

EFFICACY OF A NURSE-FACILITATED TELEHEALTH MINDFULNESS INTERVENTION FOR CHRONIC DISEASE SELF-MANAGEMENT IN RURAL HEART FAILURE PATIENTS.

Original Article

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ABSTRACT

Background: Chronic heart failure is a prevalent condition associated with high symptom burden, frequent hospitalizations, and reduced self-management confidence, particularly among patients residing in rural regions with limited access to specialized care. Behavioral and psychosocial interventions, including mindfulness-based strategies, have shown potential to enhance patient self-efficacy and improve clinical outcomes. However, evidence regarding the integration of nurse-facilitated telehealth mindfulness interventions in rural heart failure populations remains limited.

Objective: This study aimed to evaluate the impact of a nurse-facilitated telehealth mindfulness program on self-efficacy, symptom burden, and unplanned hospital admissions in rural patients living with chronic heart failure.

Methods: A five-month randomized controlled trial was conducted in Southern Punjab involving 80 adult patients diagnosed with chronic heart failure. Participants were randomly allocated to either an intervention group receiving weekly telehealth mindfulness sessions facilitated by trained nurses alongside standard care, or a control group receiving usual care alone. Self-efficacy was assessed using the Self-Care of Heart Failure Index (SCHFI), symptom burden using the Kansas City Cardiomyopathy Questionnaire (KCCQ), and unplanned hospital admissions were tracked via medical records and follow-up interviews. Data were analyzed using independent and paired t-tests for continuous variables and chi-square tests for categorical outcomes.

Results: Post-intervention, the intervention group demonstrated significant improvements in self-efficacy (mean SCHFI 64.3 ± 8.5 vs 51.2 ± 9.0 in controls, $p=0.001$) and reduced symptom burden (mean KCCQ 71.5 ± 8.7 vs 60.2 ± 9.5 , $p=0.002$). Unplanned hospital admissions were lower in the intervention group (18.4%) compared with controls (39.5%, $p=0.042$). A moderate negative correlation was observed between self-efficacy and symptom burden ($r = -0.52$, $p<0.01$).

Conclusion: The nurse-facilitated telehealth mindfulness intervention effectively enhanced self-management confidence, reduced symptom burden, and decreased unplanned hospitalizations among rural heart failure patients. These findings support the integration of structured behavioral and psychosocial strategies into telehealth programs to improve patient-centered outcomes in underserved populations.

Keywords: Chronic disease, Heart failure, Mindfulness, Rural health, Self-efficacy, Symptom management, Telehealth

INTRODUCTION

Heart failure remains one of the most prevalent and challenging chronic conditions worldwide, placing a significant burden on patients, families, and health systems (1). Characterized by the heart's inability to pump sufficient blood to meet the body's metabolic demands, the condition is associated with persistent symptoms such as fatigue, breathlessness, edema, and reduced exercise tolerance (2). These symptoms frequently fluctuate, often leading to repeated hospitalizations and diminished quality of life. Effective long-term management requires more than pharmacological therapy alone; it demands sustained self-management behaviors including symptom monitoring, medication adherence, dietary modification, and timely communication with healthcare providers (3). For many individuals, particularly those living in rural communities, maintaining these complex behaviors can be especially challenging due to limited access to specialized care, geographic isolation, and reduced availability of structured educational and psychosocial support (4). Rural populations often experience a disproportionate burden of chronic disease complications. Patients with heart failure residing in remote or underserved areas may face substantial barriers to routine follow-up visits, cardiac rehabilitation services, and educational programs designed to support disease self-management. Travel distances, transportation limitations, financial constraints, and shortages of specialized healthcare professionals can hinder consistent engagement with healthcare systems (4). As a result, rural patients frequently present with poorly controlled symptoms and higher rates of preventable hospital admissions. These disparities highlight the urgent need for innovative and accessible care models that extend beyond traditional clinic-based interventions.

Telehealth has emerged as a promising strategy to bridge this gap by delivering healthcare services through digital communication technologies. By enabling remote monitoring, education, and patient-provider interaction, telehealth platforms allow individuals with chronic illnesses to receive continuous guidance without the need for frequent in-person visits. Over the past decade, telehealth interventions in heart failure management have demonstrated potential benefits including improved symptom monitoring, enhanced medication adherence, and earlier detection of clinical deterioration (5). However, many telehealth programs primarily focus on physiological monitoring or clinical communication, while comparatively less attention has been directed toward psychological and behavioral dimensions of chronic disease management. The psychological burden of heart failure is considerable. Living with a chronic, progressive condition often generates anxiety, emotional distress, and uncertainty about symptom fluctuations (6). These psychological factors can significantly influence a patient's confidence in managing their illness and adhering to recommended self-care behaviors. Self-efficacy, defined as an individual's belief in their ability to perform behaviors necessary to achieve desired health outcomes, plays a central role in chronic disease management (7). Patients with stronger self-efficacy are more likely to recognize early warning signs, engage in appropriate self-care, and seek timely medical assistance. Conversely, low self-efficacy has been linked to increased symptom burden, poorer quality of life, and higher rates of hospitalization among individuals with heart failure (8).

