

Validity and Reliability of a Digital Application Combining LogoTherapy and Cognitive Behavior Therapy for Reducing Anxiety in Hemodialysis Patients with Chronic Kidney Disease

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Abstract

This study aims to assess the validity and reliability of a digital application that integrates Logotherapy and Cognitive Behavioral Therapy (LCBT) to reduce anxiety in patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) before and after intervention. Content validity was established through expert judgment from mental health professionals and IT specialists, while construct validity was confirmed through statistical analysis. Reliability was evaluated through Cronbach's alpha and test-retest methods. This application demonstrated strong content and construct validity, with a high Cronbach's alpha coefficient indicating excellent internal consistency. Additionally, the application demonstrated significant test-retest reliability, confirming its stability over time. These findings suggest that the LCBT application is a valid and reliable tool for managing anxiety in CKD patients, offering a promising adjunctive treatment to improve psychological outcomes in this vulnerable population.

Keywords: Chronic Kidney Disease, Hemodialysis, Anxiety, Logotherapy, Cognitive Behavioral Therapy, Hamilton Anxiety Rating Scale, Validity, Reliability

Introduction

Chronic Kidney Disease (CKD) is a progressive condition characterized by gradual loss of kidney function over time, often requiring long-term treatment such as hemodialysis. Hemodialysis, although life-sustaining, imposes significant psychological stress on patients, with anxiety being one of the most common mental health problems in this population (Rosyanti, Hadi, Antari, & Ramlah, 2023). Anxiety in CKD patients undergoing hemodialysis not only reduces their quality of life but also worsens disease progression by increasing physiological stress and negatively impacting treatment adherence (Palmer et al., 2013).

Given the profound impact of anxiety on CKD patients, addressing this psychological burden is critical to improving their overall health outcomes. Traditional psychological interventions, such as Logotherapy and Cognitive Behavioral Therapy (CBT), have been widely recognized for their efficacy in reducing anxiety (Sajjadi, M., Shokoohi-Yekta, M., & Khosravi, 2018). Logotherapy focuses on finding meaning in life,

even in the face of suffering, while CBT targets maladaptive thought patterns to modify emotional responses. These therapeutic approaches are effective in reducing anxiety across a variety of patient populations, including those with chronic illnesses (Ameli & Dattilio, 2013).

With the advent of digital health technologies, there is growing interest in the development of digital applications that deliver psychological therapies. These digital solutions offer the advantages of scalability, accessibility, and cost-effectiveness, making them well-suited for managing chronic conditions such as CKD (Kocsis, Desai, Abass, & Totten, 2022). The integration of Logotherapy and CBT into a digital application is a novel approach to managing anxiety in CKD patients undergoing hemodialysis. However, the effectiveness of such interventions depends on their validity and reliability, which must be rigorously evaluated before widespread adoption (Nilsson et al., 2019).

This study aimed to assess the validity and reliability of a newly developed digital application combining Logotherapy and CBT to reduce anxiety in CKD patients undergoing hemodialysis. By evaluating the application's content and construct validity, as well as its reliability, this study sought to establish the application as a viable tool to improve mental health outcomes in this vulnerable population.

Research Methods

A digital application combining LogoTherapy and Cognitive Behavior Therapy (LCBT) was developed to manage anxiety in hemodialysis patients with Chronic Kidney Disease (CKD). The study involved 60 CKD patients undergoing regular hemodialysis, who were randomly assigned to an intervention group, using the LCBT application, or a control group, receiving standard care.

Content Validity: The app's content validity was assessed using a panel of experts, including psychiatric nurses, nephrologists, and IT specialists. This panel of experts reviewed the app's therapeutic content and usability to ensure it was clinically relevant and user-friendly for patients with varying levels of technology experience.

Construct Validity: To evaluate construct validity, we compared Hamilton Anxiety Rating Scale (HARS) scores collected at baseline and after 8 weeks of intervention. We analyzed the differences in anxiety levels between the intervention and control groups to determine the effectiveness of the LCBT application in reducing anxiety.

Reliability: Reliability was assessed through Cronbach's alpha for internal consistency and test-retest reliability over a 4-week period. Cronbach's alpha measures the consistency of the app's therapeutic content, while test-retest reliability ensures that the app's performance is stable over time.

Program Assessment Rating (PAR): The PAR framework is used to evaluate the overall quality of LCBT apps. This assessment includes reviewing the app's design, functionality, and user engagement. PAR provides detailed insight into how well the app meets its therapeutic goals and how effectively it engages users.

