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The Effect of Supportive-Educative Nursing Interventions on the Hospital Readmission Rates of Patients with Heart Failure

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THE EFFECT OF SUPPORTIVE-EDUCATIVE NURSING INTERVENTIONS ON THE HOSPITAL READMISSION RATES OF PATIENTS WITH HEART FAILURE

By

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ABSTRACT

THE EFFECT OF SUPPORTIVE-EDUCATIVE NURSING INTERVENTIONS ON THE HOSPITAL READMISSION RATES OF PATIENTS WITH HEART FAILURE

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The prevalence of heart failure (HF) is increasing and patients with HF are frequently readmitted to hospitals soon after discharge, at great cost. Improving self-care and reducing hospitalizations in this group is vital. This study, based on Dorothea Orem's (1995) self-care deficit theory, evaluated supportive-educative vs. placebo nursing interventions. The study results were drawn from a larger longitudinal study done by Dr. Kay Setter-Kline, Ph.D., R.N.

The study sought to determine if supportive-educative nursing interventions reduced the rehospitalization rate for patients with HF. The Self-Management Tool was utilized for data collection, after being adapted from the Chronic Disease Self-Management Study Measures Tool (Lorig et al., 1996). A significant reduction in readmissions at three months was demonstrated among the supportive-educative group.

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CHAPTER 1

INTRODUCTION

With continuing decreases in mortality from health concerns of previous eras, combined with increases in life expectancy and the number of older persons, chronic illnesses are becoming a major public health concern. According to the National Heart Lung and Blood Institute (NHLBI, 1996), heart failure (HF) is the primary chronic disease affecting Americans age 65 and older, comprising one fifth of primary and secondary admitting diagnoses in this age group. It is estimated that close to five million people in the United States have HF (House-Fancher & Martinez, 1999; NHLBI, 1996; Rich & Nease, 1999; Wilkes, Middlekauff, & Hoffman, 1999) with over 400,000 new cases diagnosed yearly (Kegel, 1995; Rich & Nease, 1999). HF is listed as a direct cause of 43,000 deaths nationally, and as a contributing factor in 220,000 deaths annually (NHLBI, 1996; Rich & Nease, 1999). HF can be expected to intensify as more cardiac patients live longer after diagnosis and as the elderly population increases, becoming a major public health concern and increasing the strain on health care resources.

Total costs of managing HF in the US were estimated to be over $17 billion per year, making it the most costly single medical expense (Haldeman, Croft, Giles, & Rashidee, 1999; NHLBI, 1996). The elderly are hospitalized most commonly for treatment of HF (Haldeman et al, 1999; Kegel, 1995), and frequently readmitted. The hospital readmission rate within 60 days of discharge is 22%, resulting in a cost of $8 billion, 24% of all Medicare expenditures (Vinson, Rich, Sperry, Shah, & McNamara, 1990). Several studies (Haan et al., 1997; Haldeman et al., 1999; Proctor, Morrow-Howell, Li, & Dore, 2000) indicate that early readmissions, of which more than half are preventable.

contribute significantly to the increasing costs of care, and comprise a major proportion of Medicare expenses. A review by Evangelista and Dracup (2000) revealed that poor compliance to dietary and medication regimens is related to 50% of HF hospital readmissions. The level of expense involved in unplanned readmissions, as a result of ineffective self-care and disease management, is of growing concern. It is essential to determine ways to decrease the rate of rehospitalization.

High readmission rates may indicate poor educational results and inadequate home care, demonstrating a need for a deepened focus on patient and family education concerning HF and follow-up care. Kegel's (1995) evaluation of elderly patient requirements after discharge showed a need for reinforcement regarding disease process and management, diet, and medications. Education of both patients and families is vital to controlling HF. A study by Wehby and Brenner (1999) found that patients and registered nurses both ranked education related to the disease and its management as a top priority. According to Haldeman et al. (1999) studies are showing decreasing hospitalization rates and improvement in functional status when intensive in home care programs are utilized with patients with HF. Close follow up, including disease management education, has been shown to appreciably decrease readmission rates for patients with HF by increasing acceptance of and adaptation to chronic illness (Kegel, 1995; Proctor, Morrow-Howell, Li, & Dore, 2000). This would indicate that ongoing education and support in the home is essential for preserving functional status and quality of life, and for decreasing frequency of rehospitalization.

Multiple variables can impede the quality of self-care that patients with HF can perform. Among these variables are adjustment to and education about their disease. Post discharge changes in lifelong habits may be confusing, leading to non-compliance, ineffective self-care, and rehospitalization. Vinson et al. (1990) felt that both adaptation to a chronic illness, as well as functional capacity, may have an impact on the readmission rate. The importance of following medication, diet, and exercise regimens, as well as being aware of signs and symptoms of disease progression, are all vital components of a preventive patient and family educational program. Educating patients and families to the early detection of worsening failure may prevent further deterioration requiring hospitalization.

Problem Statement

Progressive aging of the American population, coupled with a continuing rise in the prevalence of HF, will continue to increase the burden on society, including its public assistance program, Medicare, to a staggering degree. The current burden on the health care resources of the nation as a whole, as well on the individuals with the disease is tremendous. Reducing the costs associated with HF management is a concern necessitating research.

Orem (1995) believes that those who can engage in self-care will do so, precluding the need for hospitalization. Contemporary hospital stays are shorter, and patients are sent home earlier, sicker, and not as able to care for themselves as in the past. These patients are in jeopardy of unplanned readmission unless family or community support is forthcoming. Adequate multidisciplinary discharge planning, including follow up in-home care is one means to provide this support. In-home nursing care and support can have a significant effect on improving self-efficacy and disease management and reducing readmissions, but further research is necessary to validate this.

Purpose

The purpose of this study was to determine if a comprehensive supportive educational intervention by nurses could reduce hospital readmissions to a greater degree than a placebo intervention. As cited in Jaarsma et al. (1998), effective information and support for patients with HF and their families increases therapeutic self-care ability. Effective self-care precludes the need for nursing and hospitalization.

Presuming the supportive educational nursing intervention is effective, the result would be a decline in hospital readmissions among the study group. The ability to manage a chronic illness well can lead to a more positive outlook and an improved feeling of well being and control. This in turn can lead to improved disease management. Improving the level of understanding of the disease process and its management may improve the readmission rate among this population. The group would also be inferred to benefit from improved quality of life.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical Framework

Nursing theories put a perspective onto nursing practice. Theories orient the functions nurses perform and the roles they fulfill to meet the needs of patients, based on a set of concepts regarding the patient's capabilities, culture, religious beliefs, etc. Dorothea Orem's self-care deficit theory (SCDT) provides a structure for the endeavors and activities of nurses in nursing situations, giving clarity to the nature of the relationship between nurses and the consumers of nursing. Hartweg (1991) states that the SCDT provides concepts for nursing practice that clarify the legitimate role of the nurse in practice situations.

Dorothea Orem began formulating her SCDT in the 1950s as she became aware that, while nurses were good at nursing, they had no common 'language' or organizing framework within which to discuss nursing. There was no understanding of what defines nursing as an entity. Orem felt it "essential for nurses to know and be able to express and thereby communicate what they do, why they do it, and the results of what they do" (1995, p. 9). Her search to refine the sphere and boundaries of nursing as both a field of knowledge and practice (as cited in Hartweg, 1991) lead to development of the SCDT.

According to Orem, the SCDT "provides direction to nursing practice and research" (1995, p.11). It is a holistic approach to nursing that considers the physical, psychological, cultural, and environmental dimensions of patients. Orem (1995) perceives health as "the state of a person that is characterized by soundness or wholeness of developed human structures and of bodily and mental functioning" (p. 101) and a patient as a "receiver of care by a health care provider" (p. 101). Nurses are viewed by Orem as persons qualified through education, training, and experience to provide care and assist persons in meeting their self-care needs. Environment is the setting in which the person normally engages in self-care actions. Environments are combinations of biologic and social components that interact with the individual and each other and have both positive and negative effects on the individuals.

There are three interrelated theory components in the SCDT: self-care/dependent care, self-care deficit, and nursing system. Self-care proposes that people learn deliberate, purposeful self-care behaviors as they mature so they may care for themselves and others in response to known needs. People exist in social groups who provide for dependent members unable to meet their own needs. The ability of a person to deliberately act in response to perceived needs is self-care agency and this ability varies with maturity level. Orem (1995) states that an individual must be able to determine his/her needs, determine the appropriate necessary actions, and be able to perform those actions to maintain adequate self-care agency.

All individuals have self-care needs and will meet those needs personally whenever possible. Self-care is perceived by Orem (1995) as a function learned by interacting with others, and performed daily and continuously over the life span. Self-care actions are purposeful and maintain functioning and developmental tasks. The goals of self-care, as cited in Chinn and Kramer (1991), are termed self-care requisites and fall into three categories: universal or common to all humans, needs relating to promotion of the human developmental processes throughout the life cycle, and those relating to deviations from the normal health state. Positive health and well-being are fostered when a set of basic universal health care requirements are fulfilled. These universal health care needs are: maintenance of adequate intake of air, water, and food; provision of care associated with elimination and excrements; maintenance of a balance between activity and rest; maintenance of a balance between solitude and social interactions; prevention of hazards to human life; and promotion of human development and functioning within social groups (Orem, 1995).

Developmental self-care requisites are divided into two categories by Orem: those associated with developmental processes normally occurring at various life cycle stages, and those associated with specific conditions and events that can adversely affect development. Health deviation requisites listed by Orem include seeking and securing appropriate medical assistance and being aware of and attending to the effects and results of abnormal conditions. Prescribed treatment measures must be fulfilled and the adverse effects of prescribed measures must be anticipated and addressed. Modifying one's self-concept and learning to accept a health deviation and to live with the changes it necessitates are the final health deviation requisites that Orem lists (1995); these are also the requisites that relate closely to HF.

Orem believes that all persons have the necessary latent ability and motivation to care for themselves and dependents but this does not ensure that all will utilize that knowledge (Orem, 1995). Continuous self-care maintenance is required by humans to maintain life, health, and well being. Humans discover, develop, and transmit methods of caring for self and others, as well as structure relationships and tasks to provide self-care. Self-care requirements originate in each person's environment (internal and external) and from the resources available to them for meeting self-care needs. Self-care agency is the ability to meet self-care requirements, while therapeutic self-care demand is the collective of all self-care requirements necessary at any point in time for accomplishing therapeutic self-care. Basic conditioning factors (age, gender, developmental state, health state, health care system, sociocultural orientation, family system, patterns of living, environment, available resources) affect the components of self-care needs and pertain to all individuals (as cited in Dennis, 1997; Orem, 2001). They are characteristics unique to each individual that make that person and his/her self-care requirements unique. They affect the self-care abilities of each individual as well as the self-care requirements and nursing agency. These factors may affect the ability of the patient to participate in nursing interventions, as well as the quality of the response. Conditioning factors are also a part of every nurse and thus affect the abilities of the nurse to design and implement nursing care.

Self-care deficit "expresses and develops the reasons why persons require nursing" (Orem, 1995, p. 174). Individuals encounter episodes when their self-care abilities are inadequate for meeting either their own or others needs. When changes take place in an individual's developmental, functional, or structural integrity, that person's self-care requirements also change. This change may cause the self-care needs to exceed the individual's ability to care for her/him self, leading to a self-care deficit. Self-care deficits may be temporary or permanent in nature, and are an acceptable state of social dependency that validates the need for the helping service of nursing (Dennis, 1997). Therefore, the person with self-care deficits is a patient with legitimate need of nursing assistance.

A nursing system is created when nurses provide care directed at meeting a person's self-care needs resulting from health care deficits. It is deliberate use of specialized learned skills for providing nursing to care for individuals with self-care deficits. Dennis states that nursing systems establish the nature of the helping service provided by nurses. "Nursing is a complex, deliberate action performed by nurses to assist others" (Dennis, 1997, p. 14). Within a nursing system, patients and nurses interact to promote the development of the patients' self-care abilities. The nurse provides physical and psychological support, while ensuring a supportive environment for teaching and personal development (Orem, 1995). The basic conditioning factors also affect the patient/nurse interaction. Nursing system goals are to assist individuals in resuming self-care ability and protecting and developing existing and potential self-care abilities. Achieving these goals requires complementary interaction between the patient and the nurse.

