



Multicultural Awareness and a Comprehensive Team Approach to Liver Transplantation: A Case Report

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Abstract

Patients being considered for a liver transplant undergo a rigorous evaluation process to identify the medical and psychosocial factors that may impact transplant success. The American Association for the Study of Liver Disease outlines recommendations for medical factors, but guidelines for psychosocial factors, such as multiculturalism, are less clear. The aim of this unique case study was to highlight the importance of multicultural awareness in the context of liver transplantation. More specifically, the report follows an American Indian man from initial diagnosis through psychological assessment and transplantation in order to illustrate the benefits of a comprehensive, multicultural team approach. Various components of multiculturalism are discussed, including the patient's ethnicity, intellectual functioning, socioeconomic status, and mental health history. Consideration of these factors by the patient's treatment team ultimately led to the patient's candidacy for transplant, as well as effective psychosocial support throughout the transplant process and recovery. Incorporation more specific psychosocial recommendations into national liver transplantation guidelines would likely improve the evaluation process and outcomes.

Keywords Transplant · Psychological assessment · Multicultural · Multidisciplinary care

Introduction

The Organ Procurement and Transplantation Network (OPTN) has documented 160,722 liver transplants from January 1988 to July 31, 2018 (OPTN, 2018). Each of these transplants has adhered to the American Association for the Study of Liver Disease (AASLD) practice guidelines (Martin, DiMartini, Feng, Brown, & Fallon, 2014). AASLD recommends the use of comprehensive care teams as part of the evaluation process to identify and assist with biological, psychological, and social factors that may impact the success of transplant for patients. While many of the biological factors are critical and detailed in nature, the psychological and social components are less clear. Recommendations 26 and 28 are related to the patients' psychological and social

functioning, including the ability to medically comply, mental health stability, and adequate social support/caregiving (Martin et al., 2014).

Multicultural awareness is necessary when evaluating these broad psychological and social guidelines, but there is little specificity provided within the AASLD guidelines. Multiculturalism, described by Pedersen (1991) as the "4th force," and advocates for the broadest operational definition to include demographic, status, and affiliation differences (Pedersen, 1991). The present article addresses many facets of this broad definition including: American Indian culture, intellectual disability, and mental health concerns.

When evaluating multiculturalism within the liver transplant population, Kamin et al. (2016) noted inconsistencies as it relates to developmental disabilities. Rates of intellectual disabilities in the United States range from 8.7 to 36.8 per 1000, with evidence suggesting other cultural factors (e.g., socioeconomic status, ethnicity) may increase these rates. Within the American Indian population, rates of intellectual disabilities are significantly higher with greater disparities in access to support networks (Cohen et al., 2015). In addition, rates of high school graduation or equivalent for individuals 25 or older in 1980 was significantly lower than

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the general population at 56% (U.S. Department of Health and Human Services, 2001). Intellectual disabilities and lower rates of education may have a significant impact on many aspects of care in a medical setting, including mistrust and health literacy (Sun et al., 2016). Adult liver transplantation recommendations make no mention of how to effectively tailor approaches for patients with intellectual deficits or limited education, but they do note that patients should have the ability to comply and have adequate social support.

The recommendation of mental health stability is also noted by the AASLD, but it does not define “stability.” Recent research found that 43% of liver transplant candidates had received mental health treatment recently with depression, anxiety, and post-traumatic stress disorder (PTSD) as the most prevalent diagnoses (Saracino et al., 2018). In addition, individuals coming from a low socioeconomic status (SES) and/or childhood intellectual disability are also at a higher risk for co-morbid mental health diagnoses including mood disorders and PTSD (Boat & Wu, 2015). Mental health diagnoses in the American Indian population is also elevated (U.S. Department of Health and Human Services, 2001). In addition to rates of mental health disorders being higher, there is evidence that medical mistrust is higher for American Indians, as well as stereotyping and clinician bias towards this population.

