Evaluating Cognitive Ability of Patients with Heart Failure
to Determine Specific Discharge Teaching Needs

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Abstract

Clinical problem: Patients diagnosed with heart failure are being readmitted with exacerbations of symptoms related to medication nonadherence.

Objective: To review and synthesize current peer-reviewed research in order to establish the effectiveness of administering cognitive aptitude screenings prior to discharge in order to tailor self-management instructions to patient’s cognitive ability.

Data sources: Using PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and The Cochrane Collaboration, key terms used to identify evidence-based research include heart failure cognition, cognitive ability, and medication adherence related to cognitive ability. A total of four relevant peer reviewed articles and one clinical guideline were utilized for literature review.

Results: Research studies have discovered the targeted populations most likely to return with exacerbations of heart failure symptoms, but successful interventions to prevent readmission have yet to be identified. Evidence-based research supports the probability of limited cognition in patients with heart failure (Pressler et al., 2011; Riegel et al., 2012) and the need for appropriate discharge teaching (Smeulders et al., 2010; Yancy et al., 2013); however, research evaluating the effectiveness of cognitive aptitude tests in a heart failure population has not yet been implemented.

Conclusion: In order to determine how to effectively tailor discharge teaching to patient ability, it has been proposed to administer the Saint Louis University Mental Status (SLUMS) examination (Feliciano et al., 2013) prior to discharge to determine patient cognitive ability. Based on the exam score, discharge teaching will be personalized to the patient’s cognitive needs.
Evaluating Cognitive Ability of Patients with Heart Failure to Determine Discharge Teaching Needs

Patients diagnosed with heart failure (HF) are faced with a devastating prognosis. On average, patients live a total of five years beyond the diagnosis. There are a variety of interventions that improve symptoms and prolong life. A combination of sodium restriction, exercise, and medications including β-blockers, aldosterone antagonists, and angiotensin-converting enzyme inhibitors has been proven to have a significantly positive effect on quality of life. There are many ways to live a satisfying life with HF, but multiple research articles discuss the connection between continued hospital readmissions and medication nonadherence (Riegel et al., 2012; Yancy et al. 2013).

Questions revolve around why patients have difficulty complying with the lifestyle change required for HF management. Is there a simple solution, or is it a complex answer? A plausible argument is that patients may have difficulty maintaining the prescribed medication regimen because they do not fully understand, nor do they have the cognitive capability to understand, the reasons behind treatment. By pre-screening patients with approved cognitive assessment tools, nursing and medical staff could tailor discharge teaching to the patient’s individual learning needs and avoid future hospital readmissions. The question guiding this review is as follows: In a population of patients 60 years and older, diagnosed with congestive heart failure (CHF) and an ejection fraction (EF) of 40% or less, would a cognitive screening exam prior to discharge help facilitate a more tailored discharge teaching?

Literature Search

The search engines used to identify applicable research articles include: PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and The Cochrane
Collaboration. Key terms used to ascertain research include: cognitive ability, cognitive screening, Saint Louis University Mental Status examination, Mini Mental State Exam, medication adherence in HF patients, hospital readmissions in HF, reasons for medication nonadherence, HF cognition, and medication adherence related to cognitive ability. The following is a review of current evidence-based research in relation to cognitive ability, HF, and medication nonadherence.

**Literature Review**

**Predictors of Medication Nonadherence**

It is estimated that 40% to 60% of patients diagnosed with HF do not comply with the medication regimen (Riegel et al., 2012). Riegel et al. (2012) conducted a prospective observational study to identify common trajectories of nonadherence in patients with HF. The sample was composed of 280 adults diagnosed with Stage C chronic HF from the northeastern United States. A total of 242 participants finished the six-month study, and the final results included 202 participants with the average being a 63-year-old white male (see Table 1). Data recorded for this sample reflects four categories of nonadherence including: taking nonadherence, dosing nonadherence, timing nonadherence, and drug holidays (Riegel et al., 2012).

In order to assess medication adherence, an electronic monitor, the Medication Event Monitoring System (MEMS), was utilized to assess the number of times the patient opened his or her medication bottle in real-time (Riegel et al., 2012). Data were collected over a six-month time frame, and information was downloaded to a database every three and six months. Accidental bottle openings were recorded by the patient in a study diary and rectified prior to data analysis (Riegel et al., 2012).
Results determined significant changes over time in taking nonadherence, dosing nonadherence, and timing nonadherence (Riegel et al., 2012). Patient-related factors (e.g. cognitive impairment) and therapy-related factors (e.g. treatment complexity) were the largest contributors to a steep decline in medication adherence. Taking adherence dropped from 63.47% to 39.14% in six months, dosing adherence dropped from 47.57% to 22.88%, and timing adherence dropped from 36.28% to 13.35%. In addition to the decline, drug holiday occurrences rose from 77.78% to 84.44%. These statistics showed that although patients began the medication regimen with intent to adhere, the rate of compliance dropped significantly over the six-month time frame (Riegel et al., 2012).

