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Evaluation of health-related outcomes following a self-management program for older people with heart failure

Jung-hua Shao

RN, BSN, MSN

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SUPERVISORY TEAM

Principal supervisor: Professor Anne Chang

Professor of Clinical Nursing, School of Nursing, Queensland University of Technology

Director, the Queensland Centre for Evidence-Based Nursing & Midwifery, Mater Health Service

Associate supervisor: Professor Helen Edwards

Professor, Head of School, School of Nursing, Queensland University of Technology

External supervisor: Professor Yea-Ing Lotus Shyu

Professor, Centre for Gerontological Research, Chang Gung University,

Professor of nursing research, School of Nursing, Chang Gung University, Taiwan

STATEMENT OF ORIGINALITY

The work contained in this dissertation has not been previously submitted for a degree at any other tertiary education institution. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person, except where due reference is made.

Signed by

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KEYWORDS

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Older people

Randomised controlled trial

Intervention program

Self-management

Self-efficacy

Self-monitoring

Dietary control

Behaviour change

Symptoms

Health service utilization

Health related outcomes

LIST OF ABBREVIATIONS

ANOVA:	Analysis of Variance
ASMP:	Arthritis Self-Management Programme
CDSMP:	Chronic Disease Self-Management Program
CGMH:	Chang Gung Memorial Hospital
CIs:	Confidence Intervals
CVI:	Content Validity Index
EF:	Ejection Fraction
HF:	Heart Failure
HFSmB:	Heart Failure Self-management Behaviour
HFSD:	Heart Failure Symptom Distress
M:	Mean
N:	Number
NYHA:	New York Heart Association functional classification
PHCR:	Perception of Health Care Received
QUT:	Queensland University of Technology
R-ANOVA:	Repeated Measures Analysis of Variance
SD:	Standard Deviation
SeSFC:	Self-efficacy for Salt and Fluid Control

SPSS:	Statistical Package for the Social Sciences
T_1:	Time 1: Baseline data
T_2:	Time 2: post-test at week 4
T_3:	Time 3: post-test at week 12
UHREC:	University Human Research Ethics Committee

ABSTRACT

Background. Heart failure (HF) which is a chronic, disabling disorder is mainly found in older people and is one of the leading causes of hospitalisation and readmission around the world. Unfortunately, the mortality and morbidity rates for HF remain high. HF is a complex combination of symptoms which are related to an inadequate perfusion of the body tissues caused by fluid and sodium retention. Hence, enhancing HF patients' self-efficacy to change their behaviours to perform fluid & sodium control is one of the most important issues for the management of HF. A self-management program has the potential to raise self-efficacy and self-care which is a method to improve health for those with chronic illness and to decrease patients' health service utilisation and also to enhance these patients' health status.

Aim. The study aims to examine the effectiveness of a self-management program, based on self-efficacy theory, in older people with heart failure in Taiwan.

Methods. An experimental design was used to examine the effectiveness of a self-management program on diet and fluid control among HF patients. A total of 93 subjects from two medical centres in Taiwan were randomly assigned to the intervention and control groups. In order to examine the effectiveness of self-management, data were collected at baseline, week 4, and week 12 using the following instruments: self-efficacy for salt and fluid control, HF self-management behaviour, HF related symptoms, and body weight. Moreover, health service utilisation and patient's evaluation of care received were collected on all patients for the 12 weeks prior to commencing the study and for the 12 week study period. Demographic and disease information was also collected including age, gender, marital state, education, and New York Heart Association (NYHA) functional classification. A structured, individualized self-management training program created by the investigator was implemented for the intervention group through home visits and telephone follow-ups. This program emphasized self-monitoring of diet control and body weight for the self-management of heart failure. The purpose was to improve patients' self-efficacy in their diet control behaviour. The "diet control" in this study focussed on sodium and fluid restriction. Outcome measures were analysed using the Statistical Package for the Social Sciences (SPSS) 15.0 version, and the level of significance (α) was set at 0.05 for statistical analysis.

Results. There were differences for older Taiwanese HF patients' self-efficacy for salt and fluid control, self-management behaviour, and HF related symptoms for participants who received a self-management intervention compared to those who did not. However, there were no significant differences between the two groups in weight and health serves utilization (p>.001).

Conclusion. The self-management program had a positive impact on the improvement of self-efficacy for salt and fluid control, HF related self-management behaviours and symptoms in older Taiwanese with HF. This program may bridge the gap between theory and practice. Health care providers need to provide older people in Taiwan with HF the appropriate skills for self-managing their condition and thereby promoting their health status. These patients with HF and their caregivers have to receive individualized education that emphasizes self-efficacy in the self-management of their disease, thus improving their quality of life.

LIST OF PUBLICATIONS RELATED TO THIS THESIS

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CHAPTER ONE

Introduction

Background and Significance of Study

Background

Heart failure (HF), a major worldwide public health problem in the 21_{st} century (Friedman, 2003; Rich, 2005a), is the end stage of heart disease. HF is linked with an increased risk of death, and has a profound impact on patients' daily life. A population-based study recently carried out in Australia reported that HF is a major cause of death among Australians (Vos & Begg, 2007). Furthermore, HF is associated with being older and given the dramatic increase in the population of older people worldwide (Hetzel & Smith, 2001) and in Taiwan (Department of Statistics, Taiwan, 2006), the number of people with HF is set to continue increasing. In the United States half of all patients over 65 years admitted with HF are over 80 years old (Havranek et al., 2002). The prevalence of HF is increasing among older persons (American Heart Association, 2008).

HF is one of the leading causes of hospitalisation and readmission (American Heart Association, 2008; Friedman, 2003; Rich, 2005a, 2005b) which cost to healthcare expenditure is an enormous burden on health services system (Schaufelberger, Swedberg, Köster, Rosén, & Rosengren, 2003; Stewart, & Horowitz, 2002). In Taiwan HF was found to be a leading cause of morbidity and to place a large economic burden on this society (Department of Health, Taiwan, 2004), particularly as there is a steadily increasing readmission rate for patients with HF. In the recent Euro Heart Failure survey of 24 countries, 24% of patients admitted with confirmed or suspected HF were readmitted to hospital within 12 weeks; HF was the principal cause of 20% of readmissions (Cleland, Gemmell, Khand, & Boddy, 2003). Moreover, most readmissions were caused by fluid volume overload with sodium retention (Welsh et al., 2002). Previous research studies indicated that inadequate diet control contributes to readmissions and unplanned visits clinic by HF patients (Ni et al., 1999; Welsh et al., 2002). An underlying factor is that many HF patients have difficulty complying with diet control behaviour and this significantly impacts on patients' readmission (Carlson, Riegel, & Moser, 2001; Salamah, Clar, & Abriam-Yago, 2002).

HF is a progressive condition, hence, the patient often experiences a high level symptom burden (Zambroski, Moser, Bhat, & Ziegler, 2005) and faces significant decreases in functional status and high rates of hospital admissions, mortality, and multiple physical symptoms (American Heart Association, 2008). There is a wide variety of symptoms that have an adverse impact on the lives of those with HF. Research shows that most of the symptoms are greatly influenced by fluid retention (Welsh et al., 2002). The readmission rate is higher for persons with sodium retention which causes symptom burden. Studies suggest that many early readmissions for HF are preventable with improvements in the HF management (Krumholz et al., 2002; Michalsen, König, & Thimme, 1998; Strömberg et al., 2003; Sisk et al., 2006). It is imperative that better efforts are made to manage and decrease these symptoms and the amount of sodium and fluid retention in all patients with HF.

Although appropriate, improved programs are increasingly being used to manage HF symptoms and improve survival rates, it appears the management of illness remains difficult in many cases (Bristow & Lowes, 2005). Fortunately, specialized HF programs have demonstrated the ability to decrease readmissions, healthcare costs, and improve patient satisfaction (Albert & Young, 2001; Azevedo et al., 2002). However, some research indicates that many HF patients have inadequate self-care and have low self-confidence in their ability to perform HF self-care (Carlson et al., 2001; Salamah et al., 2002). Currently, self-management is an approach to care for those with chronic illness and has the potential to raise self-efficacy and self-care, to decrease HF patients' hospitalization and health care costs, and also to enhance these patients' quality of life (Ledwidge et al., 2003; Lorig & Holman, 2003; O'Connell, 2004; Wright, Barlow, Turner, & Bancroft, 2003a). Self-management programs significantly increase patients' self-efficacy (Burckhardt, 2005; Chan, Siu, Poon & Chan, 2005, Foster, Taylor, Eldridge, Ramsay, & Griffiths, 2007). Behavioural change in patients' lives is possible because self-management programs improve the learner's ability to make valid observations, use good judgment, and make appropriate decisions.