Another area not discussed explicitly in the context of the AASLD guidelines is ethnicity (Martin et al., 2014). Ethnicity may play a role in social support, faith, and medical interventions approved by the patient. For example, approximately 30% of adult liver transplant patients are of ethnic minorities, with research suggesting that these groups have poorer pre- and post-treatment outcomes and quality of life related to barriers in their minority status (Kemmer, 2011). Of these minorities, American Indians are the most impoverished in the United States. Their rates of homelessness, incarceration, mood disorders, substance abuse problems, and exposure to trauma are the highest (U.S. Department of Health and Human Services, 2001). In addition, access and availability to both mental health and medical services are fraught with barriers as well as medical mistrust and poor health outcomes (Martin et al., 2014).

While the abovementioned cultural variables are broadly addressed by the AASLD, there are inconsistencies in the listing of patients on transplant lists due to the lack of specificity. The purpose of this case presentation is to highlight the importance of comprehensive care that includes a focus on the psychological and social aspects of liver transplant evaluation, particularly in the area of multicultural awareness and support.

Case Presentation

The patient will be referred to under the pseudonym of AE, which are not his real initials. His age has also been slightly altered to further protect his privacy.

Presenting Problem

AE is a 55-year-old, who identified as an American Indian (Cherokee Tribe) male. He initially presented to the University of Kansas Health System hepatology clinic in January of 2015 with end stage liver disease secondary to Hepatitis C genotype 1 complicated by hepatocellular carcinoma. Patient endorsed prior treatment in California, with initial liver disease diagnosis in 2010. His liver disease included symptoms of ascites (with a history of paracentesis), history of hepatic encephalopathy (treated with rifaximin), hepatitis C, and history of varices without bleeding (banding completed).

Psychosocial History

AE was raised by his biological mother and step-father in rural Kansas. He was the fourth of five children living in the home, with three biological sisters and one biological brother. AE left his childhood home at age 16. His psychological history is notable for multiform childhood abuse/neglect. He also endorsed multiple head injuries starting at age nine with a motor vehicle accident. His highest level of education is 8th grade, with more than nine schools attended between the 5th and 8th grade. He reported difficulty with reading and writing, but denied intellectual difficulties in primary school. He also denied receiving an individualized education program. His prior career was focused on construction, specifically building bridges. He has been on medical disability since 2010 related to his liver disease. AE has been married and divorced three times, with one adult son. He has limited contact with his son. He lives with his cousin, ER, and her boyfriend. They have one dog in the home. Through his pre-transplant evaluation process, he was diagnosed by a psychiatrist with intermittent explosive disorder and alcohol abuse in 2015. More recently (2017), he was diagnosed with PTSD and Adjustment Disorder with Mixed Anxiety and Depressed Mood. At the time of present assessment in 2018, he did not have a history of psychotropic medication use or psychiatric hospitalizations.

Medical History

AE's(2015) Model for End-Stage Liver Diseases (MELD) score was 17, and a course of Harvoni for Hepatitis C was recommended. He endorsed a remote history of alcohol and

intravenous substance abuse, which was the most likely cause for his Hepatitis C diagnosis. AE struggled adhering to treatment recommendations due to difficulties obtaining Medicare, a tenuous living situation, and failure to respond to contact efforts. A liver transplant was also considered but was ultimately deferred due to a lack of social support and poor living situation.

Approximately 6 months later, AE presented again to the hepatology outpatient clinic with his cousin, ER. He had recently moved in with ER, and she had committed to being AE's primary caregiver. Subsequently, AE completed a 12-week course of Harvoni and ribavirin treatment, which successfully cured the virus. The patient's prior cirrhosis-related complications, ascites and hepatic encephalopathy symptoms continued to be well-managed. Due to the improvement in AE's level of adherence and living environment, a liver transplant evaluation was reconsidered.

The transplant evaluation process was initiated shortly thereafter, and AE completed evaluations with providers from psychiatry, social work, anesthesiology, pharmacy, cardiology, and dietetics and nutrition. During one of his education sessions with the transplant coordinator, AE made a comment that he would refuse to take immunosuppression therapy and hoped to receive a wolf liver. This prompted concerns about his desire for a transplant and whether he was engaging in inappropriate defense mechanisms. The transplant evaluation process was again deferred to provide patient with appropriate services to improve his coping strategies. He was subsequently referred to psychiatry and psychology for additional assessment.