Nursing systems assist with the development and/or guidance of people's self-care agency at three levels: wholly compensatory, partially compensatory, and supportive-educative (SE). According to Dennis (1997), the type of nursing system appropriate for meeting an individual's needs is determined by asking who can or should perform the actions necessary to meeting self-care requisites for this person. Wholly compensatory systems provide care for those patients unable to maintain their own self-care activities. Partially compensatory systems provide ancillary support for those patients with limitations in self-care agency resulting from physical disability or medical restrictions. These patients can manage some self-care, but need assistance with the remainder. SE systems provide coaching and teaching assistance to patients who need to learn self-care measures or adaptations. There is a sharing of responsibility with the nurse providing information and support while the patient learns to overcome self-care deficits (Hartweg, 1991).

For this study, attention was focused on the SE nursing system. Orem's (1995) concepts of partial compensation and supportive education are utilized in home based nursing care and her theory provides a consistent system for structuring care. Jopp, Carroll, and Waters (1993) state that the most critical period for a patient and family is immediately following discharge when systematic planning of self-care activities can improve recuperation. The authors consider learning behavior modification to be a mutual process involving both patient and nurse.

Throughout the recovery process, the nurse promotes the ongoing development of the patient's self-care agency. The effects of the disease impact everything in the life of a patient with HF. As the disease progresses, lifestyle changes must be made. Through the SE system nurses provide the knowledge, skills, support, guidance, and positive environment that patients and their families need to make those adjustments. According to Jaarsma et al. (1998) nursing actions in the SE system support actual care giving and management of care. Patients are directly involved in learning about disease management and what adapting mechanisms function best for their situation. Effectively educating and supporting patients and their families encourages more effective self-care and prevents development of self-care deficits. Effective self-care leads to greater self-efficacy and clinical stability, and precludes the need for hospitalization. Dorothea Orem's concepts in relationship to this study are shown in Figure 1.

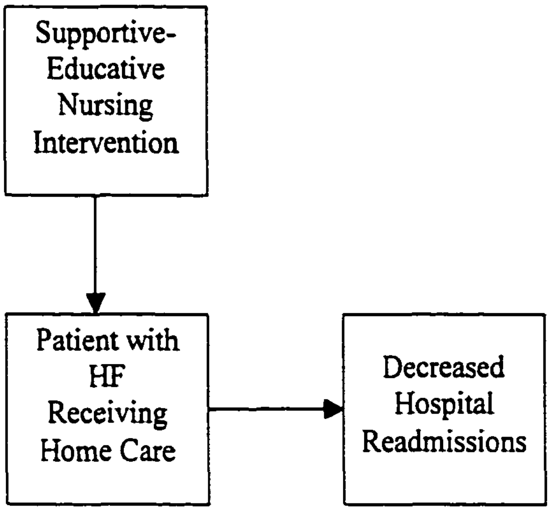

Figure 1. Dorothea Orem's self-care model applied to disease management for the patient with heart failure receiving home care.

Literature Review

In a review of the literature, a number of studies on a variety of aspects relating to patients with HF are found and will be discussed in this segment. Supportive-educative interventions are investigated in relation to their effect on hospital readmissions. Other studies are directed toward investigating the effects of home based interventions, case management, and advanced practice nurse (APN) directed HF clinics on decreasing readmissions. Additional literature discusses the frequency of HF patient readmissions and factors involved.

Evangelista and Dracup (2000) state in their meta-analysis that the likelihood of any one type of intervention being effective with all patients is slight. They felt this was the case because effective self-care for patients with HF necessitates motivated inner personal changes that few people are willing or capable of sustaining. Communication with and education of patients with HF appears to influence their adherence behavior, but adherence decreases over time. They deduce that low general health seeking behaviors will prevent improvements in behavior. Consequently, recurrent rehospitalization resulting from untreated/undetected deterioration will typify the illness route for many patients with HF.

Supportive-Educative Nursing Studies

Patients perceived learning needs are an important consideration when attempting to devise a SE system. Wehby and Brenner (1999) found in their descriptive, comparative survey of 84 HF inpatients that patients perceived most categories of HF information more important and realistic to learn while hospitalized than did the 84 registered nurses (RNs) surveyed. Patient participation criteria were age 30 years and over (mean = 71.8, SD = 12.86), a confirmed primary diagnosis of HF, awareness of the diagnosis, ability to complete a survey instrument or oral interview, and admission within the previous 24-48 hours with a diagnosis of HF. Participation criteria for the convenience sample of RNs included non-administrative, management, or clinical nurse specialist roles, employment on either medical, HF, or telemetry units, working at least 10 hours per week, and employment on the study unit for at least 3 months.

Wehby and Brenner (1999) designed their study to investigate patient and nurse perceptions regarding the importance for learning and whether the content can realistically be learned during hospitalization. After review by an expert panel, it was determined that the revised Heart Failure Learning Needs Inventory had face and content validity (alpha coefficient = .96). Multivariate analyses of variances were done for the importance and realism scales. Patients felt that general HF information, risk factors, medications, prognosis, and signs and symptoms were of greater importance to learn about than did the RNs (Wilks' lambda F = 7.08, $p < .001$). Patients perceived that all of the information was more realistic to learn while hospitalized (Wilks' lambda F = 9.25, $p < .001$) than did the nurses. This study supports the premise that patient education during hospitalization is a vital component of nursing care.

In a descriptive study done at a midwestern teaching hospital, Hagenhoff, Feutz, Conn, Sagehorn, and Moranville-Hunziker (1994) found that patients and nurses generally perceived all HF information as important and realistic to learn during hospitalization. A convenience sample of patients (n = 30), aged 38-87 years (mean = 68, SD = 12.81), was recruited from those hospitalized over 24 hours with a primary diagnosis of HF who were able to complete either a survey instrument or an oral interview. A convenience sample of nurses (n = 26), aged 23-52 (mean = 35, SD = 6.73), was recruited from licensed practical nurses and RNs working with patients with HF in non administrative positions at least half-time for a minimum of three months. The study examined patient and nurse perceptions on the importance and realism of educational content for patients with HF. The Cardiac Patient Learning Needs Inventory, which has established validity and reliability, was adapted by the investigators into a Congestive Heart Failure Patient Learning Needs Inventory for their study. Using comparison of means, patients' ratings for importance and realism were generally higher than the nurses, and medication knowledge was rated significantly higher (Z = -3.11, p = .002) as was anatomy and physiology content (Z = - 2.95, p = .003) by patients. Both patients and nurses generally perceived all the information as important and realistic to learn during hospitalization. While this study is limited by the small sample size, it gives credence to the value patients place on education about their health.

Ni et al. (1999) concluded that a discrepancy exists between the self-care information given to inpatients and its retention. A needs assessment survey of new patients (n = 113, mean age = 51.0 years, SD = 12.8) at a HF center was conducted, and multiple linear regression was used to appraise factors predictive of knowledge level and care plan compliance. The authors did not determine that a higher knowledge score correlated with better perceived self-efficacy or a lower rate of hospital readmissions ($r^2 = .22$). Patients who had been recently hospitalized showed a higher level of self-care knowledge, but it was unclear whether this was a result of increased contact with health care workers or increased motivation to learn about HF when faced with a life-threatening situation.

Ni et al.'s (1999) survey underscored the importance of an ongoing and repetitive educational process as well as effective communication between patient and provider, and providing written information about self-care skills, medication regimens, and dietary limitations. The repetition of self-care information teaching was shown to be essential for retention. Of interest was the finding that retention was greatest when a female health care worker did the teaching. Limitations of the study include the use of a convenience sample from a HF center (where patients have a more advanced state of cardiac disease than the general population of patients with HF). There was also a lack of assessment of cognitive status of study participants. Finally, it is possible that there was over-reporting of healthy behaviors by the participants. This survey underscores the importance of integrating written information with continuing patient education.

Jaarsma et al. (2000) studied the effects of a SE nursing intervention on the self-care abilities and behavior of patients with HF. Utilizing an experimental format, 132 patients admitted to the cardiology unit of a university hospital with symptoms of HF were randomly assigned to either a control or an intervention study group and were followed for nine months. Criteria for study participation included New York Heart Association (NYHA) functional class III and IV, diagnosis of HF for more than three months, minimum of 50 years of age, and absence of coexisting severe, chronic, debilitating disease. Baseline data were collected from patient interviews and chart reviews.

Control group patients (n = 74, mean age = 72 years, SD = 10) received usual care, including unstructured information about medications and life style. The intervention group (n = 58, mean age = 72 years, SD = 9) received intensive HF education from the study nurse during in-hospital visits following a standard care plan developed by the investigators for use with older patients with HF and based on Orem's SCDT. The study nurse assessed patients' needs during admission, provided education and support for patients and families, and managed individual problems and concerns experienced by the patients. The nurse called each patient at home within a week of discharge to assess potential problems and arrange a home visit. Education was continued and reinforced during the home visit, and specific needs were communicated to the home care nurse in writing.

The Appraisal of Self-Care Agency Scale (ASA) (Cronbach alpha between .80 and .87) was utilized to assess self-care ability at baseline and at 3 and 9 months post discharge. The Heart Failure Self-Care Behavior Scale (Cronbach alpha between .62 and .68) was utilized to assess self-care behavior. Functional capabilities, psychosocial adjustment, and overall well being were assessed by the Heart Failure Functional Status Inventory and the Psychosocial Adjustment to Illness Scale (PAIS). Only the Cronbach alpha for the PAIS (.66 - .90) is given. Student t-tests were utilized for continuous variables.

The intervention group showed significant improvement in self-care behavior at 1 month (t = 3.8, p = .001) and at 3 months (t = 2.9, p = .005). Both groups demonstrated identical improvements in their PAIS scores for all assessment points (t = 2.3, p = .03), indicating improved psychosocial adjustment to illness. The investigators found a significant improvement in self-care behavior as a result of their SE intervention. Intervention patients continued to have less frequent and less distressing symptoms at the 9 month follow up than the control group. This could indicate better disease management through skills learned as a result of the intervention. However, inconvenience and insufficient instrument sensitivity are cited by the investigators as possibly affecting the outcomes. The investigators felt that a SE intervention was effective in improving self-care behavior of patients with HF, and suggest further research with extended interventions, or with the inclusion of additional components to increase the scope of the intervention, while maintaining individuality to fit patient needs.

A qualitative study by Lough (1996) used semi-structured interviews with 25 patients aged 65 years and older (mean = 71) admitted to a private metropolitan hospital with a diagnosis of HF. The study's purpose was to describe the hospital to home transition process experienced by these patients using semi-structured in-home interviews two weeks post discharge. Constant comparative data analysis was used and results were graphed using a trajectory phasing scheme. Lough found that figuring out their dietary, medication, and activity changes was challenging for these patients. Some of the patients had in-hospital teaching, but remained unsure about transferring that knowledge to their home routines. These concerns were expressed in comments related to being unsure of how far to walk, how to read and interpret ingredient labels, and having medications that were differently shaped and colored than those received while hospitalized.

These patients were in need of post discharge plans to provide them with ongoing support, information, and resources. Less societal value is placed on the time nurses spend educating and working with patients to meet their self-care needs. Meeting these needs is vital to a growing segment of our population and studies of this type are necessary to provide proof of the value of these SE nursing endeavors.

Home Based Interventions

Interventions in the home setting are one area being studied. The effect of a single home visit by an APN and a pharmacist on the readmission and non-hospital death rates among high-risk elderly patients with HF (n = 99) was examined by Stewart, Pearson, and Horowitz (1998). Subjects for the controlled, blind, randomized study were recruited from a tertiary referral hospital serving a predominately elderly population. Control group patients (n = 48) had a mean age of 74 years (SD = 10) and received standard post discharge care consisting of an office visit within two weeks of discharge and standard home care, if referred. Intervention group patients (n = 48, mean age = 76 years, SD = 11) were visited pre discharge and taught about the treatment regimen and identification of symptoms of deterioration.

At one week post discharge, an intervention visit was made by a nurse and a pharmacist during which medication management, signs of early clinical complications and general follow up needs were assessed. During these visits, 52% of the patients were found to be nonadherent with their medication regimens, and 90% lacked adequate knowledge of their treatment plans. As a result, further teaching and support were given during the visits. Patients requiring further medical assessment were immediately referred to their primary care physician. The Charlson Index was utilized to determine extent of comorbidity and multiple logistic regression was utilized for analysis of readmission data. At the 6-month review, the home-based intervention (HBI) group had significantly fewer readmissions (36 vs. 63, $p = .03$, SD = 8.1 ± 7.4) than the control group. Interestingly, 40% of the readmissions were for conditions other than HF. Though limited by the small sample size, this study suggests that a HBI of this nature is effective in preventing readmissions among patients with HF.