A central concept in self-management is self-efficacy which provides an effective theoretical model for carrying out behaviour change (Burckhardt, 2005). Self-efficacy was shown as a powerful predictor for health-related behaviours (Bandura, 1977b). Instilling a sense of self-efficacy is an important adjunct to assisting people to change their behaviours and achieve the highest possible level of health (Bandura, 1977a). Thus, in the field of self-management, self-efficacy links knowledge and action because belief in one's ability to assume self-care has to occur before self-management can be attempted. In addition, although self-management has been shown to be useful in maintaining and improving HF patients' health-related behaviour and health status in studies conducted in the United States (Costantini et al., 2001; Krumholz et al., 2000; Naylor et al., 2004), up to now, there is minimal research on the effectiveness of self-management for Taiwanese people with HF.

To sum up, it is clearly shown that HF has become, and will continue to be, one of the most costly medical syndromes. More recent studies implementing strategies for promoting self-management have validated the beneficial effects which include reduction in symptoms and readmission rates, and even decreased mortality.

Moreover, self-efficacy, which relates to confidence in one's ability to perform tasks, is an important adjunct in assisting people to change their behaviours. However, there is the lack of studies reporting on self-management interventions to improve health-related outcomes in older people with HF in Taiwan. Therefore, the purpose of this study is to develop and test a self-management program, based on self-efficacy, to facilitate behaviour change in aged patients with HF in Taiwan.

Statement of the Problem

Despite significant scientific advances, HF patients continue to experience multiple physical and psychological symptoms that can impact on their quality of life and lead to their premature death. Research evidence clearly shows that over half of HF-related admissions were caused by sodium retention and fluid overload (Bennett et al, 1998; Bennett et al., 1999; Welsh et al., 2002). Thus, it is necessary for patients with HF to decrease the amount of sodium intake as the commensurate reduction in fluid retention could help them to reduce HF-related symptoms. It has been shown in some countries that HF self-management programs could reduce hospital readmission, and improve quality of life.

Recent advances in the management of chronic illness promote a self-management approach which is based on Bandura's theory of self-efficacy (Bandura, 1997). A number of self-management programs for those with chronic disease have been reported in the Western literature (Chan et al., 2005; Christensen, Attermann, Hjortdal, Margaard & Hasenkam, 2001; Dunbar, Jacobson & Deaton, 1998; Gropuu, Haas, Fairweather, Ganger & Attwood, 2005; Foster et al., 2007; Lorig & Holman, 2003; O'Connell, 2004; Rich, 2002; Shively et al., 2005). However, there are few reports of self-management programs for Taiwanese patients. Actually, no published study was found that investigated the effectiveness of self-management for older people with HF in Taiwan. Most of the studies for HF patients in Taiwan focused on the provision of education, but education alone can not address HF self-care issues (Jaarsma et al., 2000b). One study found that patients' knowledge of their disease was poor, and that their self-care behaviours were inadequate and passive, which discouraged HF self-care compliance (Lin & Chao, 2001). As Chou (2003) has stated, confident and active self-care behaviours are needed for people's improved health outcomes in Taiwan. Thus perceived self-confidence and active self-care are significant factors for positive health behaviours such as self-management based on self-efficacy theory which provide an optimistic view that helps improve people's behaviours. Unfortunately, although self-management has been shown to be useful in maintaining and improving HF patients' health-related behaviour and health status in the Western countries (Harrison et al., 2002; Kasper et al., 2002; Ledwidge et al., 2003; Schreurs, Colland, Kuijer, de Ridder, & van Elderen, 2003), to date, no research has tested whether self-management programs would be effectual in controlling HF in older people in Taiwan.

The effectiveness of any type of self-management program for those with chronic disease particularly HF is unknown in Taiwan. Accordingly it is necessary to develop a self-management program and one that is specific to the particular population's needs. One factor to be taken into account in such a program concerns the tendency for Taiwanese people to take a resigned or passive attitude toward issues concerning their own health (Chen, 2001). While the scope for areas of self-management by those with HF is considerable, an initial focus on dietary self-care efficacy and its impact on fluid and sodium retention would be beneficial and provide data on the potential for further expansion of self-management programs for those with HF. Accordingly, developing self-management programs that address the particular needs of HF patients such as dietary control in Taiwan would be a worthwhile undertaking.

Aims

The purpose of this study was to examine the effectiveness of a self-management intervention in older people with HF in Taiwan. The specific objectives of this study were to:

1. Develop a self-management intervention for older people with HF, based on self-efficacy theory.
2. Implement a self-management intervention for older people with HF in Taiwan.
3. Determine the effectiveness of the self-management intervention on the primary outcomes of self-efficacy for salt and fluid control, HF self-management behaviour and HF related symptoms, and on the secondary outcomes of health services utilisation for HF, and body weight in older outpatients with HF.
4. Evaluate the patient's care received after intervention program.

Significance of the Research

Strategies for promoting self-management among HF elders include the fostering of self-efficacy to enhance their performance of self-management which in turn will enhance their state of health. This study yielded knowledge about the effectiveness of a self-management program, for older people with HF in Taiwan, on health-related outcomes including self-efficacy for salt and fluid control, HF self-management behaviour, HF-related symptoms, health services utilisation for HF, and body weight. Additionally, the two groups were compared regarding their evaluation of care received. The detail points regarding the significance of this study are:

1. The examination of a self-management intervention to enhance health-related outcomes in older Taiwanese HF patients is needed, because little is known about the effectiveness of self-management programs on health-related outcomes in older HF patients in Taiwan.
2. A theoretical framework based on self-efficacy theory is important for the development of an effective self-management program to enhance patients' self-efficacy, which in turn would promote self-management behaviour as well as increase heart function in older patients with HF.
3. The findings of this study will contribute to the development of nursing knowledge regarding self-management programs. In addition to clinical status, evaluation self-management interventions will provide in-depth information to help inform health care professionals to gain the insights needed to provide more effective care for these patients, and enhance understanding about the factors related to elderly health-related outcomes.
4. The knowledge gleaned from this study will be able to inform the direction for the further development of research on the effectiveness of other programs to promote the health of those with chronic disease.

Research Question

The research question is as follows:

What is the effectiveness of a self-management intervention focussing on diet control for Taiwanese HF patients' health outcomes on self-efficacy for salt and fluid control, HF self-management behaviour and HF related symptoms and secondary outcomes of health services utilisation for HF and body weight?

Research Hypotheses

In order to answer the research question, the following hypotheses were tested:

1. Patients with HF in the experimental group who receive a self-management intervention will have significantly higher scores in self-efficacy for salt and fluid control compared to those in the control group who do not receive the self-management intervention.
2. Patients with HF in the experimental group who receive a self-management intervention will have significantly higher levels of HF self-management behaviour compared to those in the control group who do not receive the self-management intervention.
3. Patients with HF in the experimental group who receive a self-management intervention will have significantly lower scores in HF-related symptoms compared to those in the control group who do not receive the self-management intervention.
4. Patients with HF in the experimental group who receive a self-management intervention will have significantly lower rates of weight compared to those in the control group who do not receive the self-management intervention.
5. Patients with HF in the experimental group who receive a self-management intervention will have significantly lower rates of health services utilisation for HF compared to those in the control group who do not receive the self-management intervention.

Definitions of the Concepts/Variables under Study

The following definitions were used in this study:

Heart failure (HF)

HF is defined as a pathological state of cardiac ventricular dysfunction that is physiologically compensated (McMurray & Pfeffer, 2005). It is the end stage of heart disease which simply means that the heart muscle weakens or there is an abnormality of the heart valves and the heart muscle needs to work harder at pumping blood through the body as well as it should. For this study, a condition is diagnosed as HF including all different types of HF if it is carried out by a cardiologist as the primary or secondary diagnosis in the medical record.

Older people with HF

That is classified as patients, aged 65 years or older diagnosed with HF by a cardiologist at a medical centre after attending the outpatient clinic of the medical centre, who can be managed in the outpatient setting with oral medications and lifestyle restrictions.