Mindfulness-based interventions have gained increasing attention as complementary approaches for managing chronic illness. Mindfulness practices encourage individuals to cultivate present-moment awareness, emotional regulation, and non-judgmental acceptance of physical and psychological experiences. In patients with chronic disease, these techniques have been associated with reductions in stress, improved coping mechanisms, and enhanced engagement with self-management behaviors (9). For individuals living with heart failure, mindfulness may help patients better interpret bodily sensations, reduce anxiety related to symptom fluctuations, and foster a more proactive approach to managing their condition (10). Nurses play a particularly vital role in facilitating such behavioral and psychosocial interventions. As frontline healthcare professionals who maintain frequent and meaningful contact with patients, nurses are uniquely positioned to provide education, emotional support, and practical guidance related to disease self-management. Nurse-led programs often emphasize patient empowerment, holistic care, and continuity of support, all of which are critical components of effective chronic disease management. Integrating mindfulness training into nurse-facilitated telehealth platforms therefore offers a promising model for simultaneously addressing the clinical, psychological, and behavioral needs of rural heart failure patients.

Despite growing recognition of the benefits of telehealth and mindfulness-based approaches, evidence regarding the combined impact of nurse-facilitated telehealth mindfulness interventions on heart failure outcomes remains limited, particularly within rural populations (11). Existing studies have frequently focused on either telemonitoring or psychological support independently, leaving a gap in understanding how integrated interventions may influence patients' confidence in self-management, perceived symptom burden, and healthcare utilization patterns. Addressing this gap is essential for developing sustainable care models capable of improving outcomes for underserved populations. By examining both psychosocial and clinical indicators, such research can provide valuable insight into whether digital nurse-led mindfulness programs can strengthen patient self-efficacy while simultaneously reducing symptom distress and preventable hospital admissions (11, 12).

Therefore, the present randomized controlled trial was designed to evaluate the efficacy of a nurse-facilitated telehealth mindfulness intervention for chronic disease self-management among rural patients living with heart failure. Specifically, the study aimed to determine whether participation in the program improves patients' self-efficacy in managing their condition, reduces the burden of heart failure-related symptoms, and decreases the frequency of unplanned hospital admissions compared with usual care.

METHODS

A randomized controlled trial was conducted over a five-month period to evaluate the efficacy of a nurse-facilitated telehealth mindfulness intervention for chronic disease self-management among individuals diagnosed with heart failure. The study was carried out in Southern Punjab, a region characterized by dispersed rural communities and limited access to specialized cardiovascular services. The setting was considered particularly relevant because patients residing in this region often experience barriers to continuous clinical follow-up, making remote health support strategies both practical and necessary for improving long-term disease management. Participants were recruited from outpatient cardiology clinics affiliated with secondary care hospitals serving rural catchment areas. Adults aged 40 years or older with a confirmed diagnosis of chronic heart failure for at least six months were considered eligible. Additional inclusion criteria included stable pharmacological treatment for the preceding three months, the ability to communicate in Urdu or Punjabi, and access to a basic smartphone capable of supporting telehealth communication. Individuals with severe cognitive impairment, advanced psychiatric illness, terminal comorbid conditions, or those currently participating in another behavioral intervention program were excluded to ensure consistency in outcome assessment. Following eligibility screening and informed consent, participants were randomly allocated in a 1:1 ratio into either the intervention group receiving the nurse-facilitated telehealth mindfulness program alongside standard care or the control group receiving usual heart failure management alone.

A total sample of 80 participants was included in the trial. The sample size was determined with reference to a previously published randomized study investigating behavioral self-management interventions in heart failure patients that included approximately 70 participants, demonstrating adequate statistical power for detecting moderate differences in psychosocial outcomes. Allowing for potential attrition, a slightly larger cohort was recruited to preserve analytical reliability. Data were collected at baseline and at the end of the intervention period using validated measurement instruments. Self-efficacy related to chronic disease management was assessed using the Self-Care of Heart Failure Index (SCHFI), a widely used instrument that evaluates patient confidence and adherence to recommended self-management behaviors. Symptom burden was measured using the Kansas City Cardiomyopathy Questionnaire (KCCQ), which captures patients' perceptions of symptom frequency, physical limitation, and quality of life associated with heart failure. Information regarding unplanned hospital admissions was obtained through hospital medical records and patient follow-up interviews to ensure accuracy of reported events.