In an extension of the above study, Stewart, Vandenbroek, Pearson, and Horowitz (1999) followed up on the 86 surviving patients 18 months after initial hospital discharge to determine the duration of the beneficial effect of a single HBI. Using multiple logistic regression, the intervention group had significantly fewer unplanned readmissions (64 vs.125, $p = .02$), lower hospital costs ($5,100 vs. $10,600, $p = .02$), and a lower non-hospital death rate (2 vs. 9, $p = .02$) than the control group. The authors hypothesized that the magnitude of problems assessed during the HBI, and thus receiving immediate remediation, significantly improved these patients' self-care abilities and outcomes. Modifications of this intervention for further research could include readmission risk factor determination, educational components more specific to HF, and repeated HBI for patients with recurrent readmissions. This study showed long term benefits from a SE in-home intervention.

Examining the effectiveness of an APN administered discharge planning and home follow up intervention on readmission rates was the subject of a randomized clinical trial by Naylor et al. (1999). A total of 363 subjects (mean age = 75 years) from two urban teaching hospitals were divided into control (n = 186) and intervention (n = 177) groups. The control group received routine adult discharge planning and standard home care, if referred. The intervention, managed by APNs, began within 48 hours of admission and continued for four weeks post discharge.

Standardized, comprehensive pre-discharge planning combined with a home follow up protocol specially designed for elders at high risk for poor post-discharge outcomes comprised the intervention. The intervention involved direct clinical care, education for patients and caregivers, validation of learning, and coordination of necessary home services. Interventions were individualized to enhance patient and caregiver abilities to manage symptoms, diet, medications, activity, sleep, and medical follow up needs. Telephone interviews were done at 2, 6, 12, and 24 weeks post discharge to monitor readmissions and unscheduled acute care visits.

Wilcoxon rank sum and t-tests were used to compare readmissions. The intervention group had fewer readmissions at six weeks (20. 3% vs. 37.1%, $p < .001$) as well as fewer total readmissions (49 vs. 107, $p < .001$) in the 24-week follow up period. Time to first readmission for any reason in the control group was significantly less than for the intervention group (48 days vs. 133 days, $p < .001$). Total per patient expenses at 24 weeks were significantly lower for the intervention group ($3630 vs. $6661, $p < .001$) than for the control group. Reduced readmissions, lengthened time to first readmission, and reduced cost of care were demonstrated results of a holistic, comprehensive discharge plan and home follow up in this study.

Rich et al. (1995) did an experimental randomized study of 282 patients with HF to determine the effect of a multidisciplinary HBI on 90-day readmission rates. Patients 70 years of age and over, admitted to a university medical center with HF were eligible to participate. Control group patients (n = 140), mean age of 78.4 years (SD = 6.1) received all standard treatments and services ordered by their primary care physicians. Intervention group patients (n = 142), mean age of 80.1 years (SD = 5.9), received a nurse-directed multidisciplinary intervention. Education on HF and its treatment, individualized dietary instruction, social service consultation to facilitate discharge planning and post discharge care, and analysis and individual tailoring of medication regimen were provided by a registered nurse, dietician, social worker, and cardiologist as components of the intervention. Individualized home visits and telephone contact with the study team supplemented intensive post discharge follow up by the hospital's home care service.

The Wilcoxon rank sum test was utilized to assess readmission data. At the 90-day follow-up, the HBI group had a lower overall readmission rate (44.4% difference, p = .02) as well as $460 less in treatment cost per patient compared to the control group. Readmissions specifically for HF related problems were significantly reduced in the HBI group (24 vs. 54; risk ratio = .44; p = .04). The Chronic Heart Failure Questionnaire demonstrated substantial improvement (22.1 ± 20.8 vs. 11.3 ± 16.4, p = .001) in the perception of quality of life in the HBI group. Through this questionnaire the HBI group was found to have a better understanding of HF at discharge and follow up, demonstrating the benefits of the intervention.

The multidisciplinary nature of this HBI can be a limitation, since the particular intervention element(s) having the greatest effect cannot be differentiated. However, the authors believe that the multiple components fulfilled various and complex patient needs and positively impacted the results, indicating that a multidisciplinary approach is more beneficial than a single intervention approach.

A blind randomized study by Stewart, Marley, and Horowitz (1999) of 188 patients with HF from a tertiary referral hospital was done to determine if a single home visit with follow up by telephone would decrease unplanned readmissions and out of hospital deaths. All patients were assessed by use of the Mini-Mental State Examination (MMSE), Katz Activities of Daily Living Index, and Charlson Index. The 100 control group patients (mean age = 76 years, SD = 9.3) were provided with routine discharge planning and care. The 88 intervention group patients (mean age = 75.2 years, SD = 7.1) received the usual post discharge care plus a single structured in home visit by a cardiac care nurse and telephone follow up at 3 and 6 months post discharge. During the home visits, approximately 90% of the patients were assessed to be deteriorating clinically, nonadherent with medication regimens, or lacking in dietary understanding. Additional counseling, education, and support were provided for these patients. Following the home visit, 25% of the patients telephoned the nurse for further support. Chi-square analysis was utilized to compare readmission data. There were significantly fewer readmissions (68 vs. 118, p = .031) at the 6-month mark among the intervention group than the control group. This study suggests the value of HBI as an effective method of reducing readmissions, and associated costs, for patients with HF, and worthy of further study.

Naylor and McCauley (1999) studied the effect of a comprehensive discharge planning and a 4-week home follow up by APNs in a secondary analysis of previously collected data. The study sample of 202 subjects was drawn from patients admitted to a teaching hospital with medical and surgical conditions with random assignment to control and intervention groups. All patients were followed for 24 weeks. The control group (n = 106) had a mean age of 74.9 years (SD = 5.4) and received routine discharge planning. The intervention group (n = 96) had a mean age of 74.4 years (SD = 5.5) and received a comprehensive discharge planning and four week home follow up protocol designed for elders at high risk for poor post discharge outcomes. The intervention began with patient and caregiver needs assessments and documentation of the discharge plan within 48 hours of admission. During hospitalization the APN visited patients at least every 48 hours to implement the protocol and finalize discharge preparations, and followed up with a minimum of two home visits – one within 48 hours of discharge and another at 7-10 days post discharge. The APN was available via telephone seven days a week for questions and concerns, and made weekly telephone contact with the patients.

Chi-square analysis was utilized for the proportion of readmissions and Wilcoxon rank sum tests for comparison of the distribution rates for number of readmissions and length of stay. There was a trend in the intervention medical patient group toward fewer readmissions (18 vs. 26, p = .09) but it was not statistically significant. In the surgical intervention group there was a borderline improvement in readmissions (8 vs. 18, p = .05). The majority of readmissions in both groups were directly related to the primary HF diagnosis or to a comorbid condition. The APN's comprehensive discharge planning and home follow up did reduce readmissions suggesting the importance of individualized planning for patients facing multiple health problems. Though the reduction in readmissions was not statistically significant, the clinical impact on patients and families as a result of avoiding readmission should be investigated through future studies.

The goal of a purposive study by Kornowski et al. (1995) was to determine the impact of an intensive HBI on morbidity rates of elderly patients with HF. Patients ($n = 42$) were recruited from a home care surveillance program in an urban area. Participation criteria included a diagnosis of HF, over 65 years of age (mean = 78, SD = 8), hospitalization at least once for cardiovascular complications during the year previous to the study, and survival of one year of home surveillance. The intervention consisted of weekly home visits by physicians to obtain patient/family reports on current condition, exam and assess medical condition, review and revise medications as needed, administer intravenous diuretics if needed, order lab tests, and recommend treatment strategy for the coming week. Comparison parameters utilized in the study were hospitalization rate, hospitalizations resulting from cardiovascular complications, hospitalized days per year, hospitalized days per year for cardiovascular admissions, and global functional status index of each patient.

Comparison of means for the year previous to study participation and the year after the study were done by paired t-tests. There were significant reductions in the mean cardiovascular hospitalization rate ($.8 \pm 1.1$ vs. 2.9 ± 1.5, 72% reduction, $p < .001$), and in cardiovascular LOS (4 ± 4 vs. 23 ± 13, 83% reduction, $p < .001$). Global functional status index also significantly improved ($2.3 \pm .7$ from $1.4 \pm .9$, $p < .001$) indicating patients were able to function in daily activities with more independence. Though findings of this study are limited to very elderly patients with HF who have already survived a year of follow up, the considerable improvements suggest a positive benefit for the general HF population, warranting further study.

Case Management

Health maintenance organizations are increasing the use of case management for their patients as a means of controlling costs. The impact of a comprehensive HF management program was assessed in an uncontrolled study of patients with advanced HF done by Fonarow et al. (1997). A convenience sample of 179 patients (mean age = 52 years, SD = 10) admitted to a cardiomyopathy center as transplant candidates was used. Functional class was assessed upon referral with all patients being either NYHA class III or IV.

The investigators provided comprehensive HF education, following the Agency for Health Care Policy and Research (AHCPR) HF Practice Guidelines, to patients and families individually and in group settings, and utilized information brochures for reinforcement. The medication regimen of each patient was reviewed and revised to optimize symptom control and included a flexible diuretic regimen. A self-supervised progressive walking program was emphasized for exercise. Patients were followed post discharge by HF cardiologists in conjunction with their primary care physicians. They were contacted within three days of discharge and seen in weekly visits to the HF center until clinically stable. Frequent telephone contact was maintained with patients to review symptoms and reinforce education. All patients were followed for a minimum of six months. Unpaired t-tests were utilized to compare clinical status data. Functional status of

87 patients had improved to NYHA class I or II. Readmissions were significantly reduced (.21 ± .48 vs. 1.9 ± 1.3, 89% reduction, $p < .0001$) after participation in the program. Though the design of this study did not isolate specific components, it demonstrated that comprehensive management of HF can improve patient clinical condition and reduce readmissions and is deserving of further investigation.

West et al. (1997) utilized a convenience sample of patients with HF ($n = 51$, mean age = 66 years, SD = 10) from a medical center for an uncontrolled study to determine the effectiveness of a HF management system. Patients were followed for six months post discharge by nurse managers who provided education on HF, diet, medications, symptoms of deterioration, and behavioral techniques for improving adherence to the treatment regimen. An individualized schedule was established for telephone contacts and follow up questionnaires. Objectives of the management plan were to promote optimal dosing of ACE inhibitors, promote daily sodium intake of less than two grams, and monitor for evidence of clinical deterioration. Nurse initiated telephone contacts occurred weekly for six weeks after the initial assessment, and then at 8, 10, 12, 16, 20, and 24 weeks. Functional status, using the NYHA classification system, the Duke Activity Status Index, and the Medical Outcomes Study Short Form-36 were utilized to compare clinical condition before and after program participation by use of paired t-tests and Fisher's exact test. All functional status indicators showed significant improvement: NYHA functional class from 60% of patients in Class I/II to 76% in Class I/II ($p = .007$), Duke Activity Status Index scores 28.0 ± 15.0 vs. 24.9 ± 14.5 ($p < .01$), and Medical Outcomes Study Physical Component scores 40.6 ± 12.1 vs. 35.2 ± 12.9 ($p = .04$). Readmission rates, compared with the 12 months before program participation, declined

87% (p = .0001). Though this study was small, it demonstrated that the clinical status and resource utilization of patients with HF can be improved by SE nursing approaches and follow up, suggesting further study in this area.

