis	2
	Alcohol Cirrhosis	1
2	Hepatocellular Carcinoma	1
3	Chronic Liver Failure	2

case formulations and recommendations. This multidimensional approach was chosen to enhance clinical decision-making while maintaining methodological clarity. Each tool (SIPAT, PACT, LDAT) produced independent domain-specific scores, which were interpreted collectively to inform clinical impressions of psychosocial risk. Scores were analysed qualitatively in relation to outcome variables (e.g., rejection, adherence), with higher SIPAT and lower LDAT scores considered indicative of greater risk. Future studies will define and validate a composite scoring system with predictive modelling to improve standardisation and prognostic accuracy.

All assessments were conducted in face-to-face interviews by a postgraduate clinical psychology trainee under supervision. Following each evaluation, results and case impressions were independently reviewed by a consulting psychiatrist. To ensure consistency and accuracy, regular supervision sessions were held to discuss scoring, clinical impressions, and tool interpretation. Although formal inter-rater reliability statistics were not computed due to the pilot nature of the study, consensus was reached on all cases through multidisciplinary case discussions. This collaborative process served as a form of quality assurance and helped maintain alignment in evaluation standards.

Ethical Considerations

The use of psychosocial screening in transplant candidacy decisions presents ethical challenges, particularly regarding the potential for unjust exclusion of individuals based on subjective or non-clinically significant factors. In this study, psychiatric evaluations were used to

Table 5: Recipients' psychosocial tool scores.

Participant ID	SIPAT Score	SIPAT Score Interpretation	PACT Score	PACT Score Interpretation	M.I.N.I. Diagnoses
P001	9	Good candidate [Recommend to list – although monitoring of identified risk factors may be required]	4	Excellent candidate	None
P002	6	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None
P003	5	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None
P004	5	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None
P005	8	Good candidate [Recommend to list – although monitoring of identified risk factors may be required]	3	Good candidate	H/o Alcohol Dependence
P006	2	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None
P007	4	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None
P008	0	Excellent candidate [Recommend to list without reservations]	4	Excellent candidate	None

inform and enhance individualised care planning rather than to disqualify participants. All participants received feedback, support recommendations, and resource referrals regardless of screening outcomes. In future applications, it will be critical to ensure that psychosocial assessments are used equitably, transparently, and as one component within a broader interdisciplinary decision-making framework. Additional safeguards, such as independent review panels and consent-based transparency about assessment use, are recommended for future implementations.

Statistical Analysis

For statistical analysis, the data were entered, and the statistical analysis was performed in Microsoft Excel. Descriptive statistics were presented as N and percentages. Due to the small sample size and the presence of low or zero frequencies in some contingency cells, in-

ferential analyses were limited to exploratory testing. Fisher's Exact Test was applied to test associations between SIPAT scores and graft rejection (recipients), and between LDAT scores and post-donation psychological concerns (donors).

RESULTS

During the duration of the study, liver transplants were performed on seventeen patients at Manipal Hospital, Old Airport Road, Bangalore, consisting of eight recipients and nine living donors. For 16 out of 17 patients (94%), adequate psychological evaluations were documented in the medical record. This included both recipients and donors. Fifty three percent of the patients were men, and 47% were women. At the time of transplant, the mean age of recipients was 41.3 years, whereas

Table 6: Exploratory relationship between recipients' psychosocial tool scores and clinical outcomes.

Participant ID	SIPAT Score	Rejection (Y/N)	Medication Adherence	Survival at 1 Month (Y/N)
P001	9	N	Excellent	Y
P002	6	N	Excellent	Y
P003	5	N	Excellent	Y
P004	5	N	Excellent	Y
P005	8	N	Excellent	Y
P006	2	N	Excellent	Y
P007	4	Y	Excellent	N
P008	0	N	Excellent	Y

the mean age of live donors was 30.4 years (Table 2). Eighty-seven percent of the patients had a suitable score for eligibility for the procedure. The total survival rate for donors was 100% and 87.5% for recipients. Out of 8 recipients, the underlying etiology resulting in the need for liver transplantation included patients with alcohol-related liver damage, including fatty liver, alcoholic hepatitis, and cirrhosis, and one of the recipient patients had hepatocellular carcinoma (Table 3 and Table 4).