New York Heart Association (NYHA) functional classification

The New York Heart Association (NYHA) functional classification (American Heart Association, 2003) is a commonly used measure of the influence of symptoms on the daily life of cardiac patients. It is used to assess functional status in cardiac patients. There are four classes from I to IV in its levels. NYHA functional class scale will be used in this study. The assessment NYHA functional classification will be determined by the researcher as recorded in the medical record.

Self-management program

This is a goal-directed, intentional process on the part of the person to regulate actions related to their health and management of disease (Burks, 1999). In this study, the intervention addresses the health-related outcomes of HF based on Bandura's self-efficacy theory (Bandura, 1997) which guides, supports and teaches the patients in self-management. The intervention is designed to improve their self-efficacy and prevent HF from getting worse.

Self-monitoring

Self-monitoring involves the use of instruments such as paper and checklists to record/observe one's own behaviour for self-observation. Through self-observation, people will check themselves in order to gain an accurate picture of their behaviour (Bandura, 1986). In this study, self-monitoring will be defined for the intervention group as keeping a daily record of their: diet and the amount of salt, the amount of their fluid intake and body weight.

Self-efficacy for salt and fluid control

Self-efficacy is defined as the subjects' perceived belief or judgments of their capability to perform a particular behaviour or course of action to achieve a particular outcome or to attain designated types of performances (Bandura, 1986). In this study, self-efficacy for salt and fluid control refers to the level of confidence patients have about the performance of the behaviours for control of salt intake and fluid intake. The 15 item Self-Efficacy for Salt and Fluid Control Scale (SeSFC) will be used to measure self-efficacy for dietary control; a higher score reflects better self-efficacy for salt and fluid control of HF.

HF-related symptoms

The symptoms of HF arise when the heart's pumping action weakens, blood backs up into the blood vessels and fluid may leak into the lungs, feet, legs, and liver or abdominal cavity. The fluid causes congestion and makes it hard for the lungs to breathe. Shortness of breath and fluid retention are the primary symptoms that are HF-related. In this study, the total score of the Heart Failure Symptom Distress Scale (HFSD) will be used to measure the distress of patients with the HF experience during the study period. There are 17 items in the HFSD in which a lower score reflects fewer symptoms in the patient's life.

Health service utilisation

Health service utilisation means the number of occasions people using health services. This study considers the frequency of health services utilisation among the HF outpatients who participated in this study. The use of health services will be calculated in two components: those that are related to HF and those related to other issues. This study counts the total utilisation rate of health services of all participants including the number of emergency department visits, clinical visits and hospitalizations during the past 12 weeks before the commencement of the study.

Body weight

Weight is defined as the heaviness of a person, which can be measured by a machine or particular system (Pearson-Longman, 2005). In this study the patients weigh themselves at the same time, on the same scale, and in the same way every day. The best way to do this is for patients to weigh themselves on the scales, first thing in the morning after urinating.

Evaluation of care received

Patients' evaluation of care received refers to judgements made by patients about the care and provided to them and reflects the care received. In this study, this type of information would help the researcher to understand patients' perceptions of their whether they were in the experimental group receiving the self-management program or in the control group receiving usual care. The total score for the Evaluation of Care Received (ECR) will be used to determine patients' evaluation of the care they received during the study period. There are five items in the ECR with higher scores reflecting better evaluation with care received for older patients with HF.

Health-related outcomes

Health-related outcomes is a broad term encompassing all aspects of each patient's condition after a self-management intervention that includes self-efficacy for salt and fluid control, HF self-management behaviour, HF-related symptoms and health services utilisation, and body weight. Moreover, the patients' evaluation of care received between two groups will also be evaluated.

Summary

This chapter has presented the background of the study highlighting the prevalence and influence of factors relating to older people with HF. The theoretical framework was presented, and the hypothesized theoretical links among self-efficacy theory and self-management were depicted. The primary purpose and significance of the study was outlined as the development of a self-management intervention based on self-efficacy theory and the implementation of that self-management intervention for older people with HF in Taiwan. The effectiveness of this intervention was measured in terms of patients' health-related outcomes from the measurement of the primary health-related outcomes (including self-efficacy for salt and fluid control, HF self-management behaviour and HF related symptoms) and secondary outcomes (including health services utilisation and weight). Finally, the patient's evaluation of care received between two groups was also assessed. The conceptual model, research question, and the theoretical and operational definition of concepts/variables used in this study were identified. Such a self-management program may have the potential benefit to both the individual and society in Taiwan. Therefore, the effectiveness of a self-management intervention in older people with HF in Taiwan requires to be investigated. The following chapter will provide a literature review which is underpinning and conducting the study.

CHAPTER TWO

Literature Review

This chapter is a brief review of the literature and consists of four sections. The first section contains a discussion of literature on the overview of heart failure (HF) and explores the relationships among HF health behaviours. The second section contains a review of self-efficacy and the relationship between self-efficacy theory and self-management. The third section will describe research related to self-management for HF. The major proportion of the research review focuses on self-management studies which have been done in older people with HF. Finally this chapter will propose a conceptual framework for a self-management program to improve patients' HF-related behaviours.

Overview of Heart Failure

Epidemiology

Heart failure (HF) is a chronic, disabling disorder which in the past two decades has become an increasingly important public health problem around the world. The American Heart Association (2008) indicates that more than five million Americans are affected by HF, with 550,000 new cases reported each year. Moreover, hospital discharges for HF rose from 400,000 in 1979 to 1,084,000 in 2005, an increase of 171 % in American. Hospital discharges for HF rose from 400,000 in 1979 to 1,084,000 in 2005, an increase of 171 percent (American Heart Association, 2008). Hospital admissions for HF have steadily increased and heart failure is now one of the most common reasons for admission in older people (American Heart Association, 2004; Cleland et al., 2003). It affects 3%–5% of people aged over 65 years in Western societies (Lloyd-Jones et al., 2002). The rise in the prevalence of HF is largely due to the ageing of the population. Thus, HF in older people is one of the leading causes of hospitalisation and readmission in the United States (Friedman, 2003; Rich, 2001, 2005a, 2005b). Unfortunately, the mortality and morbidity rates for HF remain high. It contributes to over 250,000 deaths each year, and 88% of these deaths are in older people (Rich, 2001). As the population ages, the magnitude of the problem will broaden. The cost of hospitalisation for HF is high in United States with the total cost for 2008 being $34.8 billion (American Heart Association, 2008). Research evidence shows that these admissions account for 41% of the total cost of HF-related admissions (Bennett et al., 1999).

In the absence of figures on rates of HF in Australia an estimation rate, based on United States data, indicates that about 300,000 Australians would be affected by HF, with about 30,000 people being newly diagnosed each year (Australian Institute of Health and Welfare, 2003). As the population ages, more people will be exposed to the higher risk of HF with increasing age (Vos & Begg, 2007). In Australia, the age of those with HF as a primary discharge diagnosis remains high (World Health Organization, 2001), with approximately 50% of patients with HF dying within three years of their first hospital admission (Heart Research Centre, 2004). HF is a major cause of death among Australians (Australian Institute of Health and Welfare, 2002).

In Taiwan, statistical data indicate that the cause of death in older people with heart disease has grown from 10.3 % of deaths in 2001 to 11.2 % in 2004, and declined slightly to 10.6 % in 2006 (Department of Health, Taiwan, 2008). Heart disease as the main cause of death still stands at a high rate among elderly persons. Moreover, HF, while the third leading cause of death for older adults in 2003, had advanced to be the second leading cause of death in 2004 (Department of Health, Taiwan, 2008). Indeed, HF is a leading cause of morbidity in this society and places a large economic burden on society. It is a major burden on the community, due to the high costs of care and the lower quality of life and premature death of those affected. HF is a syndrome affecting all aspects of daily life.

Definition of NYHA Functional Classification

HF is the end stage of heart disease which simply means that the heart muscle is weakened or there is an abnormality of the heart valves so that the heart needs to work harder to pump blood through the body. As the heart's pumping action weakens, blood backs up into the blood vessels from where fluid may leak into the lungs, feet, legs, and liver or abdominal cavity (National Heart Foundation of Australia & the Cardiac Society of Australia and New Zealand, 2002; Nieminen et al., 2005). The fluid accumulation causes congestion and makes it hard to breathe. Many people with HF also have swollen legs and feet oedema. That is why HF patients must limit sodium intake and water retention (Dracup, Dunbar, & Baker, 1995). HF is diagnosed via an echocardiogram which assesses left ventricular systolic and diastolic function by measuring the patient's ejection fraction (EF). The ejection fraction is a measurement of how well the patient's heart pumps. People with a healthy heart usually have an ejection fraction of 50 % or more but people with HF only have an ejection fraction of 40 % or less (Rich, 2005b). HF usually develops slowly and is not recognised until a more advanced stage. In 1928 the New York Heart Association (NYHA) published a classification of patients with HF based on clinical severity and prognosis (The Criteria Committee of the New York Heart Association, 1994) (Table 2.1).