Rich et al. (1993) did a prospective, randomized clinical trial utilizing 2:1 assignment to intervention vs. routine care to determine the feasibility and potential impact of a multidisciplinary intervention on reducing readmissions. A convenience sample of patients 70 years of age and over (mean = 79, SD = 6) was chosen from HF admissions to a university teaching hospital and followed for 90 days post discharge. The control group of 35 (mean age = 77.3, SD = 6.1) was provided with routine medical care by their primary care physician. The intervention group of 63 (mean age = 80, SD = 6.3) participated in a multidisciplinary treatment program. The program included intensive education on HF by a geriatric cardiac nurse, detailed review and revision of medication regimen by a geriatric cardiologist, social service consultation to facilitate discharge planning, dietary education by a dietician, and close follow up post discharge. The booklet "Congestive Heart Failure: A Patient's Guide", developed specifically for elderly patients with HF by the investigators, was utilized for patient instruction. A home-care nurse visited patients within 24-48 hours of discharge, assessed for clinical condition, and given educational reinforcement. Patients were visited 3 times in the first week and then seen at weekly intervals. Additionally, to assess their progress, answer questions, and keep communication open, the study nurse contacted patients at home by phone. Patients were encouraged to contact study personnel with symptoms, concerns, or questions. Readmission rates were compared using Fisher's exact test (2-tailed) and multiple linear regression was used to adjust for baseline differences between the groups. The Mann-

Whitney rank sum test was used to compare total days hospitalized. The readmission rate for the intervention group was 42% lower, however, this was not statistically significant. Intervention patients spent 1.4 fewer days (52% reduction) in the hospital than did the control group, again not a statistically significant change. Though the results were not statistically significant, there were reductions, which warrant further investigation in larger trials. The study was limited by the small sample size and lack of data on contribution of the various components and cost effectiveness of the intervention.

A multidisciplinary disease management program was designed and implemented by Knox and Mischke (1999) to reduce length of hospitalization, costs, and readmissions, and improve treatment regimen compliance. Two teaching hospitals, with a combined annual HF admission rate of 800, worked cooperatively on this project. A multidisciplinary team was formed in each hospital to evaluate their current policies, collect clinical data, and design a clinical pathway. Included on each team were emergency physicians, internists, cardiologists, pharmacists, dieticians, APNs from the HF program, laboratory personnel, and nursing staff from intensive care, telemetry, discharge planning, cardiac rehabilitation, and home care. A management approach, consisting of inpatient consultation and education, outpatient HF clinic, cardiac home care, and compliance monitoring, was developed and implemented.

In the study by Knox and Mischke (1999) education of staff at all levels, incorporating the AHCPR HF guidelines, was provided. A 5-day length of stay (LOS) clinical pathway with individualized patient education was the heart of the inpatient component. A HF Assessment Guide was created to facilitate communication among the health care team and to highlight unique patient needs. Optimizing medications and risk stratification of patients at the outpatient clinic allowed frequent visits for nonadherent and end stage patients. A 10-week educational and discussion group directed by the HF specialist APNs was provided for all patients and families. To track compliance, a computerized telephone system, Tel-Assurance, was designed for all patients with HF to call in their weights and complete a brief questionnaire daily. The computerized database identified clinical variances daily, including patients who did not call, patients with symptom changes, and weight fluctuations outside prearranged parameters. The APN called patients with identified variances to assess their situation, reinforce education, and adjust medications if needed. Patients could access their current medication regimen, clinic appointment schedule, general exercise information, low sodium diet information, and leave a message for the APN.

Patient satisfaction surveys and compliance tracking were utilized to measure the success of the Tel-Assurance program (Knox & Mischke, 1999). Daily calling compliance averaged 89.5% and patient satisfaction was high. Baseline financial data, including LOS, readmission rates, and direct costs were compared with those after 18 months with the HF management program in place. The readmission rate dropped from 35% to 0.6 per patient per year. Medication adjustments to manage early weight gain and diet reinforcement reduced the 30-day readmission rate to 2.3% compared to the national average of 23%. Direct costs decreased by 50% and the LOS decreased to 4 days compared with 6.2 days before the program began. The authors noted that, to be effective, all team members must consistently communicate education. They also noted the need for further evolution of their program, but felt that the preliminary results were promising. This study supports further research in the area of SE nursing approaches.

Advanced Practice Nurse Managed Programs

Case management programs run by advanced practice nurses (APNs) are being explored as a means of improving adherence and cost containment. Paul (2000) evaluated the effects of an APN coordinated multidisciplinary outpatient HF clinic on the prevalence of complications and readmission rates of patients with HF in a quasi-experimental pilot study. The convenience sample of 15 patients, 33 to 77 years of age (mean = 62), was drawn from patients with HF admitted to a university hospital HF clinic. Patient data from the six months prior to joining the clinic were compared with data from the six months after joining in the areas of readmissions, LOS, and charges. Upon referral to the clinic, a cardiologist evaluated each patient. The APN assessed each patient and began educating the patient and family about HF. Medication regimens were evaluated by a clinical pharmacist who initiated medication education. A dietician was available at the clinic to provide nutritional and dietary education, and a social worker was on call for assistance with psychosocial and financial concerns.

The APN followed up with the patients via telephone and clinic visits during which education was reinforced, clinical status assessed, and medications adjusted as needed. The APN ordered laboratory and other tests as appropriate and followed up on all results. Flexibility in assessing patients as needed allowed symptom assessment and treatment before problems worsened to the point of requiring admission. Dependent t-tests were utilized for analysis of comparison data. Patient readmission rates decreased (mean = 1.3, $p = .04$) and the total number of days hospitalized was reduced significantly (mean 5.1, $p = .02$). The study was limited by the small sample size and lack of preintervention NYHA classification on the patients. Patients in this study appeared to benefit from participation in an APN managed HF clinic, supporting further research on SE nursing measures.

Cline, Israelsson, Willenheimer, Broms, and Erhardt (1998) used a prospective randomized trial to study the effects of a HF management program on readmissions and costs. The patient sample (n = 135) was drawn from a university hospital and followed up at a nurse managed outpatient clinic for 1-year post discharge. The control group (n = 79) had a mean age of 76 years (SD = 5.3) and was provided routine care. The intervention group (n = 56) had a mean age of 75.1 years (SD = 5.1). Intervention components included an educational program for patients and families, guidelines for self-management of diuretics based on symptoms of worsening failure, and follow up at an easy access nurse managed outpatient clinic. Adherence to medication regimens was stressed and patients were given a 7-day medication organizer. The Nottingham Health Profile and global self-assessments were utilized, and patients were given diaries for recording weights, ankle circumference, and HF symptoms. The nurse was able to see patients on short notice, and was available by telephone during office hours. Appointments with a cardiologist were offered at one and four months post discharge. One clinic visit was prescheduled for eight months post discharge. The Wilcoxon matched pairs test was utilized to compare readmission rates and costs. The intervention group had a 33% longer time before readmission ($p < .05$) and 36% fewer readmissions ($p = .08$). While these results are not statistically significant, there were improvements, which warrant further investigation in larger studies. This study suggests the value of patient education, self-management, and nurse directed follow up in reducing readmissions and associated costs.

A quasi-experimental study by Dahl and Penque (2000) was done to determine if an APN managed inpatient program would affect readmission rates, length of stay, and regimen adherence. A convenience sample of 1,192 patients was drawn from patients hospitalized with HF in a metropolitan area in the Midwest. The preprogram group consisted of 583 patients (mean age = 72 years) hospitalized in the 18 months prior to the implementation of HF guidelines and case coordinator use. The program group consisted of 609 patients (mean age = 75 years) hospitalized in the first 18 months following the HF program implementation. Routine physician and nursing HF orders, a clinical pathway, and an automatic referral system initiating the services of an APN, social worker, and dietitian were the program components. Assessments of each patient were completed by the APN and included clinical status, knowledge of HF and its management, discharge planning, and support needs. Involvement of other health care professionals was arranged for by the APN as needed. The APN provided patient and family education and discharge planning. Individual patient needs determined the number of inpatient educational sessions received. An outpatient support group was available for further education and support. The APN made post discharge follow up telephone calls to reinforce education and provide support and motivation. The APN also investigated the clinical management of patients with HF and made suggestions according to the established guidelines when appropriate. Another facet of the APN's responsibilities was facilitating multidisciplinary group (physicians, nurses, dietitians, social workers, respiratory therapists, and pharmacists) meetings for review of data from a HF registry begun at the hospital. This group developed educational materials for the program patients, developed a home health care plan, and provided in-service on HF to physicians and staff.

Comparisons between preprogram and program groups were done through use of Chi-square analysis for readmission rates and t-tests for difference in length of stay (Dahl & Penque, 2000). Readmission rates were analyzed for 15, 30, and 90 day periods. The 15-day rate was not statistically significant (9.9% preprogram vs. 8.37% program, p = .661), but the 30 day (18.87% preprogram vs. 14.12% program, p = .027) and 90 day (37.56% preprogram vs. 30.38% program, p = .002) points were. A confounder of the study is that 228 patients included in the program group did not receive any of the program components either due to placement in noncardiac care units or to the type of HF diagnosis. The effectiveness of APN case management in achieving positive patient outcomes was supported by this study. Studies to examine which educational components have the greatest impact on patient outcomes would be beneficial in determining the direction of future HF management programs.

Readmission

Several studies have been done to research reasons for the frequent readmission of patients with HF. A retrospective observational study of 17,448 Medicare beneficiaries surviving a hospitalization for HF was completed by Krumholz et al. (1997). All patients, aged 65 years and over, discharged with a diagnosis of HF in the state of Connecticut during a 3-year period were included in an administrative database linking all admission and mortality information. Goals of the study included definition of HF readmission rates, determining the range of readmission diagnoses, and identifying patient characteristics associated with an increased risk of readmission. The sample was divided into two groups- those who were either readmitted or died within 6 months of discharge, and those who were neither readmitted nor died. The Deyo Comorbidity Index, an adaptation of the Charlson Index, was utilized for all subjects. Multiple logistic regression models were utilized to investigate the independent association between patient characteristics and outcomes, with the non-readmitted and alive group serving as the comparison group.

Krumholz et al. (1997) found that in the six months following discharge, 44% of patients were readmitted at least once, with HF accounting for 18% of the readmissions. Factors with the most impact on readmission probability were: comorbidities (52.16%, $p < .001$), male gender (43.91%, $p < .001$), and previous admissions within the prior six months (46.66%, $p < .001$) were more likely to be readmitted. The principal finding stated by the authors is that almost half the Medicare beneficiaries in the study area who survived hospitalization for HF were readmitted within six months. This finding emphasizes the importance of ensuring appropriate and prompt treatment of HF according to the AHCPR guidelines. Another finding was that a number of diagnoses were responsible for repeat admissions indicating that patients with HF frequently have comorbidities and, as a result, require multifaceted interventions to address their complex health needs. This study points to the need for further research to determine the most effective means of supporting patients with HF in successfully managing their illness to prevent readmissions. SE nursing approaches may prove beneficial in this area after further study.

An interview and chart based study of emergent readmissions within 60 days of discharge done by Burns and Nichols (1991) was conducted at the Memphis Veterans

Affairs Medical Center. Male general medical patients aged 65 years (n = 173) and over who were willing to participate, gave written consent, and scored at least 5 of 10 points on the MMSE were interviewed within 36 hours of readmission. Mean age of subjects was 71.3 years (SD = 6.72). The study's purpose was to develop an admission-screening tool for identification of those patients at risk for subsequent readmission. To achieve this, risk factors were determined by the assessment of psychological functioning using the Center for Epidemiological Studies Depression Scale, of cognition by use of the MMSE, of baseline functioning by use of the Barthel Self-Care Rating, and of illness severity throughout hospitalization by use of Horn's Computerized Severity of Illness Index. Results from these scales were integrated into a prediction model. Validity of this model was analyzed using cross-tabulation of predicted outcomes and actual outcomes.

Using a combination of student's t-test, pooled estimate of population variance, and Chi-square testing, the authors determined that readmitted patients were more severely ill (2.11 ± .95, p = .001), had a diagnosis of HF or chronic obstructive pulmonary disease (53.4%, p = .01), and had more hospitalizations (1.46 ± 1.91, p = .01) in the past year. Subjects with all risk factors were 5.4 times more likely to be readmitted. Use of this model to target high-risk patients at admission for comprehensive interventions, including supportive education, may reduce readmissions.

A retrospective, qualitative study done by Happ, Naylor, and Roe-Prior (1997) extracted data from the files of 16 intervention patients completing a six month follow up in a previous clinical trial at an urban hospital. The files of eight patients (mean age = 75.8 years, SD = 5.2) with no readmissions, and eight patients (mean age = 76.2 years, SD = 6.1) who had been readmitted were purposely selected for review to identify and describe factors contributing to and preventing readmissions. The original intervention group had received a comprehensive discharge plan and home care follow up protocol for patients with HF developed and implemented by gerontologic APNs.