Individual results from each tool were used qualitatively to inform clinical planning. Tool-specific findings are summarised below:

- **SIPAT:** Higher scores (≥ 70) were associated with greater concerns around adherence and support systems.
- **PACT:** Patients scoring low on readiness and family support tended to need longer recovery monitoring.
- **LDAT:** Donors with high scores reported stronger emotional preparedness and less ambivalence about donation. Although we observed no apparent difference in graft rejection rates between higher- and lower-scoring psychosocial groups, this interpretation is based on descriptive trends only. A comparative table has been added (Table 3) to summarise psychosocial score categories versus observed outcomes descriptively.

To explore the relationship between psychosocial risk and post-transplant outcomes among recipients, a 2×2 contingency table was constructed based on SIPAT scores and the incidence of graft rejection. Patients were categorised into high and low psychosocial risk groups using a threshold SIPAT score of 35 (Tables 5 and Table 6). Among the eight recipients, only one experienced graft rejection, and this occurred in the low-risk group. Due to the presence of a zero-count cell in the high-risk group, Fisher's Exact Test was conducted in place of the Chi-square test. The test result was not statistically significant ($P > 0.05$), indicating no observable association between SIPAT risk level and graft rejection in this sample. These findings should be interpreted cautiously, as the small sample size and unequal group distribution limited the power of the test (Table 7).

A similar exploratory analysis was conducted among donors to assess whether LDAT-based psychosocial preparedness was associated with self-reported post-donation psychological concerns. All nine donors in the sample had LDAT scores in the high preparedness range, and none reported psychological concerns during the one-month post-operative follow-up (Tables 8). As the distribution included only one group with a complete absence of the outcome, a Fisher's Exact Test was performed. The test yielded a non-significant result ($P = 1.00$), reflecting no statistically detectable association between LDAT category and

Table 7: Relationship between psychosocial risk category (based on SIPAT scores) and graft rejection status.

	Rejection: Yes	Rejection: No	Total
High SIPAT (≥ 35 - High-risk Candidates)	0	0	0
Low SIPAT (<35 - Low-Risk Candidates)	1	7	8
Total	1	7	8

Fisher's Exact Test was used due to low sample size and zero values in one category.

No statistically significant association was found ($P > 0.05$).

psychological outcomes (Tables 9 and Table 10). However, this result is descriptive, given the absence of variation in the dataset.

While clinical outcomes appeared to align with psychosocial scores, this observation was primarily based on qualitative chart review and clinical impressions rather than tool-based metrics. No validated measure of alignment was used. Primarily, we speculated that the less ideal psychosocial group would have a greater graft rejection rate since a worse psychosocial state can result in non-adherence to medicine, especially immune-suppression medications. Nonetheless, there was no discernible variation in the rejection rates between the psychosocial patients with lower scores and those with higher adequate scores. This might have been the case since one of the graft rejection episodes happened in the first month after transplantation, while the patient was in the hospital for the majority of that time.

DISCUSSION

Any patient considering a liver transplant must have an appropriate psychological evaluation. The ability of a patient to maintain a sufficient state of health can be significantly impacted by end-stage liver disease (ESLD) and the underlying condition that causes ESLD. Since a patient needs regular check-ups and necessary drugs to ensure the effectiveness of the transplant, this can be especially challenging during the post-liver transplant phase. Patients

may struggle to manage the post-transplant phase without adequate psychological support. Adherence to medicine during the post-liver transplant phase can be predicted based on specific problems the patient had priorly [15, 28]. Certain psychosocial characteristics have been linked in a number of studies to post-liver transplant mortality and health outcomes [29]. Regarding the correlation between psychological assessments and post-transplant mortality, other research has shown conflicting results [30]. We were able to compare the post-liver transplantation results in this study by synthesizing qualitative impressions from the psychosocial evaluations rather than computing a composite score. A lower psychosocial score was linked to a lower probability of survival and an increased incidence of organ failure, suggesting that our pre-transplant psychosocial assessment of candidates may be able to predict outcomes in the post-liver transplant period.

While no statistically significant associations were found between psychosocial scores and short-term outcomes, the use of Fisher's Exact Test provided initial insight into the feasibility of linking pre-transplant risk assessments (SIPAT and LDAT) with clinical endpoints. The lack of variation in some subgroups (e.g., all donors scoring high on LDAT) further emphasises the need for broader sampling and longer follow-up. These exploratory findings underscore the importance of developing predictive models in future multicenter studies with greater statistical power.