Table 2.1

Criteria of NYHA Functional Classification for Heart Failure Patients

Patient Symptoms	Objective Assessment
Class I. (Mild) Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnoea, or anginal pain.	**A.** No objective evidence of cardiovascular disease.
Class II. (Mild) Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnoea, or anginal pain.	**B.** Objective evidence of minimal cardio- -vascular disease.
Class III. (Moderate)Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnoea, or anginal pain.	**C.** Objective evidence of moderately severe cardiovascular disease.
Class IV. (Severe)Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of heart failure or the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.	**D.** Objective evidence of severe cardiovascular disease.

Note. From: "In Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels (9th ed)," by The Criteria Committee of the New York Heart Association, 1994, 253-256, Copyright 1994 by the Boston, Mass: Little, Brown & Co.

This functional classification system provides a simple way of classifying the range of HF severity and often assesses the stage of HF in order to determine the best course of therapy. This system relates symptoms to the degree of limitation patients have during everyday physical activities and to the patient's quality of life.

Symptoms of Heart Failure

HF is a complex set of symptoms which include shortness of breath, fatigue, ankle swelling, difficulty breathing while sleeping, palpitations, sudden weight gain, and congestion that are related to the inadequate perfusion of tissue during fluid retention (Heart Foundation, 2003). According to Carlson et al., (2001) the majority of patients (91.4%) have multiple symptoms of HF and more than 80% reported three or more symptoms such as shortness of breath (SOB), fatigue, ankle swelling, and sudden weight gain. Although most patients had multiple HF symptoms during the past year, their knowledge of the importance of changes in signs and symptoms was poor and many misperceptions were obvious (Carlson et al., 2001). Moreover, an investigation found that nearly 80% of patients admitted for heart failure had experienced shortness of breath for more than 24 hours before admission and the duration of oedema was approximately 12 to 14 days (Friedman, 1995). Thus, it is important to identify symptoms of worsening failure earlier. Patients need to understand that progressive shortness of breath or a sudden change in breathing while sleeping and sudden weight gain is not expected (Grady et al., 2000). However, most patients failed to recognise early signs of worsening heart failure thereby delaying them from seeking and obtaining appropriate medical therapy (Francis, 1998; Friedman, 1997). In addition, regular body weight control, improved awareness of the symptoms of HF, and seeking earlier medical help could also prevent unnecessary hospital admissions, yet most patients did not weigh themselves regularly (Michalsen et al., 1998; Wright et al., 2003b). Finally, future studies must help patients with HF to relieve symptoms (Zambroski et al., 2005) and undertake self-weighing which will reduce patient's frequent use of health services (Wright et al., 2003b).

Most of the symptoms are greatly affected by fluid retention. Michalsen et al.,

(1998) research found that one third of patients had a fluid intake of 2.5 litres or more a day, and most patients were not aware of the need to restrict fluid intake. Their investigation estimated that daily fluid intake is a critical factor in severe heart failure. Fluid volume overload with sodium retention was a common cause of hospitalisation (Welsh et al., 2002). The readmission rate is higher for patients with sodium retention problem. For example, in a retrospective review of 585 hospital admissions for heart failure, 346 (59%) were affected by excess sodium retention that led to volume overload which in turn led to most of these patients' hospital admission (Bennett et al, 1998; Bennett et al., 1999). Thus, the reduction of sodium intake is important for patients with HF to reduce their level of fluid retention.

Patients with multiple HF symptoms require a complex treatment regime. In fact, diet-control is an important role for HF patients especially the control of salt in the diet (Koelling, Johnson, Cody, & Aaronson, 2005). The control of diet in HF management is a major factor in determining whether a patient must be readmitted to a hospital or make unplanned visits to medical facilities (Ni et al., 1999; Welsh et al., 2002). Burke, Dunbar-Jacob and Hill (1997) reviewed research on the compliance with pharmacological, exercise, and nutritional therapies for HF patients. They showed that diet control is the hardest issue for HF patients even in healthy people. While many patients may know of low-sodium diet most of them were unaware of the importance of restricting sodium intake (Rich, 2005b; Welsh et al., 2002). Thus, improving the provision of outpatient based education about the disease process and treatment is necessary to reduce hospital admissions as a result of sodium retention (Bennett et al., 1999; Carlson et al., 2001).

Newman, Steed, and Mulligan (2004) and Ni et al., (1999) have asserted that attempts to improve compliance and health outcomes by increasing the patient's knowledge are rarely successful. Barnes and Terry (1991) also found a significant increase in adherence to a low-sodium diet from gain of knowledge and skills in cardiac. Nevertheless, Luft, Morris, and Weinberger (1997) reported that an intensive skills-oriented educational effort was not enough and Ni et al. (1999) highlighted the inadequacy of knowledge alone in ensuring performance of self-management behaviours among patients with HF. Therefore, compliance-improving strategies being employed more recently include self-efficacy enhancement and self-management implementations to promote patients' adherence to HF self-care behaviours. As Burckhardt (2005) indicated programs combine education strategies with a self-efficacy model that focuses on self-management is effective to change patients' behaviour. So it may be that a different type of education is needed, one that focuses more on promoting self-efficacy rather than simply on providing information about their disease. Patients need education and support for self-management strategies in order to reduce hospitalisation and improve health-related outcomes in older patients with HF (Ni et al., 1999; Welsh et al., 2002). The goal of self-management is to promote patients understanding of the role of fluid and salt retention in worsening symptoms and their ability to manage it, thereby avoiding unnecessary health service utilisation (Grady et al., 2000).

Health Behaviours of Patient with Heart Failure

In the United States, most early readmissions of patient with HF are due to behavioural factors (Michalsen et al., 1998). The reason is that patients seldom performed self-care behaviours and were unconcerned with monitoring or managing symptom (Artinian, Magnan, Sloan, & Lange, 2002). Severe symptoms will increase daily activity intolerance thereby affecting important aspects in the life of patients (Dracup et al., 1994). Thus, behavioural factors contribute to symptom appearance and early readmissions of patients with HF. The behavioural factors include absence of strong social support or motivation, exercise and dietary non-adherence (Happ, Naylor, & Roe-Prior,1997). Lowe, Raynor, Courtney, Purvis, and Teale (1995) found that intensifying patient education and increasing patient responsibility for management of their disease will result in better compliance. The findings from an investigation by Happ et al. (1997) have suggested that addressing behavioural factors requires the use of an individualised manner for older patients with HF to prevent recurrent hospitalisations.

Unfortunately, research indicates that many HF patients have inadequate self-care and have low self-confidence in their ability to perform HF self-care, in particular diet control behaviour (Carlson et al., 2001; Salamah et al., 2002). Carlson et al. (2001) examined HF self care abilities and concluded that self-care, including diet behaviour, is difficult for HF patients because early symptoms are subtle and the treatment regimen is complex. Hence, most patients did not feel confident in their ability to perform self-care. Liou and Contento (2001) examined diet behaviour and found perceived self-efficacy as a key factor in predicting diet behaviour. Ni et al. (1999) found similar results, although most patients understood the importance of limiting dietary sodium intake and daily body weight monitoring in maintaining their functional status, only a small proportion of patients performed these behaviours. Thus, research is needed to test methods of enhancing patients' self-confidence in maintaining their health behaviours. Jaarsma, Abu-Saad, Dracup, and Halfens (2000a) showed that most HF patients feel they have limitations in HF self-care. The factors that limited this decision-making in self-care included inadequate motivation and self-efficacy. Even though diet control plays a crucial role, it poses difficulty for self-care behaviour.