In conclusion, medication nonadherence is complex and multifaceted. There is no simple solution to resolve medication noncompliance, but there is evidence that shows multiple modifiable contributors to be addressed. Further research is needed to determine if these results will continue to stand true for larger population samples; however, the results identify some potentially modifiable factors contributing to nonadherence that could be addressed in future trials (Riegel et al., 2012).

**Nurse-Enhanced Memory Intervention in Heart Failure**

Numerous patients with HF have cognitive deficits, including memory loss. There are many factors that contribute to memory loss in HF, but the most likely causation is decreased cerebral blood flow (Pressler et al., 2011). The objective of the study conducted by Pressler et al. (2011) was to assess the effectiveness of a cognitive screening intervention related to memory, psychomotor speed, instrumental activities of daily living (IADLs), and executive function in the HF patient population.
The 2-group randomized experimental trial included a sample of 40 participants that were randomly assigned to either a health education active control intervention or the cognitive training program titled Brain Fitness. Brain Fitness is a computerized-program of auditory and visual tasks the participant must complete in 40 one-hour sessions over eight weeks. The health education active control intervention is comprised of issues of the cardiovascular magazine, *Heart Insight*, where participants are required to read one issue for at least one hour once a week. Data reflecting memory, psychomotor speed, IADLs, and executive function were collected at the beginning of the trial for baseline, then again at eight weeks, and lastly at 12 weeks (Pressler et al., 2011).

Pressler et al. (2011) determined there was small improvement in both groups over all the tests, but no significant difference was noted. One subtest did have notable results. Utilizing the Hopkins Verbal Learning Test to determine delayed recall (significance value of \( p < .05 \)), statistics showed significant changes in time (\( p = .015 \)) and group-time (\( p = .032 \)). The data indicated that patients who received the Brain Fitness intervention improved more in delayed recall memory over time than patients who received the health education intervention, although this group showed statistically significant gain (Pressler et al., 2011).

Another important discovery at the conclusion of the Pressler et al. (2011) research was the identification of a set of patients unwilling to complete the study. Only 34 of the original 40 participants completed the study. The group reported reasons for not completing the interventions, but results showed they had the lower rank of scores on all neuropsychological tests and lower measure of IADLs. As a result of this finding, consideration should be given to using enrollment criteria to specify a cutoff for eligibility; however, patients who do not meet
established criteria might be in need of alternative interventions and further evaluation (Pressler et al., 2011).

Currently, this research appears to be unique in testing the effectiveness of the Brain Fitness intervention in HF patients to assess memory loss (Pressler et al., 2011). It was determined at the close of the study that larger randomized control trials should be initiated to establish whether or not memory loss in HF patients is responsive to plasticity-based interventions (Pressler et al., 2011).

**Self-Management Programme**

A secondary analysis of data from a 2-group randomized control trial, conducted by Smeulders et al. (2010), attempted to evaluate the effectiveness of the Chronic Disease Self-Management Programme (CDSMP) in patients diagnosed with CHF to determine self-management and cardiac-specific quality of life. The CDSMP has been applied to other chronic disease patient groups and has shown favorable outcomes in health behavior, quality of life, and healthcare utilization. A total of 317 patients diagnosed with CHF for at least six months at the start of the intervention were evaluated over a 12-month period. An initial baseline measurement was obtained; data were collected at the start of the intervention with follow-up data collection at six months and 12 months. The intervention group was composed of 186 and the control group composed of 131, and a final count of 265 was included in the data analysis (Smeulders et al., 2010).

The Kansas City Cardiomyopathy Questionnaire (KCCQ) (Smeulders et al., 2010) measured the participant’s quality of life. Baseline scores showed both the control group and test group were similar in respect to patient characteristics (time from diagnosis, number of comorbid diseases, cognitive status, and education level). Subgroup analysis concluded educational level
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was a significant factor \((p = .018)\) indicating patients with lower education benefited more from the CDSMP than the higher-educated group during the one-year follow-up period (Smeulders et al., 2010).

Smeulders et al.’s (2010) results indicated that lower-educated patients should be encouraged to participate in the CDSMP because there is a relationship between involvement in the program and quality of life. Findings suggest the CDSMP’s effect among CHF patients with better cognitive function is limited to the short-term, but is more stable over time among lower-educated patients. It has been suggested that future research should be conducted to validate current research findings and explore other opportunities for patient benefit; results also find that healthcare providers are recommended to consider the possibility of cognitive deficits of patients (Smeulders et al., 2010).