Method

Procedure

AE was seen for psychodiagnostic testing, which included an intake, clinical interview, and standardized assessment battery. The assessment battery included a combination of validated cognitive and psychodiagnostic measures. The goal of the assessment was to provide diagnostic clarification, formulate treatment recommendations for psychological and behavioral interventions, and facilitate communication between AE and his medical treatment team.

AE was seen by an Advanced Psychology Doctoral Student with a master's degree in psychology for clinical interview and testing. The patient arrived 30 min late due to his prior appointment running behind. He was appropriately groomed, but exhibited a dysphoric mood and relatively flat affect. The session lasted for 3 h. At the end of the appointment, the patient and his cousin were provided instructions with how to complete the Personality

Assessment Inventory (PAI) at home. The patient returned the PAI 2 weeks following the assessment session. AE and ER received the assessment feedback together, per patient request. Of note, AE's hepatic encephalopathy symptoms (ammonia level 67 at high point), were previously treated and resolved more than 1 year prior, such that he was considered asymptomatic at the time of assessment.

Measures

Wide Range Achievement Test-4 (WRAT4)

The Word Reading and Sentence Comprehension subtests of the WRAT4 (Wilkinson & Robertson, 2006) were administered to estimate AE's premorbid intellectual and cognitive status, or his level of functioning prior to the substance abuse and multiple medical comorbidities. The WRAT4 is a standardized achievement test that assesses basic academic abilities via individual subtests in reading, spelling, and math. The Word Reading and Sentence Comprehension subtests raw scores were combined together to generate a Reading Composite score that provides a comprehensive measure of reading abilities than the individual subtests. Research supports the use of the Word Reading and Sentence Comprehension subtests as useful indicators of premorbid functioning in adult medical and neurological populations (Casaletto et al., 2014; Wilde et al., 2010). The WRAT4 has excellent psychometric properties, including internal consistency, test-retest reliability, and multiple forms of validity (Wilkinson & Robertson, 2006).

Wechsler Adult Intelligence Scale-IV (WAIS-IV)

The WAIS-IV (Wechsler, 2008a) was used to assess AE's current level of intellectual and cognitive functioning. The WAIS-IV is one of the most commonly used intelligence assessments for late adolescents and adults and consists of ten core subtests, which comprise the Full Scale Intelligence Quotient (FSIQ), and five supplemental subtests. Only the core scales were administered to AE. The ten subtests are combined into four indices that comprise the major domains of intelligence: Verbal Comprehension (VCI; Similarities, Vocabulary, and Comprehension subtests), Perceptual Reasoning (PRI; Block Design, Matrix Reasoning, and Visual Puzzle subtests), Working Memory (WMI; Digit Span and Arithmetic subtests), and Processing Speed subtests (PSI; Symbol Search and Coding subtests). The WAIS-IV was normed on a large United States sample of over 2000 subjects and has strong psychometric properties supporting its use (Wechsler, 2008b).

Personality Assessment Inventory (PAI)

The PAI (Morey, 1991) was used to assess AE's current level of personality functioning and symptoms of psychopathology. This measure is a 344-item self-reported objective test of personality and psychopathology widely used by mental health providers to aid in diagnostic clarification and treatment planning. It also provides information about intra- and interpersonal functioning. The PAI consists of four sets of scales: four validity scales, 11 clinical scales, five treatment consideration scales, and two interpersonal scales. This measure has shown good psychometric properties with normative, clinical, and college populations (Morey, 1991, 2003). Of note, ER aided AE in the completion of the PAI due to reading deficit.

Table 1 Results of AE's WRAT4 and WAIS-IV, including percentile ranks and qualitative descriptors

Test	Domain	Range description	Percentile (%)
WRAT4	Word reading	Lower extreme	1
	Sentence comprehension	Lower extreme	2
	Reading composite	Lower extreme	1
	Verbal comprehension	Borderline	7
	Perceptual reasoning	Low average	18
	Working memory	Extremely low	2
	Processing speed	Low average	10
	Full scale IQ	Borderline	5

WRAT4 wide range achievement test-4, WAIS-IV Weschler adult intelligence scale-IV, Full scale IQ full scale intelligence quotient