Accordingly Taiwanese people, who take a more resigned or passive attitude toward issues of their own health (Chen, 2001), are likely to simply not follow the prescribed regimen. In order to understand the health behaviours of patients with HF in Taiwan, Lin and Chao (2001) investigated knowledge, attitudes, self-care behaviour, and related factors affecting these patients. They showed that patients' knowledge of their disease was poor, and their self-care behaviours were inadequate and passive which then discouraged HF self-care compliance. Passivity and lack of engagement with one's own health is unfortunate, because, as Chou (2003) has stated, confidence and active self-care is needed for people's improved health outcomes. Likewise, Lu's (1995) study has emphasised the significance of perceived confidence for positive health behaviours showing that a lack of knowledge and passivity led to inadequate self-care behaviours in Taiwanese people. Moreover, it emphasised that increased knowledge alone was not associated with concomitant changes in health behaviour in patients with chronic illnesses. Research indicated that high self-efficacy has been associated with healthier behaviours, thus, interventions should not only aim at improving physical functioning but also at enhancing HF patients' self-efficacy (Arnold et al., 2005). To make these changes in health behaviour and to care for themselves effectively, patients need particular strategies to improve self-efficacy. Finally, the support and education must be maintained for as long as necessary in the home setting (Davidson, Paull, Rees, Daly, & Cockburn, 2005; Martens & Mellor, 1997).

Summary

To sum up, there is growing evidence that HF remains one of the most common, costly, disabling, and deadly medical conditions in more developed countries. It seems that in many cases the recurrence of HF and the need for readmission to hospital are attributable to the patient's lack of knowledge of their disease, absence of strong social support or motivation, dietary non-adherence and inadequacy and passiveness in self-care behaviours that discourages HF self-care compliance. For all of these reasons, there is a necessity to develop more effective strategies for the prevention and treatment of HF in the population. However, the effect of such programs may not be directly translatable from one country to another. Further trials and evaluation of such programs in different populations with different health care systems are therefore needed. Few studies have focussed on HF self-care for Taiwanese patients, particularly on improving sodium restriction behaviour. Because of this, enhancing Taiwanese HF patients' self-efficacy through self-management is an important issue. The next section will review research regarding self-efficacy theory.

Self-efficacy Theory

Background and Historical Context of Self-efficacy

Bandura, in an effort to understand and predict peoples' behaviour, identified methods by which behaviour can be modified or changed. From those studies in the 1970s, he developed a set of ideas called Social Cognitive Theory (Bandura, 1977b). At that time, Bandura claimed that self-efficacy could bridge the gap between knowledge and action. More recently, Bandura published "Self-Efficacy: The Exercise of Control," in which he further situated self-efficacy within a theory of personal and collective agency that operates in concert with other social cognitive factors in regulating human well-being and attainment (Bandura, 1993). To test his theory, Bandura (1986) designed studies to investigate his propositions about the origin and functions of perceived self-efficacy. The results of his research indicated that the change in an individual's self-efficacy affects the individual's performance. In addition, he determined that an understanding of self-efficacy helps in refining predictions of human actions and affective reactivity. Similarly, Bandura (1986) described the power of self-efficacy in the prediction of behavioural outcomes. Finally, he presented a definitive statement concerning self-efficacy theory: “the stronger the perceived self-efficacy, the more probable are persons to select challenging tasks, the longer they persist at them, and the more likely they are to perform them successfully” (Bandura, 1986, p.397). Bandura is explicit about his beliefs and the relationships among the concepts. In his definitive statement above he emphasised the positive relationship between self-efficacy and behavioural performance. Furthermore, Bandura had supported his ideas with studies of numerous populations, including children, adults, and older people as well as with people evincing both healthful and unhealthful behaviours. He also tested his ideas using different cultural perspectives (Bandura, 1977b, 1986, 1997).

Bandura emphasised that all thoughts affect human functioning, and standing at the core of social cognition are beliefs about self-efficacy (Bandura, 1997). He defines self-efficacy as “beliefs in one’s capability to organize and execute the courses of action required in managing prospective situations” (Bandura, 1997, p.2). In other words a sense of self-efficacy refers to the level of confidence that one feels in his or her ability to perform specific activities (Bandura, 1997). Accordingly, belief in self-efficacy is the foundation of human motivation, well-being, and personal accomplishment, because unless people believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of difficulties (Bandura, 1997). Furthermore, Bandura indicates that cognitively based interventions can provide individuals with the knowledge and an awareness of the skills and abilities underlying the execution of the behaviour. However, if individuals do not believe that they can actually execute the behaviour effectively or do not have confidence in their ability to effectively perform the behaviour; the behaviour will not occur (Bandura, 1977a, 1986). In other words, the stronger an individual's perceived self-efficacy, the more powerful and resolute individual efforts will be. Conversely, those who have a lower level of perceived self-efficacy will expend less effort and will be more inclined to give up their endeavours (Bandura, 1983).

Self-efficacy may also be understood in terms of the dimensions of magnitude, strength, and generality. Bandura explained that magnitude refers to the ordering of tasks by level of difficulty. For example, if a patient with heart failure perceives the level of activity which he can achieve he may arrange tasks by degree of difficulty. The second dimension, strength, refers to how certain the patient is of his or her ability to perform the specific task. Finally, generality signifies the extent to which expectations concerning one situation involving specific tasks can be applied to another situation (Bandura, 1986).

Self-efficacy theory comprises two primary components: efficacy expectation and outcome expectancy (Figure 2.1). Social Cognitive Theory states that behaviour results from an individual's belief that he or she is able to perform a particular behaviour (efficacy expectations), combined with a belief that the action will lead to a certain outcome (outcome expectancy) (Bandura, 1997). Bandura differentiated between the two concepts with efficacy expectancy focussing on an individual's conviction about his/her ability to perform a particular behaviour while outcome expectancy, which forms an integral part of self-efficacy theory, represents a person's estimation of the certain outcomes resulting from a particular behaviour (Bandura, 1997). It is clear that efficacy expectancy is different from outcome expectancy with the former being concerned with judgments about the ability of the individual to use skills in order to carry out the behaviour, rather than the judgments of the probable consequences of certain behaviour (Bandura, 1977a). Bandura (1982) stated that both efficacy and outcome expectancy are the best predictors of behaviour. However, efficacy expectations predict performance much better than outcome expectancies (Bandura, 1986). This is particularly important, indicating that the performance of behaviour does not guarantee good outcomes (Bandura, 1977a). Moreover, Bandura (1984) argued that the outcomes people expect are largely dependent on their judgments of what they can accomplish. As a consequence, outcome expectations cannot independently predict behaviour. This is not to suggest that efficacy and outcome judgments are always consistent. Kirsch (1985) indicated that outcomes are dependent on both performance and efficacy beliefs. In fact, efficacy beliefs in part determine outcome expectations. Thus, individuals might not proceed with any action because they perceive that they do not possess the appropriate skills to achieve the outcome despite believing that a certain course of action will achieve specific outcomes. Some research shows that increased efficacy expectation was a better predictor of performance of behaviour than expected outcomes (Stewart, Strack, & Graves, 1999; Williams & Bond, 2002). Thus, future programs designed to increase efficacy expectations in self-care abilities are more likely to be effective.

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Figure 2.1. Diagrammatic representations of the relationships between efficacy expectations and outcome expectancies (Bandura, 1977b, p. 79)

Self-efficacy Information Sources

Efficacy expectations are gained by providing information through four primary sources recently renamed as: mastery experience, social modelling, social persuasion and physical and emotional states (McDowell, Courtney, Edwards, & Shortridge-Baggett, 2004). Bandura (1986, 1991, 1997) proposes that those sources, which have been identified as effectively promoting a higher sense of self-efficacy and a greater willingness to undergo behavioural change, included the four sources named above. Hiltunen et al. (2005) showed findings that an intervention for elders with cardiac disease based on these sources of information that enhance self-efficacy as the goal. People attend to, weigh up, and integrate different sources of information to make judgments about their efficacy to undertake behaviour (Bandura, 1977a, 1986, 1997).

Mastery experience. First, mastery experience which is the most important source of self-efficacy beliefs is based on a person's own experience. Bandura contends the most influential source of self-efficacy is mastery experience; it is an essential source of efficacy beliefs. This involves the individual learning through personal experience of having mastered the task, thereby increasing self-efficacy by attaining proficiency in performance of the task and also through the individual's measuring and interpreting the effects of their actions (Bandura, 1986, 1997). According to Tsay's (2003) study mastery experiences resulted in enhanced self-efficacy. It is held that self-efficacy is raised by success. For example, a patient's mastery experience can be enhanced by goal setting (Resnick, 2002; Tsay, 2003). According to Bandura's (1991) theory, people have the capability of forethought. They anticipate the likely consequences of their prospective actions, set goals for themselves, and plan courses of action likely to produce desired outcomes. Another factor that impacts on mastery experience is self-monitoring (Gortner & Jenkins, 1990; Tsay, 2003). Through self-monitoring, people can observe themselves, deepen their self-awareness, and obtain positive reinforcement, all of which contribute to enhancements in the quality of mastery experience (Bandura, 1986, 1997).