The intervention began within 48 hours of admission and continued for four weeks post discharge, including at least two home visits. Telephone contacts were made by the APNs on weeks when patients did not receive a home visit. Analysis was guided by the following categories- symptoms precipitating first admission, comorbidities and risk factors, adherence factors, factors related to symptom appearance, and reasons for readmission. A second reviewer established interrater reliability of categories and data items. Since categorization was simply an organizational framework, categories and data classification discrepancies were not considered a credibility threat. The authors state that dietary nonadherence, poor general health behaviors, and medication supply emerged as major factors contributing most frequently to readmission.

Rehospitalized patients had a greater mean number of comorbidity factors ($X^2 = 27.2$, SD = 2.3 vs. $X^2 = 5.5$, SD = 1.3 respectively) than patients not rehospitalized patients and were admitted emergent. Responses from patients not readmitted during the follow-up period indicated they had better social support and treatment regimen compliance. Most readmissions occurred after the APN intervention had ended possibly indicating the need for individualized longer-term interventions for high-risk patients. The authors felt that educational interventions alone were insufficient to prevent rehospitalization of patients with HF and that multidisciplinary interventions, individualized to fit specific patient needs, may prove more beneficial, and require further study.

Vinson, Rich, Sperry, Shah, and McNamara (1990) prospectively studied 140 patients with HF to determine readmission data. The convenience sample, aged 70-95 years (mean = 80.5, SD = 6.6), was drawn from patients admitted to a university medical center with HF and followed for 90 days post discharge. Patients readmitted within the 90-day period were evaluated to determine readmission diagnosis and determination of whether the readmission could have been prevented. A physician and nurse investigator team subjectively assessed each first readmission and classified each as not preventable, possibly preventable, and probably preventable. Classification depended on the degree to which potentially remediable factors were thought to contribute to the readmission. Dietary or medication nonadherence that might have been remedied by improved education or medication review, inadequate discharge planning (not inclusive of social services and other ancillary support services), inadequate follow up (lack of home care arrangements or prolonged time between appointments), inadequate social support including inactive family involvement, and failure of the patient to seek prompt attention to symptoms were defined as remediable factors. The Medical Records Time-Oriented Database was utilized for data entry with readmitted and non-readmitted patients compared using 2-tailed t-tests and Chi-square or Fisher's exact tests.

The authors found a 47% readmission rate at the 90-day mark. A prior history of HF (76%, p = .03) and multiple prior hospitalizations (52%, p = .003) were each found to be independent risk factors for readmission. HF precipitated by acute myocardial infarction or inadequately controlled hypertension increased the risk of early readmission (39.1% vs. 19.7%, p = .02). The authors felt that 53% of readmissions were preventable, and remedial factors associated with early readmission included nonadherence with diet or medications, failure to seek medical attention for symptoms, a poor social support system, and inadequate discharge planning and follow up. Though the study is limited by the subjective nature of determining preventability of readmissions, it suggests that improved comprehensive discharge planning with follow up, and improved patient education may reduce readmissions for HF. Further studies are needed to evaluate specific interventions.

Bennett et al. (1998) conducted a retrospective audit of HF admissions to the medical centers at a midwestern university to determine and rank the foremost causes for the admissions. The sample of 390 patients had a mean age of 65.5 years (SD = 9.6). Only data from the first admission were included for patients with multiple admissions. The three major reasons for clinical deterioration requiring readmission were sodium retention leading to volume overload (55%), worsening angina and/or acute myocardial infarction (25%), and dysrhythmias (15%). Nonadherence to medication regimens and dietary sodium restrictions appeared to contribute to the volume overloads. Additionally, almost half of the patients were not receiving appropriate medications, which may have contributed to their deterioration. These findings support the premise that readmissions for deteriorating HF may be amenable to intervention and preventable in many cases. SE nursing interventions targeting the specific needs of individual patients and enhancing positive health behaviors deserve testing to determine their impact on HF readmission rates.

Summary and Implications for Study

A range of issues concerning patients with HF including education, hospital readmissions, discharge planning, and follow-up have been reported in the literature just reviewed. A number of methods have been explored to reduce frequent readmissions. Enhancing the self-care of patients by reducing self-care deficits shows some promise (Jaarsma et al., 2000; Naylor et al., 1999; Rich et al., 1995; Stewart, Marley, & Horowitz, 1999; West et al., 1997). Self-care deficits related to patients with HF revolve around the life style changes and complicated medication regimens that must be assimilated into their daily existence, along with adapting to a chronic illness. The goal of this study will be to evaluate the effectiveness of an in-home SE nursing intervention to prevent readmission for patients with HF.

The existence of self-care deficits in the elderly regarding management of the ongoing stress of dietary adaptations, medication regimes, and decreased functional status associated with HF is validated in the literature (Lough, 1996). These stressors can negatively impact health and lead to rehospitalization, affecting recovery and the ability to live independently. Guidelines for the care of patients with HF were published by the AHCPR (1994) which recommend patient and family counseling and education, dietary and medication assessment, nursing and social service interventions, support groups, and compliance improvement measures. As is reflected in the previous literature review a number of studies are supportive of the concepts represented in these guidelines (Dahl & Penque, 2000; Fonarow et al., 1997; Happ, Naylor, & Roe-Prior, 1997; Krumholz et al., 1997; Paul, 2000; Rich et al., 1995; Wehby & Brenner, 1999).

As the prevalence of HF continues to increase, bringing ever higher financial burdens and personal costs in decreased quality of life, it is vital to determine attainable ways of reducing readmissions and costs, and improving quality of life for patients with HF. Hospitalizations are frequently preventable (Bennett et al., 1998; Haan et al., 1997;

Kegel, 1995; Paul, 2000; Vinson et al., 1990). The high rate of readmission for this widespread diagnosis requires more research to determine the causes and to focus the search for remediation of the problem. Long-term multidisciplinary post discharge care and in-home care are corroborated in the literature (Kornowski et al., 1995; Naylor et al., 1999; Rich et al., 1995; Stewart, Marley, & Horowitz, 1999; Stewart, Pearson, & Horowitz, 1998; Stewart, Vandenbroek, Pearson, & Horowitz, 1999) as viable methods of reducing readmissions.

Further research needs to be done to determine the value of specific interventions for meeting this need. "The major goals of treatment for older people living with HF are to increase their control over their health condition, improve their health status, and decrease the costly use of health care services" (Happ, Naylor, & Roe-Prior, 1997, p. 75). A key question to be answered is whether SE nursing interventions can help to meet these goals.

Research Question:

The research question to be addressed by this study is: Is there a difference, at 3 months and 6 months post discharge, in hospital readmission rates between supportive-educative and placebo nursing approaches in groups of patients with HF receiving home care?

Study Hypothesis

The hypothesis of this study is: Hospital readmission rates, at 3 months and 6 months post discharge, for patients with HF that receive in home supportive-educative nursing interventions will be less than those receiving placebo nursing interventions.

Definition of Terms

Hospital readmission: The number of separate times a patient was readmitted to a hospital, overnight or longer, in the past 3 and 6 months.

Patients with heart failure (HF): A patient, 18 years old or older, admitted to the home care agency with a primary medical diagnosis of heart failure.

Supportive-educative (SE) nursing intervention: Nursing intervention, based on the theory of Orem (1995) and the AHCPR HF guidelines (1994), addressing the health deviation of heart failure that guides, supports, and teaches the patient in self-management.

Placebo intervention: Nursing intervention for general health promotion, not based on AHCPR HF guidelines, regarding adult immunization, fall risk reduction, general nutrition, normal aging, general health maintenance, and insomnia information.

CHAPTER 3

METHODOLOGY

Design

This study was a secondary analysis drawn from a primary study conducted by Dr. Kay Setter-Kline, Professor at Grand Valley State University in Allendale, Michigan. The primary study, a blind, experimental design, was of home care patients diagnosed with HF. Graduate nursing students administered three nursing interventions in the experimental aspect of the study. All patient groups received a study intervention in addition to the usual home care protocol provided by their home care agency. The study interventions were placebo, mutual goal setting, and supportive-educative (SE) nursing approaches. The three groups were compared for a number of variables. For this secondary analysis, only the placebo and SE groups were drawn from the primary study and evaluated.

Advantages/disadvantages of the study design. One advantage of the primary study design is that, due to the controls placed on the variables, it is possible to test the hypotheses. Controls in the primary study included use of two agencies to obtain a larger sample, blind technique (the data collectors were unaware of subject groupings and could not influence the subjects responses), provision of separate nursing approaches to each study group, random assignment of subjects to the three study groups, and careful preparation of the experimental protocol (Polit & Hungler, 1999). Controls add to the strength of the design, and allow valuable information to be acquired, with minimal patient risk. Another advantage is that all groups of patients receive their usual home care plus supplementary interventions and support.

One disadvantage of any type of study is the possibility of the Hawthorne effect influencing the outcome. This is the result of subjects' altering their behaviors and/or responses as a result of the awareness of participating in a study (Polit & Hungler, 1999). Potential influences on the outcomes of this study include the external variables of cognitive status, support systems, financial status, and inability to control the in-home intervention settings. Outcomes and internal validity may have been affected by the variance in disease severity level, comorbid medical conditions, and length of time from diagnosis of the patients. Additionally, the winter influenza and viral respiratory infection season could have a seasonal influence on HF exacerbations and affect the data gathered during that time, and thus the study results. The major disadvantage to a longitudinal study of this type is the loss of subjects over the length of the study as a result of increasing physical deterioration leading to institutionalization or death.

A secondary analysis is a reexamination of data from a primary study to answer an additional research question. A secondary analysis provides an intact data set, which is an economical and time saving advantage. A disadvantage of a secondary analysis is that it may be challenging to locate existing data suitable for the researcher's needs or that a particular variable that the researcher wished to address was not measured (Polit & Hungler, 1999). A secondary analysis was done in this instance because the data were readily available, and provided the information to answer the research question.

Approval for this secondary analysis was obtained from the Grand Valley State University Human Research Review Committee (Appendix A). Permission to use the data set was obtained from the principal investigator (Appendix B).

Sample and Setting

In the primary study, the patient sample was drawn from home care patients with HF admitted to two large non-profit home care agencies located in separate cities in western Michigan. Both agencies were Medicare certified and hospital affiliated. The agencies provided skilled nursing, social work services, home health aide services, and physical, occupational, and speech therapy. Patient selection criteria included: primary diagnosis of HF for referral to home care, over the age of 18, able to understand and speak English, and agree to participate in the study. The patient sample was randomly assigned to the three groups with the goal of 31 patients for each group at each home care agency site. Data from the two sites were combined for the analysis.

Sample for secondary analysis. The segment of the primary study utilized for this secondary analysis, included 30 subjects in the placebo intervention group and 26 in the SE nursing approach group at the initial data collection. The third treatment group from the primary study was not included in this analysis.

The age range for the placebo intervention group was 56 to 92 with a mean age of 75.07 (SD = 9.53). Ages in the SE intervention group ranged from 42 to 94 with a mean age of 75.00 (SD = 14.30). In the placebo intervention group, 15 (50%) were married, while 12 (40%) were widowed, and 3 (10%) were either divorced or never married. Among the SE intervention group, 11 (45.8%) were currently married, 12 (50%) were widowed, and 1 (4.2%) was never married. There were no divorced subjects in the SE intervention group. One member of the placebo intervention group continues to work a minimal number of hours per week.

The majority (n = 19, 63.3%) of placebo subjects had an 11th-12th grade educational level, while 3 (10%) had an Associate's degree. In the SE intervention group 11 subjects (45.8%) had an 11th-12th grade educational level, while 7 (29.2%) of this group had an Associate's degree. The primary insurance provider for 90% of the placebo intervention group and for 83.3% of the SE intervention group was Medicare. Additionally 73.3% of the placebo intervention group and 66.7% of the SE intervention group had some additional insurance coverage. A cardiologist was the main health care provider for 20 (66.7%) of the placebo subjects, while 10(33.3%) received health care from an internist. In the SE group, 21 (87.5%) had a cardiologist as their main health care provider, while 7 (29.2%) received care from an internist.