Table 2 AE's PAI validity scale scores and elevated clinical scale scores

Scale type	Scale/subscale name	T-score	Description
Validity scales	Inconsistency	55	Valid
	Infrequency	55	Valid
	Negative impression management	59	Valid
	Positive impression management	64	Possible underreporting
	Somatization	67	Elevated
	Paranoia	84	Markedly elevated
	Hypervigilance	75	Moderately elevated
	Persecution	77	Moderately elevated
	Resentment	83	Moderately elevated
	Schizophrenia	69	Elevated
Elevated clinical scales	Psychotic experiences	80	Moderately elevated
	Depression-physiological	79	Moderately elevated
	Borderline-negative relations	72	Moderately elevated
	Antisocial	67	Elevated
	Stimulus seeking	78	Markedly elevated

Norms-based reference T-Score for the Clinical Scales are as follows: Mean = 50, Standard deviation = 10; Clinical cut-off = 70

Relations. relationships

Results

Cognitive Functioning

The Reading Composite score of the WRAT4 placed AE at the 1st percentile of functioning compared to peers of his age, indicating lower extreme premorbid functioning. His overall score on the WAIS-IV placed him at the 5th percentile of functioning compared to peers of his age, indicating Borderline current cognitive/intellectual functioning (See Table 1). These results were likely due to a plurality of causes, including a history of multiple traumatic brain injuries, medical comorbidities (e.g., history of hepatic encephalopathy), transient childhood education, psychosocial stressors, and comorbid psychiatric conditions.

Personality Functioning

Table 2 displays the validity and elevated clinical scales and subscale scores. AE's scores on the validity scales indicate some cautious interpretation due to underreporting. However, the Positive Impression Management validity scale was only slightly elevated, and therefore did not render the report invalid. Further, AE insisted during the feedback session that he responded to the items as honestly as possible and made no attempts to present himself in a positive light. AE's clinical profile showed clinically significant elevations on the Paranoia, Schizophrenia, and Somatization scales. He also evidenced elevations on the Depression-Physiological, Antisocial-Stimulus Seeking, and Borderline-Negative

Relationships subscales. His self-concept appeared to be relatively stable with occasional periods of self-doubt and pessimism. Interpersonally, he was characterized as cold and unfeeling, with a history of intense relationships in which he felt exploited and betrayed. AE also endorsed a lower than average level of social support; however, he reported little stress arising from this or other major life areas.

Mental Health Summary

AE was found to meet criteria for the following mental health conditions: PTSD, Adjustment disorder with mixed anxiety and depressed mood, and Intellectual Disability Moderate. In addition, a rule out of Schizotypal personality disorder was applied as he did not meet full criteria.

Interventions

Psychological Intervention

AE's treatment plan following psychodiagnostic testing consisted of a behavior plan, targeted cognitive interventions, continued psychotherapy, and the use of social support (including medical staff) for assistance in understanding treatment adherence (see Appendix A). Having a strong therapeutic alliance, using evidenced based psychotherapy, and making cultural specific alterations has been shown to improve outcomes (Wampold, 2015). Thus, the first goal of intervention was focused on building a strong alliance as a common factor to future interventions. Second was utilizing testing to create recommendations, which the patient agreeable to. AE and his cousin were provided with a written copy of the behavior plan with specific recommendations for increasing medical adherence and improving communication with his medical team. Examples of targeted interventions to assist with memory included using therapeutic crystals (culture specific), phone reminders, and requesting printed copies of all medical appointments and medications. The patient was encouraged to talk to his medical team about the safe use of his culture-specific items to assist with mood management. For instance, he was permitted to use specific stones and crystals but not herbs for calming his spirit. AE also attended psychotherapy one time per month and was followed by the psychology team during his post-transplant hospitalization for additional support.

Medical Interventions

Following the psychodiagnostic testing, results and recommendations were reviewed and integrated into AE's medical plan of care (see Appendix B). Significant insight was gained by the hepatologist and liver transplant coordinator regarding AE's level of cognitive functioning, his cultural

beliefs and their significance in his life, and the severity and impact of his childhood trauma. The recommendations from testing were integral in developing a culturally-tailored and cognitively appropriate care plan for the patient to be successful pre- and post-transplant.