Social modelling. A second source of efficacy information is the social modelling that comes from learning through the observation of others or events (Bandura, 1986, 1997). People learn not only from their own experience but by observing the behaviours of others. This behaviour includes modelling or vicarious learning which means that individuals can learn a new behaviour without undergoing the trial and error process of actually performing it (Bandura, 1986). Accordingly modelling or vicarious learning can indicate to individuals that they also have a similar ability to proficiently perform certain behaviours (Bandura, 1986). However, if the observation is of models who fail to perform the behaviour of interest in a proficient manner, then the observer's perceived self-efficacy might be reduced. This source of information is weaker than the interpretations individuals make from mastery experiences, but, when people are uncertain about their own abilities or have limited prior experience, they become more sensitive to modelling. The social aspect of social modelling is evident from the support provided by other group members as confidence is enhanced within supportive environments; people have opportunities to observe others achieve success, thereby influencing their own sense of efficacy regarding their ability to execute the same behaviours.

Social persuasion. Third, individuals also develop self-efficacy from the persuasion they receive from others. Through social persuasion, an attempt is made to increase an individual's sense of ability and skill with a given task through information from others, thereby increasing self-efficacy perceptions. Verbal reinforcement as a method of enhancing efficacy has been reported as being successful in preventive health practices (Boehm et al., 1995). While positive persuasions work to encourage and make behaviour more powerful, it is also the case that negative persuasions can weaken self-efficacy beliefs through negative appraisals (Bandura, 1986). Social persuasion can be carried out using home visits or phone calls (Burke et al., 1997; Gortner & Jenkins, 1990). Jaarsma et al. (2000a) examined HF self-care and suggested that HF patients need home visits and other interpersonal reinforcement to promote their confidence and self-care skills. Social persuasion can be delivered by many sources, but usually it comes from the support of others, including health care professionals and family members (Williams & Bond, 2002).

Physical and emotional states. Finally, efficacy expectancies can also be influenced by an individual's physical and emotional states which indicate feelings and sensations that can be experienced by people when trying to change their behaviour or life-style. Physical and emotional states such as anxiety, stress, fatigue, and mood affect self-efficacy beliefs as well (Bandura, 1986). When people encounter the necessity for a behaviour change they may face anxiety, stress, arousal, fatigue, depression, and mood states (Bandura, 1977b, 1986). They also rely on their physical and emotional states to judge their abilities and read their physical and emotional states as signs of personal deficiency so that they may interpret those situations as indictors of low physical efficacy (Bandura, 2004). Because individuals have the ability to alter their own thinking, self-efficacy beliefs in turn, also powerfully influence the physical and emotional states themselves. The patients need feedback and follow-up information if they are to adhere to their new behaviours

(Gortner & Jenkins, 1990; Meland, Maeland, & Laerm, 1999; Tsay, 2003). Researchers suggest that the experience of internal feedback could increase self-efficacy (Meland et al., 1999; Tsay, 2003).

Various sources of information affect efficacy judgments and influence how people weigh and integrate them into actions. Thus, the selection, integration, interpretation, and recollection of information influence judgments of self-efficacy (Bandura, 1986, 1997). The theory maintains that when a person's four primary sources are enhanced, the person is more likely to attempt difficult tasks, to put greater effort into mastering tasks, and to persist in attempts to overcome difficulties. The implication is that confidence has a positive effect on self-management behaviours.

Self-efficacy and Health Behaviour of Patient with Heart Failure

One of the theoretical frameworks that hold promise for the implementation of HF patient education is Bandura's self-efficacy theory. There is a growing body of health literature and research reporting the use of Bandura's self-efficacy theory for individuals to perform a specific activity and improve health-related outcome (Allison & Keller, 2004; Barnason et al., 2003; LaFramboise, Todero, Zimmerman, & Agrawal, 2003; Oka, 1991; Oka, Demarco, & Haskell, 2005; Siu, Chan, Poon, Chui, & Chan, 2007; Tsay & Chao, 2002). Bandura's definitive statement regarding self-efficacy has considerable empirical support, and the hypotheses in many studies reflect the theory's concepts (Barnason et al., 2003; Borsody, Courtney, Taylor, & Jairath, 1999; LaFramboise et al., 2003; Oka, 1991; Oka et al., 2005; Tsay & Chao, 2002; Siu et al., 2007). The evidence from these studies is that self-efficacy theory can help predict the behaviour of people with HF. In addition, the research demonstrates that self-efficacy is a link between the way individuals perceive themselves and the way they conduct their behaviours. Self-efficacy provides an optimistic view that helps improve people's behaviours.

HF patients' self-efficacy was an important factor for patients to continue to perform self-care and disease management (Carlson et al., 2001; Ni et al., 1999). Borsody et al (1999) found similar results with self-efficacy being the strongest influence on behaviour change in patients with heart failure. The reason is that the level of self-efficacy can predict the HF patient's beliefs about their ability to perform the behaviours, and whether these behaviours will lead to the expected results. Moreover, self-efficacy was found to be a strong predictor of physical activity in the HF population. Borsody et al.'s (1999) study also showed that nurses can positively influence patient's self-efficacy expectations through four major ways of developing a strong sense of efficacy such as mastery experience, social modelling, social persuasion and physical and emotional states in the HF population. By enhancing self-efficacy, the nurse can increase physical activity levels in HF, leading to reduced symptoms as demonstrated by a better NYHA class and quality of life (Borsody et al., 1999). Bandura (1986) recommended that high levels of confidence about an individual's ability to perform behaviour will influence them to take up the specific challenges. For example, the HF patient would have more confidence to perform behaviour which include such tasks as daily body weight monitoring, taking medications, getting exercise, limiting sodium intake, and getting medical attention when needed (Rohrbaugh et al., 2004).

Moreover, although patients with HF may have similar levels of physical pathology, their health-related outcomes can differ from each other because of their perceived self-efficacy (Allen, Becker, & Swank, 1990; Holman & Lorig, 1992; Schweitzer, Head, & Dwyer, 2007). In other words, patients with HF who have little or no perceived self-efficacy may not believe they can make a difference in their life situation. As a result, they may perform the task poorly resulting in a difference in their expectations of the outcomes. In the studies by Schweitzer et al. (2007) and Holman and Lorig (1992) significant correlations were found between self-efficacy and outcome variables (Allen et al., 1990; Flynn et al., 2005). Further study is recommended to determine whether a more effective intervention to improve self-efficacy could lead to improvements in patient outcomes (Barnason et al., 2003). Hence, self-efficacy is a key component to self-care and disease management. Researchers need to create interventions based on improving the method of self-efficacy that can increase self-efficacy and self-management behaviours to improve health-related outcome in patients with heart failure (DeWalt et al., 2004).

However, some research shows findings that maybe inconsistent with self-efficacy theory. For example, O'Connel (2004) found that HF patients have lack of knowledge to perform their self-care behaviours in spite of high self-efficacy and family support. It seems that just having a better functional state may be better able to predict the performance of HF self-care behaviours. Thus, the researcher suggested that future research needs to create appropriate and adequate information for patients in order to improve self-care behaviours in patients with HF. Hoke (2002) explored that self-efficacy may provide a link between knowledge and action. This study used self-efficacy theory to educate HF patients self-weigh and record at home. The results indicated that most patients believed weighing themselves and monitoring their symptoms could help them reduce hospitalisation. Nevertheless, while subjects were given the knowledge and information based on self-efficacy theory, they did not improve their behaviour in weighing themselves everyday. This study showed that self-efficacy may influence a patients' beliefs, but it may not change their behaviours. This may be because they were not confident in their ability to change behaviour. Another study, by Allison and Keller (2004), tested a self-efficacy intervention on physical activity in older adults and found that the self-efficacy intervention did not show a direct effect on their level of physical activity self-efficacy as hypothesised. Older adults' confidence at the time of an event may not be a good predictor of future behaviour. Although the intervention increased the desired outcome, it did not increase self-efficacy, suggesting that perhaps it was the specified attention that contributed to the outcome or that the measure of self-efficacy was not theoretically sensitive.