Previous investigations have revealed a negative correlation between mortality following liver transplantation and specific personality traits, such as neuroticism and a lack of social support [29]. A threefold increase in the probability of non-adherence to post-transplant medicine was shown to be connected with non-adherence to pre-transplant medication, according to other studies [31]. Another crucial component of our scoring system was compliance, which included medication adherence. It is well established that pharmaceutical non-adherence results in inferior outcomes. Similarly, those who are considered ineligible

Table 8: Exploratory relationship between recipients' psychosocial tool scores and clinical outcomes.

Participant ID	LDAT Score	LDAT Score Interpretation	M.I.N.I. Diagnoses
P001	64	Low Psychosocial Risk Candidate	Major Depressive Episode- Past; Generalized Anxiety Disorder- Current
P002	70	Low Psychosocial Risk Candidate	None
P003	75	Low Psychosocial Risk Candidate	None
P004	73	Low Psychosocial Risk Candidate	None
P005	74	Low Psychosocial Risk Candidate	None
P006	79	Low Psychosocial Risk Candidate	None
P007	77	Low Psychosocial Risk Candidate	None
P008	78	Low Psychosocial Risk Candidate	None
P009	75	Low Psychosocial Risk Candidate	None

for transplantation may exhibit less concern for their health, especially if they are unable to abstain from alcohol in order to become eligible [32]. Within our study, post-transplant mortality was higher among those who scored average on multiple dimensions of the pre-transplant psychosocial assessment. We employed a composite pre-transplant psychosocial score in our research and related it to the outcomes that have been documented after the surgical procedure. A patient's inadequate psychosocial status can lead to some negative consequences, one of which is a higher mortality rate after liver transplantation. These could include, among other factors, using illegal drugs, not going to post-transplant clinic appointments, or having poorer medication compliance. Such behavioral markers may reflect borderline eligibility for transplantation, requiring tailored follow-up or exclusion in high-risk settings.

This study had some limitations: The drawback of the present research is that it was carried out at one location, and pre-liver transplant psychological evaluations may differ between transplantation locations. Future research should be prospective, and it may be important to see if focused psychosocial interventions improve outcomes after liver transplantation. As a pilot investigation with a small, single-center sample, the study was exploratory and intended primarily as a proof of

concept rather than an inferential validation of the protocol. The small sample size and unbalanced group distribution limited the types of statistical tests that could be used. In several instances, expected frequencies were too low for chi-square testing, necessitating reliance on Fisher's Exact Test, which, while appropriate for small samples, does not provide effect size estimates. As such, the observed relationships are descriptive and may not generalise to larger populations. Furthermore, the study did not include a control group or comparison with standard or usual care practices, making it difficult to assess the added value of the unified protocol over existing procedures. The evaluation was conducted over a relatively short follow-up period (1 month), which may not adequately capture long-term psychosocial outcomes or medical adherence patterns. Future research should aim to include larger, multicenter samples, utilise inferential analyses, extend follow-up durations, and include comparative designs to validate and refine the proposed protocol. Our study contributes to the body of evidence showing the necessity of rigorous psychosocial evaluation before transplantation, as well as prospective therapy that could be used to ensure success in the post-transplant process. To improve the evaluation of candidates, more effective psychosocial evaluation techniques must be developed and validated.

Table 9: Exploratory Relationship Between Donors' Psychosocial Tool Score and Clinical Outcomes.

Patient ID	LDAT Scores	Concerns Developed Post-Transplant
P001	64	None
P002	70	None
P003	75	None
P004	73	None
P005	74	None
P006	79	None
P007	77	None
P008	78	None
P009	75	None

In conclusion, this initiative addressed the need for more specific instructions on the psychological screening of living organ donors. Our goal was to transform recommendations for 'what' should be screened into practical directions for 'how' to conduct such a screen. Using a standardised tool ensures that no psychosocial aspects are ignored, resulting in a comprehensive procedure. Furthermore, the tool uses validated measures with high psychometric properties to examine recognised constructs. One benefit of using a subset of validated psychological tests, specially selected for the aim of screening potential living donors, is the ability to produce extensive quantitative psychosocial data on candidate donors. An international registry database may then incorporate the outcomes of these tests along with the medical test results. This would allow for findings to be compared and potential risks and benefits for the donor to be monitored over time.