Other demographic statistics were also analyzed. Annual income was evaluated at four levels: less than $10,000, $10-20,000, $20-30,000, and $30-40,000. Of the placebo group, 93.3% (28) had annual incomes of $30,000 or less. In the SE group, 95.7% (22) had annual incomes of $30,000 or less. The length of time from diagnosis with HF was assessed at four levels: less than one year, one to two years, three to five years, and over five years. The length of time from diagnosis in 66.7% (20) of the placebo group was five years or less, while 70.9% (17) of the SE group had been diagnosed for five years or less. No significant differences between the study groups in the areas of age, marital status, employment status, educational level, insurance provider, health care provider, annual income, and length of time from diagnosis with heart failure were demonstrated. Demographic data from the two study groups are presented in Table 1.

Instrument

The Self-Management Tool (SMT) was utilized for data collection in the primary study. The SMT was adapted from the Chronic Disease Self-Management Study Measures (Lorig et al., 1996). These measures were developed by Lorig et al. to assess the effectiveness of a chronic disease self-management program. The health utilization segment of the SMT was utilized to assess hospital readmissions for the secondary analysis (Appendix D). Using a test-retest procedure, the reliability coefficient was determined to be .89.

Procedure

In the primary study, a list of patients with a primary diagnosis of HF (ICD-9 code 428) referred for home care was used for subject selection. The home care agency case manager initially screened those meeting the study criteria for participation. Using a script (Appendix E), the case manager introduced the study to the patient. If home care patients demonstrated an interest in participating, patients were then asked if a graduate nursing student involved in the study could contact them. The data collector made a home visit once verbal agreement for a visit was given. At the home visit, the data collector explained the study and requested informed consent from the patient using the script to obtain consent (Appendix F). If the patient agreed to participate, the consent was signed (Appendix G). Following this, the data collector used a demographic tool (Appendix C) to collect data. Using the data assessment tool the data collector, a graduate nursing student, collected data initially, and at 3, 6, 9, and 12 months. Only data from the initial, 3- and 6-month data collection periods were used for the secondary analysis.

Table 1

Sample Characteristics (n = 54) (continued)

Group	Placebo		Supportive educative	
	#	%	#	%
Employment Status*				
Employed	1	3.3%	0	0%
Unemployed	29	93.3%	23	100%
Educational Level				
1st – 7th grade	3	10.0%	1	4.2%
8th – 10th grade	4	13.4%	4	16.7%
11th – 12th grade	19	63.3%	11	45.8%
Associate's degree	3	10.0%	7	29.2%
Bachelor's degree	1	3.3%	0	0%
Master's degree	0	0%	1	4.2%
Insurance Provider**				
Private insurance	1	3.3%	1	4.2%
HMO	0	0%	1	4.2%
Medicare	27	90.0%	20	83.3%
Medicaid	7	23.3%	3	12.5%
Supplemental insurance	11	36.7%	9	37.5%
Other	3	10.0%	2	8.3%

*Note: One SE subject did not respond regarding employment status. (Table continues)

Table 1

Sample Characteristics (n = 54) (continued)

Group	Placebo #	Placebo %	Supportive educative #	Supportive educative %
Health Care Provider**				
Family practice physician	7	23.3%	2	8.3%
Cardiologist	20	66.7%	21	87.5%
Internist	10	33.3%	7	29.2%
Nurse practitioner	2	6.7%	1	4.2%
Physician's assistant	0	0%	0	0%
Other	3	10.0%	2	8.3%
Annual Income in Dollars				
Less than $10,000	9	30.0%	5	21.7%
$10,000 – 20,000	9	30.0%	10	41.7%
$20,000 – 30,000	10	33.3%	7	29.2%
$30,000 – 40,000	2	6.7%	1	4.2%
Length of Time with HF				
Less than 1 year	9	30.0%	7	29.2%
1 – 2 years	5	16.7%	4	16.7%
3 – 5 years	6	20.0%	6	25.0%
More than 5 years	10	33.3%	7	29.2%

**Note: Totals indicate greater than 100% because subjects were able to select more than one answer.

The principal investigator for the primary study randomly assigned each patient to one of the three intervention groups. The home care agencies provided the standard care for both groups. Graduate nursing students provided the experimental components for both groups during eight weekly visits. The placebo group received health promotion education. This included information on general nutrition, normal aging, general health maintenance, insomnia, methods to decrease the risk of falls, and adult immunizations (Appendix H). The AHCPR HF guidelines (Appendix I) addressing the health deviation of HF formed the basis of the SE nursing approach (Orem, 1995) that was delivered. The SE nursing approach supports, guides, and teaches self-care management for the patient with HF.

Risks and Confidentiality

Data were collected in the primary study, and coded into a computer database, in a manner that made it impossible to identify the patients. Therefore there were no risks to patient confidentiality from the secondary analysis as the data were already collected. Since there were no interventions in the secondary analysis, there were no patient contacts and, therefore no risks involved.

CHAPTER 4

RESULTS

Data Preparation and Analysis

This study was drawn from a primary, two-site, blind, experimental study of home care patients diagnosed with HF. Placebo and supportive-educative (SE) nursing interventions were evaluated using a two-group comparison. Hospital admissions at baseline, 3 months, and 6 months were the variables evaluated. Two graduate nursing students coded data from each site and entered it into a computer database. With use of the Statistical Package for the Social Sciences, the data were analyzed at Grand Valley State University based on the research question. An initial comparison of data from the two sites was completed to assess for significant demographic differences between sites. It was determined that there were no significant differences between the two sites; therefore, data from the two sites were combined. The demographic variables were evaluated through the use of descriptive statistics.

Analysis of the Study Variables

The data were collapsed into admitted and not admitted categories for analysis using Chi-square to determine if there was a significant difference in hospital admission rates between the placebo and SE nursing approach groups. The level of statistical significance was $p < .05$.

The research question addressed by this study was whether there was a difference, at 3 months and 6 months, from baseline, in hospital readmission rates between SE and placebo nursing approaches in groups of patients with HF receiving home care. In order to know whether there was a difference at 3 and 6 months, it was first necessary to determine if there was a difference in the previous three months (baseline) between the two study groups.

The placebo approach group had a baseline admission frequency of 25 (83.3%), while the SE group baseline admission frequency was 18 (75.0%). Thus there was no significant difference between the groups at baseline (X^2 = .57, p = .45). At the 3-month mark the hospitalization frequency for the placebo group was 13 (48.1%) while the SE group rate was 3 (17.6%), indicating a significant difference in admission frequency (X^2 = 4.19, p = .04). The 6-month admission frequency for the placebo intervention group was 7 (31.8%) while the SE intervention group had a frequency of 2 (12.5%) indicative of no significant difference in hospitalization rates at 6 months (X^2 = 1.91, p = .17). (See Table 2).

The hypothesis for this study was that there would be a reduction in hospital admission rates at 3 and 6 months for the SE group. Referring to Table 2, it can be seen that at the 3-month mark there was a statistically significant reduction in admissions for the SE group, supporting the hypothesis at this point. While there continued to be a reduction in admission rates for both groups at the 6-month mark, there was no statistically significant difference between the groups. Thus, while the hypothesis was supported at 3 months, it was not supported at 6 months.

Additional Findings

Since the data were readily available during the readmission analysis, length of stay (LOS) and emergency room (ER) visits were briefly explored with the following findings. Baseline mean LOS for the placebo intervention group was 9.60 days (SD = 8.94) while the SE intervention group had a mean LOS of 5.08 days (SD = 5.03), a

Table 2

Admitted versus Not Admitted between Placebo and Supportive-Educative at Baseline, 3 Months, and 6 Months

Group	N	Admitted f	(%)	Not Admitted f	(%)	X^2	p
Baseline							
Placebo	30	25	(83.3)	5	(16.7)	.57	.45
Supportive-Educative	24	18	(75.0)	6	(25.0)		
3 Months							
Placebo	27	13	(48.1)	14	(51.9)	4.19	.04
Supportive-Educative	17	3	(17.6)	14	(82.4)		
6 Months							
Placebo	22	7	(31.8)	15	(68.2)	1.91	.17
Supportive-Educative	16	2	(12.5)	14	(87.5)		

significant difference (t = 2.21, df = 52, p = .03). At 3 months there was no significant difference between the groups in LOS (t = 1.8, df = 42, p = .079). LOS at 6 months also showed no statistically significant difference between the groups (t = .87, df = 36, p = .39). (See Table 3).

The baseline LOS data for the SE intervention group was significantly better than that of the placebo intervention group, which may indicate that this group was healthier at baseline. This may be related to the length of time from diagnosis. In the SE intervention group 29.2% had been diagnosed for five years or more, while 33.3% of the placebo intervention group had been diagnosed for that length of time. Patients diagnosed more recently may be presumed to be less debilitated, and able to be discharged earlier. This might have affected the level of coping and ability to manage the disease, thus decreasing the LOS for the SE intervention group.

LOS is often related to the reason for admission. Since no data were available on the reasons for baseline admissions, there was no way of knowing if the admissions were attributable to HF. It might be that the placebo group had been admitted for reasons other than HF, thus affecting the LOS data. If adjusted for this factor, there may have been no baseline difference in LOS between the two groups.

LOS reported for the placebo intervention group declined considerably, from a maximum of 40 days at baseline to a maximum of 14 days at the 6-month point. This decline may indicate that the eight patients lost from this group during the study were some of the more seriously ill who may have died or been placed in care facilities. Or it may indicate that the placebo intervention group benefited appreciably from their intervention in the area of health maintenance.

LOS for the SE intervention group declined at a less dramatic rate, from a maximum of 20 days at baseline, to a maximum of 16 days at the 6-month mark. Either the loss of eight patients in this group, or the more debilitated subjects being hospitalized for longer periods, may have affected the results. In a sample of this size, a few more seriously ill patients with greater LOS can have a major effect on results.

Table 3

Differences in Length of Stay between Placebo and Supportive-Educative at Baseline, 3 Months, and 6 Months

Group	N	M (SD)	t	df	p
Baseline					
Placebo	30	9.60 (8.94)	2.21	52	.03
Supportive-Educative	24	5.08 (5.03)			
3 Months					
Placebo	27	3.00 (3.79)	1.80	42	.08
Supportive-Educative	17	1.12 (2.78)			
6 Months					
Placebo	22	2.23 (4.06)	1.91	36	.39
Supportive-Educative	16	1.13 (3.58)			

Initial ER visit rates for the two study groups were comparable (t = .41, df = 52, p = .68). The placebo intervention group showed a decrease of 26.7% from a baseline mean of 1.37 (SD = 1.10) to a mean of .77 (SD = 1.07) at the 6-month mark. The SE intervention group showed a 39.5% decrease from a baseline mean of 1.25 (SD = .94) to a 6-month mean of .50 (SD = .63). While there was no statistically significant difference between the groups in the number of ER visits at any point, the number declined from baseline to the 3-month mark and remained stable at that level through the 6-month mark for both groups. (See Table 4).

Table 4

Differences in Emergency Room Visits between Placebo and Supportive-Educative at Baseline, 3 Months, and 6 Months

Group	N	M (SD)	t	df	p
Baseline					
Placebo	30	1.37 (1.10)	.41	52	.68
Supportive-Educative	24	1.25 (.94)			
3-Month					
Placebo	27	.81 (1.11)	.39	42	.70
Supportive-Educative	17	.69 (.63)			
6-Month					
Placebo	22	.77 (1.07)	.91	36	.37
Supportive-Educative	16	.50 (.63)			

Summary of Findings

The findings of this study of hospitalization rates at the 3-month point did support the hypothesis that hospitalization rates would decrease for patients with HF who receive in-home SE nursing interventions. However, data analysis found that there was not a statistically significant difference between placebo and SE nursing approach groups in hospital readmissions at 6-months. Though the hypothesis was only partially supported, and the improvements were statistically significant at only the 3-month point, this may still indicate clinical significance in that both groups improved and benefited from the interventions as shown by a reduction in readmissions, LOS, and ER visits. This could represent a clinically significant difference to the patients involved because they were able to manage their illness at home and remain out of the hospital.

CHAPTER 5

DISCUSSION AND IMPLICATIONS FOR NURSING PRACTICE

Discussion

The self-care deficit theory (Orem, 1995) is a holistic approach to nursing that considers the physical, psychological, and environmental dimensions of patients. Using this holistic framework, the independence and self-care abilities of patients are promoted through supportive-educative (SE) nursing measures which include teaching, counseling, making referrals and arrangements, and monitoring clinical condition. An essential segment of supportive nursing care is educating the patient to care for his/her own needs by identifying the self-care deficits of each patient and teaching self-care related to those deficits.