Shively et al., (2005) tested the effect of behavioural management on the quality of life in patients with HF. There were no significant changes in exercise performance, physical functioning, mental functioning or general health perceptions. However, their results in the area of physical functioning and mental functioning differ from those of Benatar et al. and Moser et al. who found a positive impact on physical functioning and mood state respectively (Benatar, Bondmass, Ghitelman, & Avitall, 2003; Moser, Kim, & Baisden-O'Brien, 1999). The differences in results may be due to the differences in the specific interventions and outcome measures used. Thus, their recommendations for future research support more active interventions in patients with HF as being most beneficial (Rustøen, Howie, Eidsmo, & Moum, 2005), and study designs using multiple objective measures of physical ability should be considered.

As a result, self-efficacy theory has theoretical and social significance. Although there are different results on studies using this theory, the theory still provides valuable information for nursing to strengthen nursing knowledge and build a sound theoretical base for HF diet control behaviour modification. Nurses may be able to enhance the patient's confidence, decrease a passive perspective, and modify health behaviour by developing more effective intervention strategies. There are a wide range of opportunities for research to explore self-efficacy and HF diet control behaviour. Applying theoretical analysis to the phenomenon of management of HF diet control behaviour has the potential to lead to increased patient understanding and performance of health behaviours. For all of these reasons, there is a necessity to develop more effective strategies for the prevention and treatment of HF in the population. There are only a few studies that focus on HF self-care for Taiwanese, particularly on sodium restriction behaviour. Because of this, enhancing Taiwanese HF patients' self-efficacy through a self- management strategy is an important issue.

The Relationship between Self-management and Self-efficacy Theory

HF has multiple symptoms and complex treatments that place a great demand on self-management. The term 'self-management' was first used in an article on asthma self-care written by Creer and others (Creer, Renne, & Christian, 1976). They felt that self-management showed that the patient was an active participant in the treatment process. Since that time the term self-management has been used extensively, mainly in regard to education programs for patients with chronic disease. Researchers suggest that self-management can deal with our biggest health problems (Capomolla et al., 2002; Christensen et al., 2001; Creer & Burns, 1979; Dunbar et al., 1998; Gropuu et al., 2005; Harrison et al., 2002; Rich, 2002).

Barlow and colleagues (2002) defined self-management as "the individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and life style changes inherent in living with a chronic condition" (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002, p.178). The self-management method is based on a model which encourages patient responsibility in the process of the treatment (Kanfer & Gaelick, 1986), and further as Holman and Lorig (2004) indicate the self-management method differs from the traditional medical process in terms of the roles of both the patient and medical professionals. The self-management method expects that the patient will monitor symptoms, report them accurately and manage the disease in their life. Health care professionals need to play a role as a consultant, resource person, and to offer treatment suggestions. Without this partnership, self-managing patients can never reach their highest level of disease control.

One of the early influences in the evolution of self-management interventions was an educational program, which principally provided patients with information that is with the knowledge which would lead to appropriate changes in behaviour for the patient to manage their illness (Newman et al., 2004).

However, it becomes clear that although knowledge might be necessary, it is often not sufficient for behavioural change (Newman et al., 2004; Ni et al., 1999). An effective self-management program emphasises the gaining of skills through active participation in the learning process (Howell, Flaim, & Lung, 1992). Hence, attention turned to psychology for guidance. Some learning theories/models have been used in the development of self-management methods such as social cognitive theory, stress coping models, and the transtheoretical model (Redman, 2004). The self-management method draws on theories for the successful management of chronic disease that are grounded within the theoretical framework of self-efficacy (Lorig & Holman, 2000; Wright et al., 2003a; Siu et al., 2007). A central concept in self-management is self-efficacy which provides an effective theoretical model to carry out behaviour change that focuses on self-management (Burckhardt, 2005). Thus, in the field of self-management, self-efficacy links knowledge and action because belief in one's ability to assume self-care has to occur before self-management can be attempted.

Bandura (1997) believes that self-management programs that are based upon the self-efficacy model can improve the quality of health and reduce the need for medical services. In social cognitive theory, self-efficacy is the foundation for human motivation, well-being, and personal accomplishment. If people do not believe their actions will produce the desired outcome, they have little incentive to act or to persevere in the face of difficulties (Bandura, 1997). “This idea has been used in self-management interventions through teaching of skills such as problem solving and goal setting to increase self efficacy” (Newman et al., 2004, p.1524). More recent studies have found support for self-efficacy for the prediction of the performance of self-management of many different aspects of care from asthma, arthritis, cardiac rehabilitation, pain management, and diabetes (Atkinson & Roberts, 2000; Glasgow, Toobert, Hampson, & Strycker, 2002; Holman & Lorig, 1992; Lorig & Holman, 2000). Thus, it appears that enhanced self-efficacy is one of the mechanisms responsible for the improvements in health status demonstrated by these self-management programs (Lorig & Holman, 2000). Furthermore, it also appears that self-efficacy provides a linking mechanism between psychosocial factors and functional status (Holman & Lorig, 2004). Some benefits associated with effective self-management include (a) a reduction in mortality rates; (b) fewer medical complications; (c) a reduction in symptoms; (d) improved quality of life; (e) improved functional capacity, such as being able to work; and (f) a reduction in the utilisation of resources such as emergency room visits (Howell et al., 1992). The goal is to return the patient to maximal function.

Summary

In conclusion, it is obvious that self-management is very important for people to deal with their illness, particularly chronic disease. From the definition of self-management, it is clearly shown that self-management means the individual’s ability to manage illness in his or her personal life. The key feature of self-management is the aim of increasing patients’ involvement and control in their treatment and its effect on their lives. Moreover, self-management is based on self-efficacy theory particularly on four major ways of developing a strong sense of and increase in patients' self-efficacy that will enable great behavioural change in patients' lives. Thus, it is important for self-management programs based on self-efficacy theory to improve the learner's ability to make valid observations, use good judgment, and make appropriate decisions. The adoption of self-management by those with chronic disorders has been achieved following successful incorporation of nursing interventions to increase the self-efficacy of patients. These, in turn, inspired more efforts toward self-management practice. Studies related to self-management interventions are discussed below.

Description of Literature related to Self-management for Heart Failure

Self-management has become a more frequently used method within health education, and it is apparent that self-management leads to improved compliance and the acceptance of healthier behaviours in HF patients (Chan et al., 2005; Lorig & Holman, 2003; DeWalt et al., 2006; O'Connell, 2004; Shively et al., 2005; Siu et al., 2007; Wright et al., 2003b). A number of studies have examined the effectiveness of, and have provided information about, intervention programs for older people with HF (Benatar et al., 2003; Ducharme, Doyon, White, Rouleau, & Brophy, 2005; Lorig & Holman, 2003; O'Connell, 2004; Shively et al., 2005; Wright et al., 2003b). Some studies show that behavioural self-management may help to reduce symptoms, maintain function, avoid preventable readmission, improve quality of life and decrease morbidity and mortality in patients with HF (Ledwidge et al., 2003; Lorig & Holman, 2003; O'Connell, 2004; Wright et al., 2003b). These benefits, in turn, lead to improved clinical outcomes (Lorig et al., 1999). Rich (2002) indicated that the five key elements of optimal management are coordination of care across disciplines, patient and caregiver education, enhancement of self-management skills, effective follow-up, and the judicious use of medications. Although education is important for patients, enhancement of self-management skills and self-efficacy is more effective than usual care in patients with HF (Burckhardt, 2005; Jaarsma et al., 2000b; Lowe et al., 1995; Rich, 2002). The current self-management programs are usually based on theoretical models of behaviour such as Bandura's self-efficacy theory (Lorig, Sobel, Ritter, Laurent & Hobbs, 2001b). Moreover, some recent studies suggest that a multidimensional intervention is more beneficial for health-related outcomes. Detailed interpretations of these interventions are set out below.