The testing results and recommendations also led to the development of an updated liver transplant evaluation by AE's transplant team. Subsequently, his case was re-discussed by the liver transplant selection committee, and he was approved to be activated on the liver transplant waitlist as he had overcome the barriers previously cited as reasons for deferral. Importantly, he had a committed caretaker, ER, who was willing to provide support through the entirety of the transplant process. Shortly after approval and receiving insurance authorization, AE was activated on the transplant waitlist.

Additional care team members were receptive to feedback about how to be culturally aware and sensitive to delivery of care for AE's unique needs. Post-surgery, the inpatient transplant coordinators abbreviated education sessions in accordance with AE's limited cognitive functioning. They also modified the health education to be written at his reading level and borrowed materials and resources from a local children's hospital for his use. In addition, efforts were made to relate the materials to AE's life interests and cultural beliefs to increase his likelihood of information retention. Once he was discharged from the hospital, his post-transplant coordinator communicated with him frequently and provided positive reinforcement. He was also encouraged to take ownership of his own recovery, something he needed help realizing he could do. The nurse practitioner made attempts to schedule every appointment at the same time to prevent confusion, and the nurses incorporated educational strategies with AE's love for wildlife and the outdoors.

Intervention Summary

At present, the patient is eight months post-transplant and doing well. He is compliant with medications, follow-up, and labs, which are stable. AE currently denies symptoms of depression, and his anxiety symptoms are at his pre-morbid state. These were all initial concerns posed by the liver transplant committee and have all been successfully overcome with psychotherapy and tailored recommendations. The patient has maintained this therapeutic alliance with his psychologist and has completed a total of ten sessions over a period of 1 year. Currently, AE is working on value-driven behavior, with a focus on his future. The next step of his treatment plan is to begin cognitive processing therapy to address symptoms of PTSD.

Discussion

The AASLD practice guidelines for liver transplantation are comprehensive in nature, but lack specificity with regards to psychosocial awareness (Martin et al., 2014). Because of the limited specificity, psychological evaluations are also inconsistent in practice (Fineberg et al., 2016). Comprehensive evaluations allow medical teams to assess multicultural components, thereby facilitating holistic and well-rounded care. Multiculturalism is not limited to one domain, such as ethnicity, but rather a broad concept (Pedersen, 1991). AE, for example, was from a minority background, had limited education with intellectual deficits, and a significant trauma history with personality features that made communication with his medical team challenging. Overall, this case study highlights the importance of understanding diversity including cultural identity, intellectual functioning, and mental health history.

There is some evidence that intelligence may predict quality of life outcomes post-liver transplant, but not survival outcomes. In addition, personality characteristics, such as low conscientiousness, is related to poorer compliance post-transplant (Fineberg et al., 2016). Jones and Kanwal, (2016) noted the impact of ethnicity, SES, and education as barriers to receiving a liver transplant. Communication/trust was also a critical component of outcomes. It was suggested that psychological testing, communication, and provider awareness can aid in the coordination of care, improve outcomes, and decrease disparities post-transplant. The approach to AE was thus consistent with the literature.

In order to provide a comprehensive psychodiagnostic assessment, a psychological interview, intellectual and aptitude testing, and personality assessment were completed. Even with these more objective assessments, multicultural awareness and interpretation was necessary. In this case, intelligence testing allowed for a tailoring of recommendations. Critically, the results prompted the treatment team to ensure the integration of AE's caregiver throughout the transplantation process, as she substantially facilitated his health literacy and adherence. Results of the psychosocial assessment were also enlightening and indicated that AE struggled with various symptom clusters. His elevations on the Somatization and Depression scales were consistent with his multiple medical concerns and adjustment disorder diagnosis. Similarly, the Antisocial and Borderline scale elevations were conceptualized by AE, ER, and the team as resulting from AE's complex trauma history that manifested in a diagnosis of PTSD, fractured relationships, and distrust of others.