**Utility of the SLUMS Exam**

A cross-sectional study conducted by Feliciano, Horning, Klebe, Anderson, Cornwell, & Davis (2013) was initiated to determine the validity of the Saint Louis University Mental Status (SLUMS) examination by comparing it to the established Mini-Mental State Examination (MMSE). The investigators attempted to determine if the SLUMS examination could predict standard neuropsychological measures of executive functioning and memory more accurately than the MMSE. Directed at a university-based research clinic, the sample was composed of 170 community-dwelling adults aged 60 years and older with a mean age of 73.08. A variety of tests were compared to one another including the Trail Making Test (TMT), the Rey Auditory Verbal Learning Test, the Wisconsin Card Sorting Test (WCST), the MMSE, and the SLUMS examination (Feliciano et al., 2013).
Feliciano et al. (2013) directly compared the results of the SLUMS examination to the MMSE. The outcomes showed the SLUMS examination was a more significant predictor of neuropsychological performance than the MMSE, even after controlling for all demographic variables. Despite their strong correlation, Feliciano et al.’s (2013) findings suggest the SLUMS examination is a more appropriate screening tool to determine cognitive ability among older adults (Feliciano et al., 2013).

**Guideline for the Management of Heart Failure**

In 2013, the American Heart Association published revised guidelines for the management of HF (Yancy et al., 2013). These guidelines are developed by the American College of Cardiology Foundation and the American Heart Association and are published in order to provide standards of care that are evidence-based and peer reviewed. They are intended to assist nursing and medical personnel in decision-making by providing a range of acceptable approaches to the diagnosis, treatment, and prevention of certain disorders (Yancy et al., 2013).

Guidelines indicate patients with HF should receive personalized education to simplify self-management (Yancy et al., 2013). They further recommend patients must understand the importance of monitoring weight, blood pressure, and heart rate in order to adequately manage HF. Restricting sodium intake, taking medications as prescribed, and exercising are other important facets to controlling HF symptoms. According to Yancy et al. (2013), patients who receive in-hospital education comprehended their self-management regimen at a higher level than those who did not receive in-hospital education; it can be concluded that adequate discharge teaching is needed to prevent further hospitalizations for exacerbations of the patient’s condition (Yancy et al., 2013).
Synthesis

The 2-group randomized experimental study conducted by Pressler et al. (2011) indicates memory loss as a probable side effect of HF and providing memory-building interventions (specifically Brain Fitness) will improve recall. When paralleled to Riegel et al.’s (2012) prospective observational findings, a connection can be drawn between an impaired cognitive ability, recall capability, and medication adherence (Pressler et al. 2011; Riegel et al., 2012). Based upon the results of these two studies, patients with HF have strong potential for cognitive impairment and a risk for medication nonadherence and therefore, would benefit from cognitive intervention.

According to guidelines published by Yancy et al. (2013), appropriate discharge teaching is necessary for promoting self-management compliance. When compared to results from the secondary analysis of randomized control trial data published by Smeulders et al. (2010), self-management programs and interventions can be beneficial to certain subgroups of patients. Smeulders et al. (2010) discovered that a significant effect \( (p = .018) \) occurred from applying the CDSMP to the sample identified as being lower-educated, indicating that this subgroup benefited most from the program in terms of cardiac-specific quality of life.

A variety of screening tests and assessment tools have been given to patients with HF to determine several outcomes. These include medication compliance (Riegel et al., 2012), memory recall (Pressler et al., 2011), and cardiac-specific quality of life (Smeulders et al., 2010); however, there is limited research in which cognitive assessment tools are used as predictors of self-management compliance in HF patients. If patients are given the responsibility for self-care, and are expected to maintain care on a long-term basis, cognitive aptitude must be evaluated...
prior to discharge teaching to ensure instructions are presented appropriately (Smeulders et al., 2010, Yancy et al., 2010).

**Clinical Recommendation**

Patients diagnosed with HF are susceptible to the risk of cognitive deficits, such as memory loss, because of the disease process (Pressler et al, 2011). This poses a threat to medication compliance because HF patients are typically prescribed multiple self-management techniques including both medications and lifestyle changes (Yancy et al., 2013). The primary goal healthcare providers must strive toward is improving quality of life for patients diagnosed with HF, and the path to that goal is through self-management compliance.

In a population of patients 60 years and older, diagnosed with CHF and an EF of 40% or less, would a cognitive screening exam prior to discharge help facilitate a more tailored discharge teaching? Although many cognitive screening tools are available, validity and reliability are of prime importance when assessing patient orientation, mathematical skills, memory recall, and critical thinking; therefore, based upon the results of Feliciano et al. (2013), the SLUMS examination is the appropriate assessment tool for measuring neuropsychological ability.