Participants assigned to the intervention group attended weekly telehealth sessions facilitated by trained cardiac nurses. These sessions incorporated guided mindfulness practices, breathing techniques, and brief educational discussions focused on symptom awareness, stress regulation, and daily self-management strategies. Each session lasted approximately 30 minutes and was delivered through a secure mobile communication platform. Data analysis was performed using SPSS version 26. Descriptive statistics were calculated to summarize demographic and clinical characteristics of participants. Continuous variables were expressed as means and standard deviations, while categorical variables were presented as frequencies and percentages. The normal distribution of continuous data was verified using the Shapiro–Wilk test. Independent sample t-tests were applied to compare mean outcome scores between the intervention and control groups, while paired t-tests were used to assess within-group changes between baseline and post-intervention measurements. Differences in hospital admission frequencies were analyzed using the chi-square test. Pearson correlation analysis was also conducted to evaluate the relationship between self-efficacy scores, symptom burden, and hospital admission frequency. Statistical significance was determined at a p-value of less than 0.05.

RESULTS

A total of 86 patients were initially approached for participation during the recruitment period. Of these, 80 individuals met the eligibility criteria and consented to participate, resulting in a response rate of 93.0%. Participants were randomly assigned to the intervention group (n=40) or the control group (n=40). During the follow-up period, four participants were lost to follow-up due to relocation or inability to maintain telehealth communication; however, outcome data were available for 76 participants at the end of the study period, yielding a completion rate of 95.0%. The final analysis included 38 participants in the intervention group and 38 in the control group. The baseline

demographic and clinical characteristics of the participants are summarized in Table 1. The mean age of the sample was 58.6 ± 9.4 years, with the majority of participants aged between 50 and 65 years. Male participants comprised 56.3% of the sample, while females represented 43.7%. Most participants were married (82.5%) and resided in rural villages surrounding secondary care centers. The mean duration of diagnosed heart failure was 4.8 ± 2.1 years. Baseline characteristics, including age distribution, comorbid conditions, and initial self-care scores, were comparable between the intervention and control groups, with no statistically significant differences observed ($p > 0.05$).

At baseline, the mean Self-Care of Heart Failure Index (SCHFI) self-efficacy score for the entire sample was 48.7 ± 9.2 . At the end of the five-month intervention period, the intervention group demonstrated a significant improvement in mean self-efficacy scores, increasing to 64.3 ± 8.5 compared with 51.2 ± 9.0 in the control group ($p = 0.001$). Within-group analysis revealed a statistically significant increase in self-efficacy scores among participants receiving the nurse-facilitated telehealth mindfulness program ($p < 0.001$), while the control group demonstrated only modest, non-significant improvement. Similarly, symptom burden measured using the Kansas City Cardiomyopathy Questionnaire (KCCQ) showed notable improvement in the intervention group. The mean baseline KCCQ score was 55.1 ± 10.3 for the intervention group and 56.4 ± 9.8 for the control group. At the end of the study, the intervention group exhibited a mean score of 71.5 ± 8.7 , reflecting reduced symptom severity and improved functional perception, whereas the control group showed a smaller increase to 60.2 ± 9.5 . The between-group difference was statistically significant ($p = 0.002$). These findings are summarized in Table 2 and Table 3.

Unplanned hospital admissions during the study period were also lower among participants receiving the intervention. A total of 7 admissions (18.4%) were recorded in the intervention group compared with 15 admissions (39.5%) in the control group. The difference in admission frequency reached statistical significance ($\chi^2 = 4.12$, $p = 0.042$). Detailed comparative outcomes between groups are presented in Table 4. Correlation analysis further revealed a moderate negative correlation between self-efficacy scores and symptom burden ($r = -0.52$, $p < 0.01$), indicating that higher confidence in disease self-management was associated with lower reported symptom severity. Additionally, improved self-efficacy demonstrated a modest association with reduced likelihood of unplanned hospital admission ($r = -0.36$, $p = 0.03$).

Overall, participants who engaged in the nurse-facilitated telehealth mindfulness intervention reported greater improvements in self-management confidence and symptom control compared with those receiving usual care alone. These findings suggested that integrating structured behavioral support through telehealth platforms may contribute to meaningful improvements in both psychosocial and clinical outcomes among rural patients living with chronic heart failure.