Other results, however, were inconsistent with the assessors' clinical judgment and AE's self-reported

symptoms and mental health history. Notably, he showed elevations on the Paranoia and Schizophrenia scales but denied any history of psychotic and personality symptoms, including hallucinations, delusions, and paranoia. Thus, the empirical literature was consulted to investigate the cultural validity of personality assessments with American Indian patients. Prior research has indicated that American Indians show significantly higher elevations on the Schizophrenia and Paranoia Scales compared to predominantly White normative samples (Hill, Pace, & Robins, 2010; Pace et al., 2006). These differences are argued to be partially attributable to cultural differences, namely the relatively higher rates of socioeconomic hardship, trauma, and exposure to violence in American Indian groups. In addition, items and scales intended to reflect bizarre experiences, unusual thought processes, and ideas of persecution in White populations may inadvertently pathologize healthy and normal experiences and beliefs in American Indians (Hill et al. 2010). Therefore, AE's results were interpreted in the context of these empirical findings, as well as his complex trauma history and transient formal education (see Table 3). The results of the assessment had clinical implications for both AE's psychological and medical interventions. These interventions were specific to the patient's diverse needs and improved communication between the medical team and the patient.

Limitations

Although this case study effectively illustrates the necessity of a comprehensive multicultural approach to liver transplant evaluation, several limitations are important to note. First, UNOS statistics for liver transplantation outcomes are examined at the one-year mark. AE is only eight months post-transplant; however, incorporating cultural considerations into the psychodiagnostic assessments and treatment-planning processes was integral to developing a comprehensive treatment plan and is a large component of defining outcomes. Regarding administration of the PAI, we recognize that completing the assessment at home is not an ideal form of administration. However, given the complexity of this case, we also believed that the information gleaned from some sort of personality assessment would benefit our case conceptualization and treatment recommendations, even if it was slightly biased. Further, we stressed to the patient and his caregiver that it was imperative she only help read the questions to him if he was to become fatigued, but that the all answers should come from the patient alone. This was best clinical practice for this particular patient but may be considered a limitation of this report. Of note, the patient and his cousin did agree with the findings of the personality assessment, as well as the other measures used in the assessment.

Table 3 Example format for presenting AE's PAI results to medical team (paranoia and schizophrenia scales only)

Scale Name	Description	Etiology	Implication for Transplant
Paranoia	Mr. AE likely feels bitter and resentful about the way he has been treated and anticipates others will attempt to exploit him. The specific subscales suggest that Mr. AE likely questions and mistrusts the motives of those around him, despite the nature or history of these relationships. He may be quick to believe he is treated inequitably and dwell on past slights	These symptoms are likely linked to Mr. AE's history of complex trauma and the abuse inflicted by his stepfather as a child. His aversive experience with the formal educational system and challenges in romantic and interpersonal relationships are also likely correlated with these elevations	Working relationships with others, including medical providers, may be strained and may require a high degree of support and established rapport to establish trust and to enhance Mr. AE's willingness to actively participate in and adhere to medical treatments and procedures
Schizophrenia	Mr. AE is someone who may be seen as withdrawn, aloof, and unconventional. He may also be cautious and hostile in his few interpersonal relationships. Further, he endorsed unusual perceptual or sensory events or unusual ideas that may involve delusional beliefs	While the Schizophrenia-Psychotic Experiences subscale suggests psychotic symptoms, this elevation is more likely tapping Mr. AE's belief systems and experiences related to his American Indian culture. Prior negative relationships (e.g., childhood perpetrators, unhealthy romantic relationships) also likely contribute to his difficulty in social interactions	Odd or eccentric statements should be viewed as culturally-grounded. Coupled with Mr. AE's low cognitive and social functioning, they may also represent an attempt to neutralize uncomfortable/distressing situations. Additionally, his tendency to joke may be a defense mechanism to cope with stressful encounters or to provide time to respond to questions or statements perceived as complex. If the medical team has concerns about reality testing, efforts should be made to understand the meaning of Mr. AE's statements and his comprehension of medical instructions, the purpose of medical interventions, benefits and risks, etc. The onco-Psychology team remains available for consultation regarding these questions

Future Directions

Future research may want to further evaluate and develop “best practice” guidelines for psychodiagnostic assessments within transplant populations. While there are several articles that have discussed psychological evaluation processes, there is limited consistency within the field (Fineberg et al., 2016). Further, despite their obvious importance, there are no explicit recommendations for how to incorporate multicultural considerations. Focus groups with patients and providers assessing meaningful cultural aspects in the transplant process may allow for more specificity within the AASLD recommendations.

