

Facilitating Anxiety Reduction in Post Hospitalization Transitions Through Interventions for Independent Living

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Abstract

Transitioning to independent living after long-term hospitalization often triggers significant anxiety, impacting patients' ability to reintegrate successfully. This review examines existing evidence on at-home interventions aimed at reducing anxiety during this critical period, focusing on strategies such as cognitive-behavioral therapy (CBT), mindfulness-based stress reduction (MBSR), and progressive muscle relaxation. The integration of telehealth platforms and mobile applications has shown promise in delivering these interventions, with the potential to enhance accessibility and patient engagement. However, barriers such as socioeconomic inequities, limited digital literacy, and variable adherence rates remain significant challenges. Recommendations include the development of adaptive digital tools and the creation of hybrid intervention models combining virtual and in-person elements. Additionally, this review emphasizes the importance of incorporating mental health interventions into discharge planning protocols, prioritizing holistic approaches that address both psychological and functional recovery. A standardized framework for assessing the efficacy of at-home anxiety reduction programs, including measures of anxiety symptoms, quality of life, and healthcare utilization, is necessary to guide implementation and ensure equitable access across diverse patient populations. The insights and recommendations outlined provide a clear roadmap for integrating targeted anxiety reduction strategies into post-hospitalization care, focusing on practical tools like digital platforms and structured interventions. Tailored approaches aim to empower patients to effectively manage anxiety, regain functional independence, and navigate the complexities of life after long-term hospitalization with confidence and resilience.

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Introduction

Returning to independent living following hospitalization can be challenging for patients in many aspects. Individuals may face significant anxiety during their transition to independent living that can impede their recovery process and cause notable distress. The prevalence of anxiety after hospitalization varies depending on the patient group and the nature of their hospitalization. For patients discharged from intensive care units (ICUs), anxiety is quite common. A systematic review and meta-analysis revealed that about 32% of ICU survivors experience anxiety symptoms within the first year of recovery [1]. Additionally, a UK study found that 46% of ICU survivors reported significant anxiety symptoms at both three and twelve months post-discharge [2]. A study conducted in Japan found the prevalence of anxiety to be notably lower, with 16.6% of patients experiencing anxiety one-year post-ICU discharge [3]. In those discharged after acute coronary syndrome (ACS), anxiety was found in 18.8% of patients during their initial hospitalization, with many continuing to experience symptoms after discharge [4]. These findings indicate that patients with serious medical conditions experience significant rates of anxiety long after they have been discharged from the hospital.

Patients who are discharged from psychiatric hospitalizations can also face significant anxiety when transitioning from inpatient care to outpatient care. A study conducted by Mao et al. revealed that 56.4% of patients preparing to leave psychiatric

hospitals in Alberta, Canada, experienced anxiety [5]. This finding emphasizes the considerable mental health challenges faced by individuals transitioning from inpatient psychiatric care to outpatient settings. Furthermore, Mao et al. reported no significant improvement in mental health conditions, including anxiety, between baseline and six weeks post-discharge [6]. This persistence of anxiety symptoms highlights the need for ongoing mental health support and strategies to promote better long-term outcomes for these patients.

These findings emphasize a central theme: post-hospitalization anxiety should not remain isolated to one patient group because it is a common issue across diverse populations. However, variations within study populations, follow-up periods, and assessment methods may account for differences in reported prevalence rates. Overall, post-hospitalization anxiety is a common issue among patients who are hospitalized for serious medical conditions as well as those who were hospitalized for psychiatric diagnoses. These findings illustrate the widespread and enduring nature of post-hospitalization anxiety, highlighting the need for effective and accessible interventions that patients can utilize at home to support their mental health recovery as they undergo this critical transition from the hospital to outside. The primary aim of this literature review is to examine current evidence on at-home interventions aimed at reducing anxiety in the post-hospitalization period. This review compares the efficacy of and adherence to different interventions to reduce

post-hospitalization to provide suggestions regarding optimal interventions in the post-hospitalization periods.

Literature Review

Search Strategy

A comprehensive search strategy was conducted on December 14th, 2024 to identify relevant studies for literature review interventions focusing on post-hospitalization anxiety. The PubMed database was utilized to identify peer-reviewed studies that focused on diverse therapeutic approaches for managing anxiety as people transition from hospitalization to settings outside the hospital.

The search terms were carefully selected to cover the main aspects of the research topic. These terms were combined with Boolean operators such as “AND” and “OR” to ensure the results were both comprehensive and relevant. To address the hospitalization context, terms like “hospitalization,” “discharge,” “post-hospitalization,” “post-discharge,” “hospital discharge,” “after hospitalization,” “care transition,” and “post-acute care” were included.