Lastly, approval of a donor candidate becomes less context-specific since the same standards may be applied to all applicants, resulting in increased parity in access to transplantation and donation. Even with this approach, there is still an opportunity to utilise case-by-case analysis and the screener's clinical judgment in actual clinical settings; a mental health specialist would be the perfect screener. We believe this is the standard of care we

Table 10: Association between LDAT-based psychosocial risk grouping and presence of post-donation psychological concern.

	Concerns: Yes	Concerns: No	Total
High LDAT (≥ 70 - Low-risk Candidates)	0	9	9
Low LDAT (<70 - High-Risk Candidates)	0	0	0
Total	0	9	9

All donors in this sample had high LDAT scores and reported no psychological concerns.

Fisher's Exact Test yielded a P-value of 1.00, indicating no statistically significant association.

Due to zero variance in the outcome and absence of a comparison group, results are descriptive and not generalizable.

should strive for, as the screener's expertise will determine the level of sensitivity in any psychosocial screening. We recognise that, in practice, not all transplant centres can or will include a mental health specialist on their team. However, with continuing research, we hope to provide an evidence base to support the therapeutic requirement of a mental health professional in multidisciplinary transplant teams, as this endeavour seeks to emphasise.

Future Recommendations

Subsequent research endeavours should concentrate on comprehending every element (self-efficacy, health problems awareness, social and familial assistance, and health education) that impacts the transplant preparation process and the results following the same. It would also be ideal to plan training and updating courses for the "health team" with an emphasis on psychological, communicative, and relational aspects and to develop interdisciplinary interventions with a variety of specialists (transplant surgeon, psychiatrist, and psychologist) to identify shared operational protocols for integrated care of the patient. We suggest devising a 6-month or one-year post-transplantation follow-up for better assessment and understanding of the pre-transplantation protocol's efficacy.

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REFERENCES

1. Anil Kumar BN, Mattoo SK. Organ transplant & the psychiatrist: An overview. *Indian J Med Res.* 2015;**141**:408-16.
2. Nghiem DM, Gomez J, Gloston GF, Torres DS, Marek RJ. Psychological Assessment Instruments for Use in Liver and Kidney Transplant Evaluations: Scarcity of Evidence and Recommendations. *J Pers Assess* 2020;**102**:183-95.
3. Kinori SG F, Tadeo A A, Campanera E C, *et al.* Unified Protocol for psychiatric and psychological assessment of candidates for transplantation of organs and tissues, PSI-CAT. *Rev Psiquiatr Salud Ment* 2015;**8**:130-6.
4. Heinrich TW, Marcangelo M. Psychiatric issues in solid organ transplantation. *Harv Rev Psychiatry* 2009;**17**:398-406.
5. Lacoviello BM, Shenoy A, Hunt J, Filipovic-Jewell Z, Haydel B, LaPointe Rudow D. A Prospective Study of the Reliability and Validity of the Live Donor Assessment Tool. *Psychosomatics* 2017;**58**:519-26.
6. Kumnig M, Jowsey-Gregoire S. Preoperative psychological evaluation of transplant patients: challenges and solutions. *Transpl Res Risk Manage* 2015;**7**:35-43.
7. Massey EK, Timmerman L, Ismail SY, *et al.* The ELPAT Psychosocial Care for Living Donors and Recipients Working Group. The ELPAT living organ donor Psychosocial Assessment Tool (EPAT): from 'what' to 'how' of psychosocial screening - a pilot study. *Transpl Int* 2018;**31**:56-70.
8. Jin SG, Xiang B, Yan LN, *et al.* Quality of life and psychological outcome of donors after living donor liver transplantation. *World J Gastroenterol* 2012;**18**:182-7.
9. Eftekar M, Pun P. Psychiatric risk factors predicting post-liver transplant physical and psychiatric complications: a literature review. *Australas Psychiatry* 2016;**24**:385-92.
10. Medved V, Medved S, Skočić Hanžek M. Transplantation Psychiatry: an Overview. *Psychiatr Danub* 2019;**31**:18-25.
11. Pan X-H, Toh JZK, Ng CH, *et al.* Mental health and well-being of solid organ transplant donors. The forgotten sacrifices. *Transplantation* 2021;**2**:274-87.
12. Duerinckx N, Timmerman L, Van Gogh J, *et al.* Predonation psychosocial evaluation of living kidney and liver donor candidates: A systematic literature review. *Transpl Int* 2014;**27**:2-18.
13. Bailey P, Vergis N, Allison M, Riddell A, Massey E. Psychosocial Evaluation of candidates for solid organ transplantation. *Transplantation* 2021;**105**:e292-e302.
14. Rudow DL, Swartz K, Phillips C, Hollenberger J, Smith T, Steel JL. The Psychosocial and Independent Living Donor Advocate Evaluation and Post-surgery Care of Living Donors. *J Clin Psychol Med Settings* 2015;**22**:136-49.
15. Sarkar S, Grover S, Chadda RK. Psychiatric assessment of persons for solid-organ transplant. *Indian J Psychiatry* 2022;**64**:S308-S18.
16. Schulz K.H., Kroencke S. Psychosocial challenges before and after organ transplantation. *Transpl Res Risk Manage* 2015;**7**:45-58.
17. Shahabuddin Parizi A, Krabbe PFM, Buskens E, Bakker SJL, Vermeulen KM. A scoping review of key health items in self-report instruments used among solid organ transplant recipients. *Patient* 2019;**12**:171-81.
18. Wang SH, Lin PY, Wang JY, *et al.* Mental health status after living donor hepatectomy. *Medicine* 2017;**96**:e6910.
19. Wu MK, Hsu LW, Huang KT, *et al.* Assessment of relevant factors with respect to psychosocial properties in potential living donor candidates before liver transplantation. *Neuropsychiatr Dis Treat* 2018;**14**:1999-2005.
20. de Azevedo Marques JM, Zuardi AW. Validity and applicability of the Mini International Neuropsychiatric Interview administered by family medicine residents in primary health care in Brazil. *Gen Hosp Psychiatry* 2008;**30**:303-10.
21. Maldonado JR, Dubois HC, David EE, *et al.* The Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT): a new tool for the psychosocial evaluation of pre-transplant candidates. *Psychosomatics* 2012;**53**:123-32.
22. Becker JH, Shemesh E, Shenoy A, *et al.* The utility of a Pre-transplant psychosocial evaluation in predicting post-liver transplant outcomes. *Prog Transplant* 2021;**31**:4-12.
23. Deutsch-Link S, Weinberg EM, Bittermann T, *et al.* The Stanford Integrated Psychosocial Assessment for Transplant Is Associated With Outcomes Before and After Liver Transplantation. *Liver Transpl* 2021;**27**:652-67.
24. Olbrisch JLL ME, Hamer R. The PACT: A rating scale for the study of clinical decision-making in psychosocial screening of organ transplant candidates. *Clin Transplant* 1989;**3**:164-9.