Table 1: Baseline Demographic and Clinical Characteristics of Participants (N=80)

Variable	Category	n (%) / Mean \pm SD
Age (years)	Mean \pm SD	58.6 ± 9.4
Age Group	40–49	18 (22.5%)
	50–65	42 (52.5%)
	>65	20 (25.0%)
Gender	Male	45 (56.3%)
	Female	35 (43.7%)
Marital Status	Married	66 (82.5%)
	Unmarried/Widowed	14 (17.5%)
Duration of Heart Failure	Mean \pm SD	4.8 ± 2.1 years
Hypertension (Comorbidity)	Yes	49 (61.3%)
Diabetes Mellitus	Yes	31 (38.8%)
Baseline SCHFI Score	Mean \pm SD	48.7 ± 9.2
Baseline KCCQ Score	Mean \pm SD	55.7 ± 10.0

Table 2: Self-Care of Heart Failure Index (SCHFI) Self-Efficacy Scores by Group

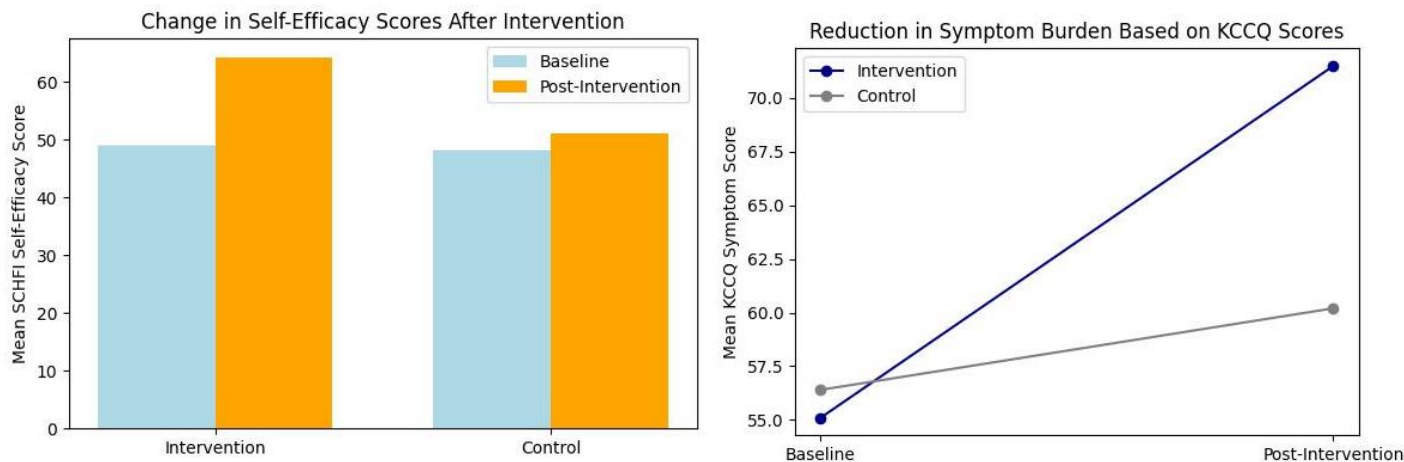
Group	Baseline Mean ± SD	Post-Intervention Mean ± SD	p-value
Intervention (n=38)	49.1 ± 9.0	64.3 ± 8.5	<0.001
Control (n=38)	48.3 ± 9.4	51.2 ± 9.0	0.09

Table 3: Kansas City Cardiomyopathy Questionnaire (KCCQ) Symptom Scores

Group	Baseline Mean ± SD	Post-Intervention Mean ± SD	p-value
Intervention (n=38)	55.1 ± 10.3	71.5 ± 8.7	0.002
Control (n=38)	56.4 ± 9.8	60.2 ± 9.5	0.11

Table 4: Comparison of Unplanned Hospital Admissions

Group	Number of Admissions	Percentage	p-value
Intervention (n=38)	7	18.4%	
Control (n=38)	15	39.5%	0.042