Heart failure (HF) is a progressively debilitating disease with high morbidity and mortality. Management of HF entails complex life style changes for most patients, requiring learning and adapting to significant amounts of new information. Self-care ability and behaviors, and thus better disease management, may be expected to improve with education about HF and its treatment. Patients with HF are prime candidates for SE nursing approaches to promote optimum functioning, remaining in their homes, and avoiding hospitalizations.

Most patients with HF are managing at home, alone or with the help of family and/or friends. Home-care nursing incorporates the fundamental tenets of SE nursing, along with community support services, to promote and enhance self-care ability in each patient. A number of studies have found that patients with HF are frequently readmitted (Bennett et al., 1998; Burns & Nichols, 1991; Happ, Naylor, & Roe-Prior, 1997; Krumholz et al., 1997; Vinson et al., 1990). SE nursing may be proactive disease management as it could empower patients to better manage their disease and thereby prevent exacerbations leading to readmissions. Jaarsma et al. (2000) found that SE nursing interventions improved self-care behavior and symptom frequency and distress. Further research into methods of reducing the cost of HF in terms of physical distress and health care dollars is necessary. This study was pursued to determine if a SE nursing intervention reduced hospital admissions. Although the data from this study give mixed results, that is, being significant at 3-months but not at 6-months, the findings may be clinically significant, as patients in both study groups appeared to benefit from their respective interventions as shown by reductions in readmissions, LOS, and ER visits, supporting the benefits of continuing follow up through home care.

Several variables could have affected the results of this study, including the length of time since diagnosis with HF. It is reasonable to presume that persons diagnosed a number of years prior to entering the study would have been exposed to previous educative efforts in regard to managing their condition. This previous educational contact may have clouded the outcome of this study by preventing a true representation of the benefit of the SE intervention. Another variable to be considered is the severity of the disease. Patients whose disease process is more advanced could be expected to show less positive results in readmission rates or to have left the study due to death or inability to remain in the study.

Some of the basic conditioning factors identified by Orem (1995), such as socio-cultural orientation, family system, and available resources, were not evaluated in this study. Conditioning factors affect the uniqueness of self-care needs and may have impacted the ability of the study subjects to participate in the nursing interventions and thus have skewed the study outcomes. Available support systems, and their quality, can have a major impact on the ability of a patient with HF to remain at home and may have influenced results.

It is often difficult to determine why a study does not support the hypothesis. Polit and Hungler (1999) indicate the obstruction often lies in insufficient power, or too small a sample size. This may be the primary reason for the insignificant findings in this study.

Limitations

The groups were evenly distributed and statistically similar in regard to demographics and characteristics, and the use of two home-care agencies did not affect composition of the samples. The primary study had a strong experimental design, but internal validity may have been influenced by the use of two sites, and different interventionists and data collectors at each site, if the set protocol for administering the interventions or collection of data was deviated from at either site. In this study, all patients received their usual home care components from their home care agency in addition to the study interventions. Since home care has a strong SE focus, placebo group patients may have benefited sufficiently from the typical home care interventions to have influenced the results of this study.

A limitation to the assessment of hospitalizations was that there was no allowance made for differentiating readmissions resulting from comorbid disease processes, which could have had a detrimental effect on hospitalizations. Patients with HF frequently have one or more comorbidities, which increase their disease severity and health care needs. Investigation of admissions related to comorbidities would allow this effect to be separated from HF effect. Restructuring of the assessment tool would allow delineation of comorbid factors in the statistical analysis.

Two major limitations of this study include the small sample size and the loss of subjects over the longitudinal study due to increasing debilitation and death. The small sample size limits study results being generalized to a larger population.

Implications for Nursing Practice

HF continues to increase in prevalence and importance as the population ages and demand for limited health care resources escalates. Goals for the treatment of patients with HF include improving health status, increasing patient control over their health, and decreasing the drain on costly health care resources. Nurses play a vital role in achieving these goals by educating and motivating patients with HF in the management of their illness. The first step in this process is ascertaining the perceptions of what patients, families, and caregivers feel is important to be learned, and then determining the best methods of providing and reinforcing this learning.

Kravitz et al. (1993) found that patients frequently forget medical advice, and that even when advice is recalled, many patients do not incorporate the recommendations into their daily lives. This forgetfulness intensifies the need for effective communication with patients, ongoing patient education, and formulation of more effective strategies to assist absorption, retention, and incorporation of teaching into the everyday life of patients. The importance of including families and caregivers in the education process is also reinforced by this forgetful tendency.

Patient education begins at the moment of admission, but decreasing length of stay (LOS) leaves less time for its provision during hospitalization. Nursing administration needs to bear in mind that some readmissions could be prevented either by better patient teaching, different strategies on how nurses deliver health education, staffing for patient education, or clinical pathways to include patient and family education. Nurses need to be adequately educated on how, when, and what to teach patients and families about HF and its management. Administrators need to consider how best to accomplish this, whether by nurse mentors, internships, or other means that effectively provide nurses with the knowledge and skills to teach patients, families, and caregivers.

"Both patient and support system need to be adequately prepared for the realities and responsibilities of self-care at home" (Jopp, Carroll, & Waters, 1993, p.93). Discharge planning, incorporating needs assessment, education, adherence promotion, and individualized comprehensive planning for outpatient follow-up and support, is necessary to promote clinical stability and improved patient outcomes. Nurses must be prepared to support the efforts of patients with HF to self-manage their disease, while monitoring clinical status and introducing treatment plan modifications when necessary.

This study implies that education alone may not be enough to decrease HF hospitalizations. It does encourage examination of nursing practices and further research into the types of nursing interventions that will provide the greatest benefits for patients.

Recommendations for Further Research

According to Grady et al. (2000), comprehensive and intensive patient education and counseling about HF, its treatment, and the importance of adherence are fundamentals important to any program attempting to improve the hospitalization rates of patients with HF. Which intervention program components will have positive affects in decreasing hospitalizations, reducing costs, and improving quality of life (QOL) must be the focus of future research endeavors. Stewart, Pearson, and Horowitz (1998) and Krumholz et al. (1997) both noted that up to 40% of HF readmissions were related to cormorbidities. Investigation into the presence of comorbidities and refinement of assessment tools, to enable determination of the impact of comorbidities on ER visits, hospitalizations, and LOS warrant further study.

The increasing debility imposed by the progressive nature of HF makes longitudinal studies of patients with HF difficult. Studying patients newly diagnosed with HF may provide a clearer picture of the effect of SE nursing interventions. Newly diagnosed patients would theoretically be less ill, and would also be uncomplicated by prior HF teaching experiences.

The importance of support systems, or the lack of, and including families and caregivers in the educational process have been touched on by other studies (Happ, Naylor, & Roe-Prior, 1997; Jaarsma et al., 1998; Lough, 1996). What are the perceptions of the patients, families, and caregivers about barriers to the management program? Perhaps nonadherence leading to readmission is a result of patients and families following their cultural, ethnic, or religious norms and not comprehending how recommendations can be adapted to fit their lifestyle.

HF management is complex, requiring alteration of life long habits. Research into simplification of management components, or how to make it more acceptable, adaptable, or comprehensible may yield unexpected results relating not only to adherence, but perceived barriers. Research could be conducted to include the patient and family perspective on why recurrent hospitalizations occur and what might have been done to prevent them. Some work (Jaarsma et al., 2000) has been done on the impact of SE interventions on QOL, but further research in this area would be beneficial in assessing the impact of various interventions.

Another area deserving of investigation is whether SE interventions for patients with HF need to be long term. Several studies (Happ, Naylor, & Roe-Prior, 1997; Jaarsma et al., 2000) have shown that the positive effect has declined after interventions have ended. Perhaps with the forgetfulness found by Kravitz et al. (1993), and the elderly nature of many patients with HF, long-term maintenance interventions would be of greater clinical benefit.

The reduction in hospitalizations in this study supports the role of outpatient SE nursing interventions. Benefits in improved outcomes and cost reduction from APN managed HF clinics have been shown (Cline, Israelsson, Willenheimer, & Erhardt, 1998; Dahl & Penque, 2000; Paul, 2000; West et al., 1997). These results are promising enough to warrant further exploration into the role of APNs in improving HF maintenance.

Summary

Until definitive treatment options for HF are developed, patients need support in learning the signs and symptoms of worsening HF and how to manage them optimally. Ensuring availability of a knowledgeable health care provider to patients with HF to assist in managing deteriorating HF may decrease hospital readmissions. Education and support must be tailored to the individual, multifaceted needs of patients and frequently reinforced to impact behavioral choices and to result in enduring behavioral changes. This study was undertaken to validate the benefits of a nursing focused intervention for patients with HF. Although the results were mixed, the trends existing in the variables are encouraging and justify further evaluation of this intervention. Research in this area has important implications for improving health outcomes, decreasing the drain on health care resources, and increasing patient control over health.

APPENDICES

APPENDIX A

GRAND VALLEY
STATE UNIVERSITY
1 CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

July 13, 2001

Patrice M. Whitaker
16525 Riley
Holland, MI 49424-5812

RE: Proposal #01-201-H

Dear Patrice:

Your proposed project entitled **Evaluation of the Effect of In-home Supportive Educative Nursing Interventions on the Hospital Re-admission Rates of Patients with Heart Failure** has been reviewed. It has been approved as a study, which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,

[redacted]

Paul Huizenga, Chair
Human Research Review Committee

APPENDIX B

GRAND VALLEY
STATE UNIVERSITY

1 CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

January 12, 1999

Kay Setter Kline
222 HRY
Kirkhof School of Nursing

Dear Kay:

The Human Research Review Committee of Grand Valley State University is charged to examine proposals with respect to protection of human subjects. The Committee has considered your proposal, "***Home Care Outcomes for Heart Failure: A Test of Two Nursing Interventions***", and is satisfied that you have complied with the intent of the regulations published in the Federal Register 46 (16): 8386-8392, January 26, 1981.

Sincerely,

[redacted]

Paul Huizenga, Chair
Human Research Review Committee

Patrice,
you have permission
to use data from the above
study for your thesis
Kay Setter Kline

APPENDIX C

DEMOGRAPHIC DATA

Record Number: ______ (To be collected at time of initial interview)
Subject Number: _______

1. Age _____
2. Marital Status
   ___ Never Married
   ___ Married
   ___ Divorced
   ___ Widow/Widower

3. Employment Status
   ___ Employed (____ hours per week)
   ___ Unemployed

4. Highest Level of Education
   ___ 1st - 7th grade
   ___ 8th – 10th grade
   ___ 11th – 12th grade
   ___ Associate's Degree
   ___ Bachelor's Degree
   ___ Master's Degree
   ___ Doctoral Degree

5. Insurance Provider
   ___ Private Insurance (Name of Company ________________________________
   ___ HMO (Name of Group____
   ___ Medicare
   ___ Medicaid
   ___ Supplemental Insurance (Name of Company ___________________________
   ___ PPO (Preferred Provider Organization) ______________________________
   ___ Other ____

6. Health Care Provider (Who treats your heart failure?)
   ___ Family Practice Physician
   ___ Cardiologist
   ___ Internist
   ___ Nurse Practitioner
   ___ Physician Assistant
   ___ Other _______________________________

7. Annual Income in Dollars
   ___ Less than $10, 000
   ___ $10, 001 - 20, 000
   ___ $20, 001 - 30, 000
   ___ $30, 001 – 40, 000
   ___ $40, 001 – 50, 000
   ___ Over $50, 000

8. How long have you had heart failure?
   ___ Less than 1 year
   ___ 1 – 2 years
   ___ 3 – 5 years
   ___ More than 5 years

9. List current medical diagnoses:

____

____

____

____

APPENDIX D

HEALTH CARE UTILIZATION

How many times did you visit the emergency room in the past 3 months?

___None ___Times Reason? ______________________________

How many different times did you stay in a hospital overnight or longer in the past 3 months?

___ None ___ Times Reason? ______________________________

How many total nights did you stay in a hospital overnight in the past 3 months?