Complexity, Outcomes, and Needs (ICON) Index: The ICON method was applied to assess the complexity of the app, the outcomes achieved, and the needs addressed.

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ICON evaluates the complexity of the app design and implementation, measures the reduction in anxiety outcomes, and determines how well the app meets the psychological and technological needs of patients.

This evaluation method ensures that the LCBT application is effective and practical for managing anxiety in hemodialysis patients, providing a comprehensive understanding of its validity, reliability, and overall quality

Results and Discussion

Reliability:

The reliability of the application was confirmed by a Cronbach's alpha of 0.91, indicating high internal consistency. Test-retest reliability, assessed over a 4-week interval, yielded a Pearson correlation coefficient of 0.87 and an Intraclass Correlation Coefficient (ICC) of 0.86, indicating the consistency and stability of the application in providing therapeutic outcomes.

Discussion:

The findings of this study indicate that a digital application combining LogoTherapy and Cognitive Behavioral Therapy (LCBT) is valid and reliable in reducing anxiety among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. High content and construct validity, as assessed by expert assessments from mental health professionals and IT specialists, indicate that the application is well-designed to address the specific anxieties experienced by this patient population. Content validity, confirmed by input from experienced professionals, indicates that the therapeutic content in the application is appropriate and comprehensive, aligned with the psychological needs of CKD patients during hemodialysis. This is consistent with a growing body of evidence emphasizing the importance of tailored interventions in managing chronic conditions (Beck & Dozois, 2011).

Furthermore, the construct validity of the app, supported by its ability to significantly reduce Hamilton Anxiety Rating Scale scores, suggests that the app effectively targets and reduces anxiety symptoms. This is in line with previous research that has demonstrated the efficacy of CBT-based digital interventions in reducing anxiety across a range of patient groups, including those with chronic illnesses (Hofmann & Smits, 2008). The integration of LogoTherapy, which emphasizes finding meaning in suffering, further enhances the therapeutic impact, particularly for CKD patients who often struggle with existential issues (Anheyer, Haller, Lauche, Dobos, & Cramer, 2022). The app's design, which combines cognitive restructuring with meaning-making, addresses both cognitive and existential aspects of anxiety, offering a holistic approach to mental health care in this context.

In terms of reliability, the app demonstrated strong internal consistency and test-retest reliability, indicating that the app produces stable and consistent results over time. This reliability is critical for clinical applications, as it ensures that therapeutic effects are not only immediate but also maintained with continued use. The consistency of these results across different usage scenarios suggests that the app is robust and adaptable to the diverse needs of CKD patients on hemodialysis. These findings are consistent with the literature on digital health interventions, which highlights the importance of reliability in ensuring user engagement and long-term effectiveness (Mohr et al., 2014). The use of established psychometric instruments, such as the Hamilton Anxiety Rating Scale, further validates the app's reliability by providing a standardized measure of anxiety reduction.

These results have significant implications for anxiety management in patients with CKD. The validated and reliable nature of the LCBT app supports its use as an adjunct tool in clinical settings, potentially filling the gap in psychological care experienced by many patients with CKD. Given the high prevalence of anxiety and depression in this population, as reported in numerous studies (Scott, Kokaua, & Baxter, 2011), the app offers a scalable and accessible solution that can be integrated into routine care. The digital format allows for ongoing use, which is particularly beneficial for managing the chronic and recurrent nature of anxiety in patients with CKD. Additionally, the ability to access therapy remotely is an advantage in the current healthcare landscape, where digital interventions are increasingly being adopted due to their convenience and cost-effectiveness (Chan & Chen, 2019).

In conclusion, the digital LCBT app is a promising tool for reducing anxiety in CKD patients undergoing hemodialysis. Its validated content and reliable results suggest that it can effectively complement traditional therapy methods, providing patients with a sustainable and personalized approach to anxiety management. Future research could explore the long-term effects of this app, including its impact on other psychological outcomes such as depression and quality of life. Additionally, research could examine the app's effectiveness in a broader patient population, including those with other chronic conditions, to fully understand its potential in digital mental health care.

Conclusion

This study validates the effectiveness of a digital application combining LogoTherapy and Cognitive Behavior Therapy in reducing anxiety among CKD patients undergoing hemodialysis. High validity and reliability metrics suggest that this application is a valuable resource for healthcare providers seeking to integrate digital therapeutic interventions into the treatment of anxiety in CKD patients.

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