Since anxiety was the central focus of the review, terms such as “anxiety,” “anxiety symptoms,” “psychological distress,” “emotional distress,” “post-hospital anxiety,” “post-discharge anxiety,” and “transition anxiety” were included in the search. To make sure studies using different terminologies were captured, a combination of MeSH terms (e.g. anxiety [MeSH Terms]) and free text keywords were used.

To capture a wide array of potential interventions aimed at reducing post-hospitalization anxiety, the search also included terms for various therapeutic approaches. These included evidence-based techniques like “cognitive-behavioral therapy,” “CBT,” “mindfulness-based stress reduction,” “MBSR,” “progressive muscle relaxation,” and “relaxation therapy.” To account for relatively more modern modes of anxiety treatment, terms such as “telehealth,” “digital interventions,” “mobile applications,” “e-health,” “peer support,” “virtual care,” and “online therapy” were included as well.

Lastly, only peer-reviewed articles involving adult populations were considered, excluding studies where the primary focus of subjects was less than 19 years old. Furthermore, only randomized controlled trials were considered for inclusion. Only studies published within the last ten years were considered to ensure the most recent and medically relevant research. Through these filters, inclusion and exclusion criteria as well as the use of further filteres, a strong foundation was placed to investigate current evidence regarding interventions to reduce post-hospitalization anxiety.

Results

The search strategy yielded four randomized controlled trials from 2014 to 2024 that focused on reducing post-hospitalization anxiety.

A 2019 randomized controlled trial conducted at two large academic health centers in the United States compared the efficacy of mobile app-based mindfulness, telephone-based mindfulness with a licensed psychologist, or educational content regarding critical illnesses for newly discharged ICU patients [7]. All treatment arms were conducted over three months. Anxiety was assessed with the Generalized Anxiety Disorder scale. Both the therapist-led and app-based mindfulness

interventions had significant reductions in GAD scale scores from baseline to three months with their 95% confidence intervals not containing zero. There was comparable efficacy in reducing post-hospitalization anxiety for patients assigned four sessions of therapist-led mindfulness training and those who used four sessions of mobile app based training, indicating that the two modalities have roughly the same impact on post-hospitalization anxiety. The online education content about critical illness did not contain any material about psychological well-being. The 95% confidence interval for that arm contained zero, indicating no statistically significant difference from baseline to three-month follow-up in the individuals assigned to that group. Overall, this study indicated that both therapist-led and app-based mindfulness training is efficacious in reducing post-ICU discharge anxiety, but further investigation is needed to determine which of those two is superior.

Cox et. al 2019 also assessed participants’ satisfaction with the program and perceived usability of the mobile app using an adapted Client Satisfaction Questionnaire and a System Usability Scale respectively. Patients rated all three interventions highly for satisfaction. Only the app intervention was assessed for usability, on average being rated greater than eighty percent for user-friendliness. Over ninety percent of patients assigned to each group completed all sessions of their allocated treatment.

A 2015 pilot randomized controlled trial evaluated the effectiveness of brief interventions for managing depression and anxiety during the early post-stroke period, a time when many patients struggle with mental health challenges [8]. Their study focused on self-management and coping skill interventions delivered at home through a website, with the hypothesis that these approaches could reduce anxiety and depression in stroke survivors during the critical post-discharge period. Although the interventions were not statistically significant for long-term reductions in anxiety compared to usual care, the study still highlighted the potential of home-based, tailored interventions for post-stroke mental health. Of the 91% of patients who completed the course of treatments, showing a high adherence rate, the only significant increase was in their stroke knowledge. Therefore, after 3-months of treatments, there were no reductions in anxiety or depressive symptoms in the interventional groups when compared to those receiving usual care. The findings suggest that while home-based, tailored interventions can engage stroke survivors and improve their knowledge about stroke, they may not provide significant changes in anxiety or depressive symptoms in the early post-stroke period.

A 2024 study explored the effect of the Roy Adaptation Model (RAM)-based cognitive stimulation therapy (CST) intervention on elderly patients with non-small cell lung cancer (NSCLC) undergoing curative resection [9]. RAM explores how people adapt to different challenges in life, focusing on their physical and emotional well-being. Within healthcare, RAM has helped assess pain in older adults and can be used to support patients with their post-hospitalization challenges. In this group setting, participants were split into RAM and control groups to complete interventions in four primary modes: physiologic, self-concept, role function, and interdependence. The physiologic modules provided patients with additional scheduled exercises and extra encouragement for post-operative mobility compared to standard care. The self-concept components included emotional

support groups and activities focused on memory and attention. The role function tasks included social skills training and gradual restoration of daily tasks. The interdependence module provides families with handbooks about family-based rehabilitation and has a nurse provide additional education to patients and caregivers. Each session was led by a therapist or nurse, and outcomes were assessed pre-operatively, at discharge, and one month after discharge.