DISCUSSION

The findings of this study demonstrated that a nurse-facilitated telehealth mindfulness intervention was associated with significant improvements in self-efficacy, reductions in symptom burden, and decreased unplanned hospital admissions among rural patients with chronic heart failure (13). Participants in the intervention group exhibited a marked increase in Self-Care of Heart Failure Index scores, reflecting enhanced confidence in performing daily self-management tasks and adherence to treatment recommendations. This improvement suggests that structured, nurse-led behavioral support delivered remotely can effectively empower patients to take a more active role in managing their condition, particularly in settings where direct access to healthcare resources is limited. The observed reduction in symptom burden, as measured by the Kansas City Cardiomyopathy Questionnaire, indicates that increased self-efficacy translated into tangible clinical and functional benefits, with patients reporting better symptom control and improved physical well-being (14). These outcomes align with previous evidence suggesting that psychosocial and behavioral interventions complement traditional clinical care in heart failure management. The integration of mindfulness practices likely facilitated enhanced symptom awareness, emotional regulation, and stress reduction, which may have contributed to the observed improvements in patient-reported outcomes (15). The moderate negative correlation between self-efficacy and symptom burden underscores the interdependent relationship between psychological empowerment and clinical manifestations, highlighting the importance of addressing both behavioral and physiological aspects of chronic disease management (16). Furthermore, the significant decrease in unplanned hospital admissions among participants receiving the intervention demonstrates the potential for telehealth programs to reduce acute care utilization, alleviating both individual and systemic healthcare burdens in rural populations.

The study’s strengths include its rigorous randomized controlled design, which minimized selection bias and allowed for clear comparison between intervention and control groups (17). The use of validated measurement instruments provided reliable assessment of both psychosocial and clinical outcomes, ensuring that changes could be confidently attributed to the intervention (18). Conducting the study in Southern Punjab offered a contextually relevant setting, capturing the challenges faced by rural patients in accessing specialized care and demonstrating the feasibility of implementing telehealth strategies in geographically underserved regions. The high completion rate further strengthens the validity of the findings, indicating that participants were able to engage consistently with the telehealth program over the study period. Several limitations were identified (19). The sample size, although adequate for detecting moderate effects, was relatively small and derived from a limited geographic area, which may restrict the generalizability of findings to broader populations (2, 20). The intervention duration of five months provided evidence of short-term benefits, but longer-term sustainability of self-efficacy improvements and symptom reduction remains to be established. Data collection relied partially on self-reported measures, which may be influenced by social desirability or recall biases, particularly in reporting adherence behaviors and symptom experiences. Additionally, although efforts were made to standardize the telehealth sessions, variability in participant engagement and individual responsiveness to mindfulness practices could have influenced outcome heterogeneity.

The results have important implications for the design of chronic disease management programs. Nurse-facilitated telehealth interventions can serve as an accessible and cost-effective approach to enhancing patient empowerment, particularly in regions where travel constraints and healthcare workforce limitations hinder frequent in-person follow-up (21). The observed reductions in unplanned hospital admissions also suggest that such programs may have meaningful economic and resource utilization benefits, in addition to improving patient quality of life. Integrating mindfulness techniques into standard telehealth platforms can address both psychological and physiological dimensions of heart failure management, supporting holistic care models that prioritize patient-centered outcomes. Future research should focus on larger, multicenter trials to confirm these findings across diverse rural populations and varying healthcare infrastructures (22). Extended follow-up periods would allow evaluation of the durability of improvements in self-efficacy and symptom control, as well as long-term impacts on hospitalization rates and healthcare costs. Comparative studies examining different modes of telehealth delivery and varying intensities of mindfulness interventions could provide insight into optimizing program design for maximum clinical and behavioral impact. Investigations into patient characteristics that predict responsiveness to such interventions may further enable tailored approaches, enhancing effectiveness and efficiency in chronic disease management.

The nurse-facilitated telehealth mindfulness intervention demonstrated meaningful improvements in self-efficacy, symptom burden, and hospital utilization among rural patients with heart failure. The findings underscore the value of combining behavioral, educational, and psychosocial support within accessible remote care models. While acknowledging limitations related to sample size and study duration, the results support continued exploration and integration of telehealth mindfulness strategies as part of comprehensive, patient-centered chronic disease management programs.

CONCLUSION

The study demonstrated that a nurse-facilitated telehealth mindfulness intervention significantly enhanced self-efficacy, reduced symptom burden, and decreased unplanned hospital admissions among rural patients with chronic heart failure. These findings highlight the practical value of integrating structured behavioral and psychosocial support into remote care models, offering an accessible and effective strategy to empower patients, improve clinical outcomes, and reduce healthcare utilization. The results underscore the potential of telehealth mindfulness programs to strengthen patient-centered chronic disease management in resource-limited rural settings.

AUTHOR CONTRIBUTION

Author	Contribution
Sonita Rahmat	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Sarwat Mobeen	Methodology, Investigation, Data Curation, Writing - Review & Editing
Nadia Hanif	Investigation, Data Curation, Formal Analysis, Software
Izzya Taj	Software, Validation, Writing - Original Draft
Sarah Javed	Formal Analysis, Writing - Review & Editing
Dr Muhammad Ishaque M.R.	Writing - Review & Editing, Assistance with Data Curation

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