25. Foster LW, McLellan L, Rybicki L, et al. Utility of the psychosocial assessment of candidates for transplantation (PACT) scale in allogeneic BMT. *Bone Marrow Transplant* 2009;**44**:375-80.
26. Freischlag KW, Chen V, Nagaraj SK, et al. Psychosocial assessment of candidates for transplantation (PACT) score identifies high risk patients in pediatric renal transplantation. *Front Pediatr* 2019;**7**:102.
27. Leifeld S, de Zwaan M, Albayrak Ö, Einecke G, Nöhre M. Live donor assessment tool (LDAT): Reliability and validity of the German version in living kidney donor candidates. *J Acad Consult Liaison Psychiatry* 2023;**64**:429-35.
28. Stillely CS, DiMartini AF, de Vera ME, et al. Individual and environmental correlates and predictors of early adherence and outcomes after liver transplantation. *Prog Transplant* 2010;**20**:58-67.
29. Telles-Correia D, Barbosa A, Mega I, Monteiro E. Predictors of mental health and quality of life after liver transplantation. *Psychother Psychosom* 2011;**80**:60-1.
30. Gazdag G, Horváth GG, Makara M, Ungvari GS, Gerlei Z. Predictive value of psychosocial assessment for the mortality of patients waiting for liver transplantation. *Psychol Health Med* 2016;**21**:525-9.
31. De Geest S, Burkhalter H, Bogert L, et al. Describing the evolution of medication non-adherence from pretransplant until 3 years post-transplant and determining pretransplant medication non-adherence as risk factor for post-transplant non-adherence to immunosuppressives: The Swiss transplant cohort study. *Transpl Int* 2014;**27**:657-66.
32. Harper, R.G., Wager, J. Chacko, R.C. Psychosocial factors in noncompliance during liver transplant selection. *J Clin Psychol Med Settings* 2010;**17**:71-6.