Conclusions

Liver recipient candidates go through a comprehensive biopsychosocial evaluation process prior to being listed for a transplant. The AASLD provides several specific recommendations within the guidelines for medical or counter indications for listing. The primary recommendations associated with listing reflect psychosocial factors

impacting the patients' ability to medically comply, mental health stability, and adequate social support/caregiving. While these factors are critical, the recommendations lack specificity on a host of multicultural components. This case study highlights the impact a comprehensive, multiculturally sensitive psychosocial assessment on both the transplant candidate and the care teams' interventions. More research is necessary to determine psychosocial risk factors to liver transplant, tools to assess cultural factors, and implementation of individualized treatment plans resulting from comprehensive assessments.

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Compliance and Ethical Standards

Conflict of interest Authors Jessica L. Hamilton, Kalon R. Eways, Sara Fohn, and Winston Dunn declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in this case report.

Appendix A

Recommendations for Patient

1. Development of a behavioral plan with the following components:
 - a. To aid with attention and concentration:
 - i. Focus on one task at a time.
 - ii. When conversing with others (e.g., medical providers), minimize distractions and attempt to devote attentional resources solely to the conversation.
 - b. To aid with learning and memory, particularly in relation to medical care:
 - i. Make lists, write down instructions, request printed copies of instructions and future appointments.
 - ii. Repeat instructions and ask provider to confirm you understood them correctly.
 - iii. Pair new information with something you already know. For example, to recall someone's name, try to associate that person with someone you know with the same or a similar name.
 - iv. Pair an important task with another one that occurs naturally at the same time of day. For example, keep your morning medications on the kitchen counter and take them while you eat breakfast.
 - v. Utilize therapy crystals as helpful.
 - c. To aid in language and comprehension:
 - i. Ask others to slow down when providing information or instructions.
 - ii. Make eye contact.
 - iii. Ask a friend or family member to attend social outings or doctors' appointments with you to assist you with communicating with others.
 - d. To utilize Visuospatial strengths:
 - i. Maintain lists and a calendar with visual stimuli, such as highlighting, color coding, or stickers, to designate certain tasks and appointments.
 - ii. Draw out charts or diagrams to conceptualize complex tasks and when making lists.
 - e. To enhance communication with medical team:
 - i. Bring a list of questions to medical appointments and write down the team's answers.
 - ii. Openly communicate with team about values and how the liver transplant may or may not be consistent with those values.
 - iii. Ask follow-up or clarifying questions if information is not understood or is perceived as being incompletely answered.
 - iv. Refrain from making jokes when in medical settings.
2. Continue with ongoing individual therapy. Specific targets for intervention should include:
 - a. Addressing maladaptive cognitions about the trustworthiness of others, particularly the medical team.
 - b. Enhancing social awareness and assertive communication.
 - c. Discussing values and goals for physical and mental health and quality of life.
 - d. Behavioral activation strategies aimed at increasing participation in enjoyable activities.
 - e. CPT for complex trauma.
3. Continue with routine medical care, particularly treatments targeting chronic pain and sleep disturbances, which may potentially assist with improving cognition.

Appendix B

Recommendations for Medical Treatment Team

1. To enhance communication and medical adherence:
 - a. Provide patient with printed copies of any instructions, guidelines, or recommendations when verbalized.
 - b. Encourage patient and his caregiver(s) to repeat back instructions to facilitate and reinforce understanding.
 - c. Patient education should be provided in one-on-one (non-group) setting.
2. Resources should be given at a reading level no higher than 3rd grade, if possible.
3. If possible, visual instructions using diagrams and images should be provided.
4. Appointments should be scheduled as far in advance as possible and with some consistent pattern (e.g., at the same time of day).
5. Attempts should be made to recognize that patient has difficulty trusting others due to previous life experiences

and may need additional support and time to establish rapport with providers.

6. Attempts should be made to recognize that jokes perceived as inappropriate in timing or content are likely reflective of patient's culture and/or efforts to cope with stressful situations, or to increase the amount of time he has to process difficult or confusing information.
7. Efforts should be made to understand patient's experiences and behaviors within the context of his American Indian culture and to incorporate his values and belief systems into medical decision making.
8. The patient's risk-taking and stimulus-seeking behaviors should be addressed when assessing his ability to adhere to medical recommendations, and the risks posed by nonadherence and impulsive behaviors should be clearly explained.

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