This RAM-CST study found significant improvements in anxiety and depression from preoperative state to one month after discharge. One month after intervention, the RAM-based group also had significantly lower Hospital Anxiety and Depression Scale (HADS) anxiety scores compared to those who did not receive the intervention with a p-value of 0.024. The intervention group had statistically significant changes within the group at two different time points compared to the control group. During the one month of diagnostic testing, all participants had their quality of life assessed through a short-form health survey, with a higher score indicating a better quality of life. The study found that the RAM-based group had significantly higher quality of life scores at one month post-discharge compared to the control group with a p-value less than 0.001. At the one-month post-intervention stage, all participants completed a survey evaluating emotional, mental, general, and physical health, with the RAM group differences being statistically significant. However, the control group showed no significant changes in their scores. This study highlights the potential for home-based interventions tailored to the specific needs of patients that can reduce anxiety and improve quality of life in the post-hospitalization period. Adherence was not explicitly described in this study.

A 2023 study examined the effectiveness and practicality of a program on a mobile app called Blueprint in its use in combatting anxiety and depression in survivors of cardiorespiratory failure following hospital discharge [10]. The app offered self-guided coping exercises including relaxation techniques like guided breathing, cognitive exercises to challenge negative thoughts, and problem-solving activities to break down overwhelming challenges. The app also offered strategies for balancing daily activities and managing emotions, alongside video testimonials from ICU survivors and clinicians sharing relatable experiences. The study randomized participants into three groups: Blueprint alone, Blueprint with the addition of a therapist, and then a group who received the usual standards of care without the use of Blueprint. Those assigned to the therapist and app combination group received a phone call from a doctorate-level psychologist at the beginning of the study explaining the reasoning for the intervention and received follow-up calls from this psychologist if their Hospital Anxiety and Depression Scale score was in the high category or was higher than the previous week's score. Patients whose intervention involved the app were prompted to complete one or more tasks per day for a total of four weeks in the categories previously described. Both Blueprint groups demonstrated within-group improvements in psychological distress and quality of life over time assessed through the Hospital Anxiety and Depression Scale (HADS), Post Traumatic Stress Scale (PTSS) and the Quality of Life Visual Analog Scale (VAS). However, when compared to usual care, the improvements were not statistically significant. The adherence for this intervention was over ninety percent for all of the tasks combined in both the app-only and app-with-therapist groups. This research is

relevant to this literature review as it explores unique and innovative yet scalable strategies for addressing post-hospital anxiety.

Analysis

The transition to independent living after hospitalization is a critical time for patients, where many experience anxiety that can impair their recovery and negatively impact their overall well-being. This literature review examined multiple studies focused on the management of post-hospitalization anxiety across different patient populations, the effectiveness of using different interventions, and the potential of home-based mental health support. Through this source analysis, important insights and trends highlighted the need for accessible and sustainable interventions that can target anxiety during this critical period.

The collective findings from the reviewed studies emphasize that post-hospitalization anxiety is a widespread issue that transcends various patient populations. The high prevalence underscores the importance of making anxiety management an integral and routine component of post-hospitalization care. However, the variability in prevalence rates (ranging from 16.6% to 56.4% depending on the patient group) indicates that post-hospitalization anxiety may greatly vary across populations, and this variability likely reflects differences in underlying health conditions, the reason for the hospitalization, and the length of follow-up [1,2,3].

There is a clear trend that home-based, mobile, and mindfulness-based interventions show high levels of participant engagement, as evidenced by the 2019 Cox et al. study, where 92% and 93% of participants in the mobile app-based and therapist-led groups respectively completed all intervention sessions [7]. This high adherence suggests that patients are willing to engage with interventions that provide easy access and education that helps address mental health support. This is especially crucial during the post-hospitalization period when time, accessibility, and other barriers can make consistent treatment challenging. These adherence findings imply that while any interventional session will spark engagement among patients, mobile app-based sessions may remain a more viable long-term option to support anxiety management in home settings. Although not statistically significant, a comparable impact on anxiety symptoms in both mobile sessions was found in the Blueprint mobile app-based intervention. This study showed similar adherence rates between the app-only and therapist-led groups, which reinforced the potential of this approach to provide one-to-one care for patients dealing with post-hospitalization anxiety. Moreover, this further supports the importance of mobile interventions as an accessible, effective option for managing mental health challenges long-term following hospitalization.

In comparison, the web-based self-management and coping skills interventions examined by Hoffman et al. did not show significant improvements in anxiety or depression compared to usual care [8]. The only measurable outcome was an increase in stroke knowledge, with no long-term reductions in anxiety or depressive symptoms. These findings suggest that while the intervention successfully kept stroke survivors engaged while improving their knowledge about their condition, it did not produce significant changes in their anxiety or depressive symptoms during the early post-discharge period. The findings emphasize the need for further research to refine intervention content, determine the most effective timing for

implementation, and additionally identify further factors that could more effectively address long term mental health needs.