___ None ___ Times Reason? ______________________________

APPENDIX E

Agency Script

We are fortunate to have our home care agency included in a nursing study that has been funded by the American Heart Association. The study will be conducted by Dr. Kay Kline, Professor of Nursing at Grand Valley State University. The purpose of the study is to improve the lives of persons with heart failure. We would like you to consider participation in the study, but know that you cannot make a decision about participation without knowing more about the study. Can we have a registered nurse who is a graduate student at Grand Valley State University contact you to tell you more about the study?

APPENDIX F

Script to Obtain Consent

My name is _____________. I am a Registered Nurse. I am taking classes at Grand Valley State University to obtain a masters degree in nursing. I have been given permission by your home care agency to come here today with your home care nurse, to determine if you are willing to let me explain a nursing research study that is being conducted with people like yourself who have been diagnosed with heart failure and are receiving home care.

After your nurse has finished providing your care today, may I stay a few minutes to explain the nursing research study we are doing?

(If verbal permission is granted, proceed with explanation of study and obtaining informed consent after the home care nurse has left.)

Explanation of the Study

As nurses we are concerned with how people adjust to the medical diagnosis of heart failure. We want to find nursing approaches that will help you learn how to self-manage your heart failure. We believe that when you can self-manage your heart failure you will live a better life.

The study will consist of five (5) interviews of approximately 45 minutes duration, for the purpose of obtaining information about your heart failure. You will be given $10 at the completion of each of these five (5) interviews as compensation for your time. The interviews will be spaced three months apart, starting this week. If you agree to participate, you will be placed in one of three groups.

Each group will receive a different approach to managing health. Each of the nursing approaches will be provided in addition to the regular care you receive from your home care nurse, at no extra cost. Each nursing approach will be provided to you in weekly 30 minute visits by another graduate nursing student who will call you to make an appointment to come to your home. If you participate in the study, I will give you the name of the students who are participating in this study so you will recognize the name of the student who calls you. There will be a total of eight (8) weekly visits. Each visit will provide you with information about managing your health. All visits will be scheduled at your convenience, similar to your current home care visits. You will not be given compensation for these eight (8) weekly visits.

Your participation in this study will in no way affect the regular care you receive from your home care nurse, and it may help you improve your self-management of heart failure symptoms. The results of this nursing study may help nurses determine better ways to help other people with heart failure to improve their lives.

Because this is a nursing research study, I will maintain the confidentiality of the information obtained during the interview. Your name will not be identified with any of the information I collect. When reporting the results of the study, only group results will be shared; no names of individuals will be published. The nurses providing your home care will not be told that you are participating in the study.

APPENDIX G

Informed Consent

I ______________________________ agree to participate in the nursing research study for persons with heart failure who are receiving home care. I understand that as a participant in this study:

- I will be interviewed five (5) times for approximately 45 minutes each time, once within this week and again at 3, 6, 9, and 12 months. I will be compensated $10 at the completion of each interview.
- I will receive information about managing my health and that this information will be delivered by a registered nurse who is a graduate nursing student at Grand Valley State University.
- I will receive this information once a week over the next eight (8) weeks and that each visit will last approximately 30 minutes. I will not be compensated for receiving this information.
- I will be able to withdraw from the study at any time by notifying Dr. Kay Setter-Kline, the Principal Investigator, at 616-895-3517, and that my withdrawal will in no way affect the care I receive from the home care nurse.
- I understand that participation or lack of participation will have no impact on my insurance coverage or rates.
- I will not be identified by name with any of the information obtained and that any sharing of information obtained in this study will be in the form of group summaries of all participants.
- There is no identified risk from participating in this study and I may benefit from receiving information about ways to manage my health.
- If in the process of gathering information, any symptoms are identified that might need attention, the nurse gathering the information will refer me to either the home health agency or my health care provider.
- I also give permission for review of my health records to verify my health care status.

If I have any questions about the research study I may contact the Primary Investigator, Dr. Kay Setter-Kline at 616-895-3517, or the Chair of the Research Review Committee, Paul Huizenga at 616-895-2471.

______________________________ ____________________

Signed Date

______________________________ ____________________

Witness Date

The names of the students who are participating in this study are: ____________, ____________, and ____________.

APPENDIX H

Placebo Health Promotion Education Outline

INTERVENTION WEEK 1: Skin Care

As we grow older, we see and feel certain changes in our skin, the body's largest and most visible organ. Skin becomes drier, more wrinkled, and spots and growths may appear. The skin tends to heal more slowly.

Dry skin: Flaky and itchy is a problem, especially in cold, dry, and windy climates
- A moisturizer can be used after bathing, while the skin is still damp
- Do not add oil to the bathwater, as the tub can become dangerously slippery
- Bathing less often and using mild soap can help relieve dry skin

Skin lesions: Skin growths and lesions become more common as we age
- Skin cancers are usually caused by years of sun exposure

Melanoma: A more serious form of skin cancer
- Appears as a dark brown of black mole-like growth with irregular borders and variable colors
- Men over the age of 50 are at highest risk
- Most frequent sites are the upper back in both men and women, the chest and abdomen in men, and the lower legs of women
- The "ABCD" criteria:
  - Asymmetry- one half of the mole does not match the other half
  - Border irregularity- the edges are ragged, notched, or indistinct
  - Color- pigmentation is uneven and includes black, blue, or gray
  - Diameter- larger than a pencil eraser

More information: inspect your entire body monthly for any new moles or discolorations and notify your health care provider if you notice any changes.

Use sunscreen with UV light protection whenever you will be out in the sun.

INTERVENTION WEEK 2: Osteoporosis

Osteoporosis is a disease that thins and weakens bones to the point where they break easily – especially bones in the hip, spine, and wrist. Osteoporosis is called the 'silent disease' because you may not notice any symptoms.

Almost 90% of hip fractures occur in people over age 65.
- Be sure to check your home and surrounding environment for loose rugs or clutter on the floor. Have adequate lighting where you will be walking.

One out of two women and one in eight men over age 50 will have an osteoporosis related fracture.

Many older men are at risk for fractures related to aging.

Risk factors:

White and Asian women

Women with a family history of osteoporosis

Women with a menopause before age 40

A history of tobacco use and excessive alcohol and caffeine intake increase the risk of developing osteoporosis

Patients taking certain medications such as corticosteroids, thyroid hormones, anticoagulants are at increased risk

Prevention:

A diet rich in calcium and vitamin D

Regular weight bearing exercise. Check with your health care provider before starting any exercise program

Elimination of tobacco, excessive alcohol, and caffeine

INTERVENTION WEEK 3: Injury Prevention

Prevention of falls:

Remove all throw rugs and secure carpet edges

Remove any clutter from the floor

Remove cords and wires from the floor

Repair cracked sidewalks and install handrails on steps or stairs

Install adequate lighting in walkways inside and outside

Wear solid or sturdy shoes

Always wear a seat belt whenever you are riding in the car.

Be certain that the smoke detectors in the house are in working order.

Check the temperature in the water heater. It should be no warmer than 110°.

Never smoke in bed or near upholstery.

Preventing hypothermia in cold weather:

Stay indoors as much as possible, especially on windy, wet, and cold days

Wear layered clothing, and cover the head when outdoors

Keep at least one room warm

Use extra blankets, caps, socks, and layered clothing in bed

Have contact with someone daily

Do not mix cleaning chemicals.

Be sure that cleaning supplies are correctly labeled.

INTERVENTION WEEK 4: Insomnia

People 65 or older may have problems falling asleep when they go to bed at night, or may have problems staying asleep all night.

Try to go to bed and get up at the same time every day.

Try not to take naps longer than about 20 minutes.

Avoid caffeine in the afternoon or evening.

Avoid alcohol before bedtime.

Don't lie in bed for over 30 minutes 'trying' to go to sleep, get out of bed and engage in a relaxing activity.

Try to do some light exercises early in the day, but avoid exercising within three to four hours of bedtime.

Set aside time each evening for thinking and for relaxation.

Keep your bedroom temperature cool, dark, and quiet.

INTERVENTION WEEK 5: Dental Care

Aging doesn't automatically mean that you will need dentures.

30% of adults over 65 require dentures, that number is expected to drop to 10% in the next century.

There are many reasons why your teeth and gums are at higher risk as an older adult:
  Gums gradually recede from teeth
  Medications may decrease the amount of salvia in your mouth
  Many medical conditions can have an effect on the health of your teeth and gums
  Many older adults' diets aren't as nutritious as they could be
  Lack of preventive dental care

Tooth care tips:
  Brush your teeth at least twice per day
  Use a soft bristled brush
  Replace your brush when the bristles become frayed
  Floss gently, especially the teeth around a bridge
  See your dentist twice a year, and call his/her office if you have any concerns
  Be sure that your dentures fit snugly, that there are no cracks in your dentures, and that there are no missing teeth

INTERVENTION WEEK 6: Adult Depression

It is estimated that 15% of adults over age 65 may suffer from depression.
Nearly two thirds of depressed people do not get appropriate treatment because their symptoms:

- Are not recognized
- Are blamed on personal weakness
- Are not reported to their health care provider

Symptoms of depression can include:

- Persistent sad or 'empty' mood
- Loss of pleasure or interest in ordinary activities
- Decreased energy or fatigue
- Sleep disturbances
- Eating disturbances
- Difficulty concentrating, remembering, or making decisions
- Feelings of guilt, worthlessness, helplessness
- Thoughts of death or suicide
- Irritability

Depression often occurs with medical disorders, and is frequently unrecognized and untreated.

Most people can be helped quickly.

There are effective medications and talk therapy treatments. Early intervention may lessen the severity of symptoms.

If you feel that you may have any of these signs or symptoms, discuss this with your agency staff nurse or your health care provider.

INTERVENTION WEEK 7: Foot Care

Disease, wear and tear, ill fitting or poorly designed shoes, poor circulation to the feet, or improperly trimmed toenails cause many common foot problems.

Preventing foot trouble:

- Wear well-padded socks that are not wrinkled and that are ½ inch longer than your longest toe
- Raise your legs up when sitting
- Your feet should be inspected every day. Call your health care provider at the earliest signs of any problems
- Warm footbaths with mild soap, dry your feet well, especially between the toes
- Wear comfortable leather shoes with low heels
- Apply a body lotion to your legs and feet every day
- Trim your toenails straight across above the nail-bed
- Avoid walking barefoot

INTERVENTION WEEK 8: Food-Borne Illness

Many of us rely on our senses of smell and sight to determine if food is fresh and safe to eat.

Decreased vision and smell are normal changes with aging.

Keep your food safe: keep hot foods hot and cold foods cold.

Keep your kitchen safe:

Wash counter tops, sinks, cutting boards, refrigerator door handles, and the bottom shelf of the refrigerator regularly.

Bag meat and seafood separately in plastic bags. Use within a day or two.

Prepare food carefully:

Wash your hands often, including before and after handling food
Use separate cutting boards for meats and vegetables
Use separate plates for uncooked and cooked foods
Never leave food out of the refrigerator for more than 2 hours

Avoid the use of wooden cutting boards, as it is difficult to adequately sanitize them. Use a cutting board that can be cleaned easily, such as one made of plastic.

APPENDIX I

AHCPR Heart Failure Guidelines
Suggested Topics for Education and Counseling

GENERAL COUNSELING
1. Explanation of heart failure and the reason for symptoms
2. Cause or probable cause of heart failure
3. Expected symptoms
4. Symptoms of worsening heart failure
5. What to do if symptoms worsen
6. Self-monitoring with daily weights
7. Explanation of treatment/care plan
8. Clarification of patient's responsibilities
9. Importance of cessation of tobacco use
10. Role of family members or other caregivers in the treatment/care plan
11. Availability and value of qualified local support group
12. Importance of obtaining vaccinations against influenza and pneumococcal disease

PROGNOSIS
1. Life expectancy
2. Advance directives
3. Advice for family members in the event of sudden death

ACTIVITY RECOMMENDATIONS
1. Recreation, leisure, and work activity
2. Exercise
3. Sex, sexual difficulties and coping strategies

DIETARY RECOMMENDATIONS
1. Sodium restriction
2. Avoidance of excessive fluid intake
3. Fluid restriction (if required)
4. Alcohol restriction

MEDICATIONS
1. Effects of medications on quality of life and survival
2. Dosing
3. Likely side effects and what to do if they occur
4. Coping mechanisms for complicated medical regimens
5. Availability of lower cost medications or financial assistance

IMPORTANCE OF COMPLIANCE WITH THE TREATMENT/CARE PLAN

LIST OF REFERENCES

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