The clinical recommendation is that nurses will administer the SLUMS examination to the sample group prior to discharge and record the results in the patient’s chart. Using the SLUMS examination’s cut-scores as a basis, the nurse can adjust discharge teaching to accommodate the patient’s cognitive ability. Patients can also be referred to support groups or classes in order to ensure individual learning needs are accommodated.

Patients diagnosed with HF face a life-altering prognosis. Because life expectancy is so short, it is imperative to maintain quality of life and manage the disease process. In order to do
this, patients must have sufficient cognitive ability to understand his or her role. Evaluating patients’ cognition can greatly enhance the nurse’s ability to ensure the appropriate care and teaching is accessible to the patient. The goal for HF patients is to successfully manage the disease process independently, thus resulting in an enhanced quality of life. Determining cognitive aptitude is the first step in promoting patient autonomy.
References


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<td>Feliciano, L., Horning, S. M., Klebe, K. J., Anderson, S. L., Cornwell, R. E., &amp; Davis, H. P. (2013). Utility of the slums as a cognitive screening tool among a nonveteran sample of older adults. <em>The American Journal of Geriatric Psychiatry</em>. doi:10.1016/j.jagp.2013.01.024</td>
<td>To investigate the validity of the Saint Louis University Mental Status examination (SLUMS) by comparing it to a range of other neuropsychological measures of memory and executive functioning.</td>
<td>Cross-sectional. The Trail Making Test (TMT), Rey Auditory Verbal Learning Test, Wisconsin Card Sorting Test (WCST), MMSE, and SLUMS.</td>
<td>170 community-dwelling adults aged 60 years and older. Median age of 73.08.</td>
<td>The SLUMS exam significantly adds to the prediction of neuropsychological measures beyond the MMSE scores. Findings suggest the SLUMS may be an appropriate measure to use as a screening tool in older adults.</td>
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<td>Pressler et al. (2011). Nurse-enhanced memory intervention in heart failure: the MEMOIR study. <em>Journal of Cardiac Failure, 17</em>(10), 832-843. doi:10.1016/j.cardfail.2011.06.650</td>
<td>Evaluate the efficacy of a cognitive training intervention on memory (primary outcome), working memory, psychomotor speed, executive function, and performance of cognitive activities and instrumental activities of daily living.</td>
<td>2-group randomized experimental design to evaluate the cognitive training intervention in HF patients. Data were collected at baseline, 8 weeks, and 12 weeks. The Hopkins Verbal Learning Test--Revised was used to measure the primary outcome of memory.</td>
<td>40 patients were recruited from a multidisciplinary HF clinic affiliated with a university medical center in a Midwestern city. Patients were randomly assigned to the Brain Fitness and health education interventions.</td>
<td>The Hopkins delayed recall demonstrated significant time ($p = .015$) and group-time interaction effects ($p = .032$) indicating that patients who received the Brain Fitness intervention improved more in delayed recall memory over time than patients who received the health education intervention.</td>
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<td>Identify and describe common and distinct trajectories of nonadherence.</td>
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<td>Adherence to the medication regimen was assessed using MEMS.</td>
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<td>202 adults with heart failure. 40 participants were excluded for noncompliance with MEMS method. 40 participants were excluded for reasons including: death, too ill to continue, withdrawal, and loss to follow-up.</td>
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<td>Taking adherence dropped from 63.47% to 39.14% in six months, dosing adherence dropped from 47.57% to 22.88%, and timing adherence dropped from 36.28% to 13.35%. In addition to the decline, drug holiday occurrences rose from 77.78% to 84.44%.</td>
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<td>Aims to gain insight to which CHF patients benefited most from the Chronic Disease Self-Management Programme (CDSMP) with respect to cardiac-specific quality of life.</td>
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<td>Secondary analysis of the data of a two-group randomized controlled trial. Data were collected at baseline, directly after the end of the programme, and six and twelve months. Cardiac-specific quality of life measured by the Kansas City Cardiomyopathy Questionnaire.</td>
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<td>317 patients diagnosed with CHF for at least six months at the start of the intervention period participated in the study. Of these, 186 patients were allocated to the intervention group and 131 patients to the control group. A total of 265 patients completed the trial.</td>
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<td>Significant subgroup effect of the programme was found for educational level ($p = .018$) in favor of lower educated patients, indicating that lower educated patients benefited more from the programme in terms of cardiac-specific quality of life compared with their higher educated counterparts during the total follow-up period of one year.</td>
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