The positive outcomes observed by Chen et al., where elderly patients showed significant improvements after participating in Roy Adaptation Model-based cognitive stimulation therapy (CST), highlight the importance of one-on-one interventions [9]. While two of the four modalities were delivered in group settings, the remaining two provided participants with standardized one-on-one content that addressed their specific needs. This one-to-one approach could be particularly beneficial for those with complex medical and psychological conditions, as it allowed for a more comprehensive care model that supported both their emotional and cognitive recovery. This study also indicated how one-to-one care can enhance treatment adherence, as patients are more likely to engage with interventions that address their needs and concerns privately. In contrast, some studies showed limited or no sustained effects, like Hoffman et al., which suggests the effectiveness of post-hospitalization interventions may depend on factors such as the patient population, the type of intervention used, and the timing of the intervention relative to the patient's recovery period.

Additionally, participants have rated mobile app-based mindfulness interventions as easy to navigate and were overall satisfied with their experiences [7]. This indicates that app-based interventions are well-received by patients and could be further utilized to improve mental health. While the Cox et. al trial in 2023 did not assess usability in the entire group, an initial focus group of participants demonstrated similar usability of this app to the app constructed by the group in 2019.

Although not all of the randomized controlled trials showed statistically significant changes in anxiety following intervention, all studies that measured adherence rates had strong retention of participants at over ninety percent each. This indicates that website-based, app-based, and therapist-led interventions are all effective approaches in retaining participants, even when there is no significant improvement in anxiety after intervention. This demonstrates that patients are likely to fully participate in interventions of these modalities, implying they are optimal ways to manage the issue of post-hospitalization anxiety given that the content of those interventions is proven to reduce anxiety.

Overall, these studies paint a picture of both promise and complexity when managing post-hospitalization anxiety. While some interventions, like mindfulness-based approaches, have evidentially supported effectiveness across different patient groups, others require further refinement to determine their optimal use. The findings also indicate that adherence and patient engagement remain similar throughout different modalities whether the intervention is a mobile app, therapist-guided sessions via telephone, or a website. At-home mobile app sessions may offer more flexibility and greater potential to allow sustained engagements with in-person treatments. Ultimately, interventions need to be flexible and one-to-one, offering a standardized approach while still being tailored to individual patient needs to ensure the greatest impact.

Limitations and Future Directions

Despite the valuable insight from these reviewed studies, several gaps still exist. For one, many of these studies had small sample sizes, relatively short follow-up periods, and limited diversity within their patient populations. These shortcomings reduce the

generalizability of their findings. As mentioned before, anxiety can remain long after patients are discharged. Future studies need to ensure that their populations are more diverse, have longer follow-up periods, and effectively compare different types of interventions. It could be beneficial to explore how different interventions, such as mobile-based programs, perform across different age groups. Since older individuals may face technology challenges, it raises the question of whether these interventions are effective for them or if alternative approaches are needed to better address their mental health. Additionally, although mobile app-based interventions are a sound option for individuals with smartphones, many people do not have consistent access to smartphones or the Internet. Interventions via phone call or in-person sessions could be a better fit for patients without smartphones or internet access. The virtual and in-person modalities could also be combined to achieve the benefits of both. Overall, technology-based interventions show great promise in reducing post-discharge anxiety but managing post-hospitalization anxiety requires an individualized approach to determine what is best suited for the patient and their unique situation.

Conclusions

The literature review emphasized the consistent need for effective yet accessible mental health interventions to target post-hospitalization anxiety. While home-based interventions, like mobile health apps and personalized cognitive-behavioral approaches, show promise, there is a clear need for future research to optimize these interventions and understand the factors that influence their effectiveness. Current literature provides evidence for the use of mobile app-based mindfulness programs, and we suggest that patients discharged from the hospital should have a plan for post-hospitalization anxiety that is constructed with their care team. By including a discussion of post-hospitalization anxiety along with resource suggestions before discharge, patients are better equipped to return to independent living if they have been hospitalized for a significant illness or prolonged period. Adding this component to a discharge checklist could result in patients being better prepared to handle post-hospitalization anxiety and have a less challenging post-discharge period. Given the widespread nature of post-hospitalization anxiety, especially with underserved populations like ICU survivors, stroke patients, and individuals recovering from ongoing care, addressing these mental health challenges should remain a priority for healthcare systems. Personalized, accessible, and sustainable interventions are important in improving long-term recovery outcomes and promoting overall well-being for patients transitioning back to independent living.

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