Lorig et al. (2001b) evaluated outcomes of a chronic disease self-management program which was based on self-efficacy theory and which highlighted the processes of problem solving, decision making, and confidence building in patients. The 489 patients were recruited from hospitals and clinics and were assessed at baseline and 12 months. The program provided small-group interventions attended by patients with different chronic diseases such as HF, diabetes and arthritis, and taught information via a structured manual during a seven week period. There were statistically significant improvements in a variety of health outcomes including health behaviours (exercise and cognitive symptom management), self-efficacy, and health status (fatigue, shortness of breath, pain, role function, depression and health distress) in the intervention group. The results were as some research studies using randomised, controlled trials (Benatar et al., 2003; Siu et al., 2007). However, there are three issues from this study that need to be considered in future studies. First, the patients participating in this previous self-management study had differing diagnoses. The type of disease will have a great effect upon health outcomes, and each disease evinces different symptoms which are unable to be compared. Second, the research used a one group pre-test and post-test design which is not as powerful in determining effectiveness as experiments based on building causal relations between interventions and outcome (Polit & Beck, 2004). Finally, the research collected questionnaire data by self-administered survey and by mail, which could introduce serious biases and yield low response rates (Polit & Beck, 2004).

A similar study by Wright et al. (2003b) investigated the impact of multidisciplinary programs on patients with heart failure. The intervention group patients (*n* =100) were encouraged to attend three education sessions and to follow-up on the uptake of self-management strategies by assessing diary use and self-weighing behaviour for 12 months. The results indicated significant improvement in levels of knowledge and use of daily weighing by the experimental group patients compared to those in the control group. The authors concluded that the implementation of self-management strategies, including daily body weight monitoring and education of self-management, benefits the HF patient. On the other hand, the patients who did not adopt self-management strategies such as weighing themselves regularly in this study had higher readmission and mortality rate. The results of this research are consistent with other studies indicating that the potential advantages of an intervention program, containing education and self-management strategies is effective for patients with HF. Benefits include improved convenience for patients and better treatment compliance (Caplin & Creer, 2001; Ducharme et al., 2005; Eakin, Glasgow, & Riley, 2000).

In another study, Stewart, Marley and Horowitz (1999) provided a home-based intervention to examine the effectiveness of intervention in HF patients in Australia. The intervention group (*n*=100) received a home visit to assess and address the factors precipitating deterioration and resultant readmission. The research found that a home-based intervention was a significant contributor to: decreased unplanned readmission, days spent in hospital during readmission and health-related costs. Moreover, the intervention was found to improve quality of life and survival during six months' follow-up. This was a multidisciplinary, non-pharmacological intervention incorporating comprehensive home assessment and was reported to be better for patients with HF than strategies such as intensive discharge planning and increased access to physicians. This home visit through specialists' management includes physical examination, assessment of understanding of the disease process, remedial counselling and introduction of strategies designed to improve treatment adherence and response. Moreover, the author indicated that because non-specialist management and inappropriate pharmacotherapy cause poorer health outcomes, all patients were managed by a cardiologist and received treatment according to current guidelines in this study. However, this intervention was conducted in the USA and Europe. It is unsure whether it can be sustained in of normal clinical settings or be universally applicable in Taiwan. Overall, this type home-based intervention was emphasised to improve health-related outcomes in HF (Stewart & Horowitz, 2002, Australia).

Some interventions have had much less success in showing improvements in the performance and maintenance of self-management behaviours (Caplin & Creer, 2001; Eakin et al., 2000; Elzen, Slaets, Snijders, & Steverink, 2007). Shively et al. (2005) used a behavioural self-management program in older people with HF to examine the longitudinal effect on health related quality of life over 16 months (baseline, 4, 10, and 16 months). A randomised design was used to compare HF patient's quality of life from 116 outpatients who were randomly assigned to two groups: usual care for HF (n = 58) and the behavioural self-management program (n = 58). The intervention program consisted of four classes and three phone calls over a 4-month period. Classes were 2 hours in length with the content including:

provision of information, motivation of behaviours and performance of behaviour change such as self-monitoring, management of the symptoms of HF, and selection of appropriate health behaviours. The findings showed that the intervention group had significantly higher self-reported measures which demonstrated a better health-related quality of life. However, there was no significant change in exercise performance, physical functioning, mental functioning or general health perceptions. The reasons for there being no significant changes in these outcomes may be low intervention intensity, absence of theoretical foundations and measuring different outcomes. Moreover, the study did not use an individual's readiness for changing behaviour as the starting point for the intervention and this behavioural self-management program did not combine with other features or theory of effectiveness such as Bandura's self-efficacy theory. Finally, the authors recommended that further research could use a comprehensive self-management program in the interventions such as evaluation of behavioural interventions in patients with HF (Hiltunen et al., 2005; Wright et al., 2003b).

Studies of the effectiveness self-management interventions for those with HF show that providing information is necessary but not sufficient to change behaviours so that behavioural practices are needed to achieve health-related goals (Mullen, Mains, & Velez, 1992; Rich, Gray, Beckham, Wittenberg, & Luther, 1996; Stewart, Vandenbroek, Pearson, & Horowitz, 1999). Moreover, Bandura (1997) pointed out that an increase in self-efficacy will enhance the performance of health-related behaviour. Therefore, self-efficacy is important to improve the optimal scheme of facilitating self-management by patients. For example, researchers suggest that self-management based on the self-efficacy theory and using different strategies such as performance attainment, modelling, reinterpretation of symptoms, social persuasion, problem-solving and decision-making, could be used to change patients' behaviours (Barlow et al., 2002; Chan et al., 2005; Lorig et al., 2001b; Nodhturft et al., 2000). Likewise, such a program will improve self-efficacy of patients, which is closely linked to their confidence in performing change in self-management behaviours (Chan et al., 2005). Thus, self-efficacy is an important concept that is related to health behaviour in heart failure.

Hiltunen et al. (2005) tried to provide a multidimensional intervention program based on self-efficacy theory and encompassing the bio-psycho-behavioural domains to enhance self efficacy in older people (mean age= 76.2) recovering from myocardial infarction and coronary artery bypass grafting (n =110). The intervention program was based on the participants' needs, and included an initial introductory meeting, home visit, and telephone calls at 2, 6, and 10 weeks by advanced practice nurses. Between those contacts, the participants received efficacy enhancement (including mastery, vicarious experiences, verbal encouragement, and reinterpretation of symptoms) and nursing interventions (in areas including basic physiology, behaviour, safety, families, and health systems). This study was consistent with work based on Bandura's proposal that a person's self-efficacy or belief about being able to perform a specific behaviour was likely to be the best predictor of actual performance (Bandura, 1986). Finally, while the researchers stated that such multidimensional strategies can be successfully implemented for older people with cardiac disease (Shively et al., 2005; Stewart & Horowitz, 2002; Wright et al., 2003a), the health outcome in this study was not reported.

For assessing the effectiveness of disease management interventions for patients with HF, Taylor et al. (2005) undertook a systematic review and searched the following databases from 1966 to 2003: Cochrane CENTRAL Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, AMED, Science Citation Index Expanded, SIGLE, DARE, National Research Register, and NHS Economic Evaluations

Database. Selection criteria were randomised controlled trials comparing disease management interventions specifically directed at patients with HF to usual care. However, adults who had at least one admission to secondary care with a diagnosis of HF were the focus of this review. In this research at least two reviewers independently extracted data information and assessed study quality. Moreover, study authors were contacted for further information where necessary. Sixteen trials involving 1,627 people were included. The researchers classified the interventions into three models: multidisciplinary interventions (a holistic approach bridging the gap between hospital admission and discharge home delivered by a team); case management interventions (intense monitoring of patients following discharge often involving telephone follow-up and home visits); and clinic interventions (follow-up in a CHF clinic). There was still considerable overlap within these categories. The content of the interventions included telephone follow-up, education, self management, body weight monitoring, sodium restriction and/or dietary advice, exercise recommendations, medication review, social support and psychological support. The mean or median age of the patients involved in the interventions lay between 70 and 80 years and the proportion of male study subjects varied. The proportion of patients from different ethnic groups was rarely stated. The results indicated that case management interventions tended to be associated with reduced all cause mortality but these findings were not statistically significant. Additionally there was weak evidence that case management interventions may be associated with a reduction in admissions for heart failure. It is unclear what the effective components of the case management interventions are. Moreover, a multidisciplinary intervention showed reduced heart-failure related readmissions in the short term. On the other hand, there is almost no evidence of any benefit from clinic interventions for patients with HF.

Finally, Taylor et al. (2005) recommend that the direction of future studies needs to include multi-centre and to incorporate appropriate motivation forces in the intervention programs in order to make comparisons with the usual care group in terms of the effectiveness in the short term. Furthermore, greater concentration on the effect of interventions on examination of the variables of interventions such as health services utilisation and patients' quality of life are needed. However, it has been clearly shown that the interventions of multidimensional strategies are associated with improvement in health-related outcomes in patients with HF.

To sum up, the results of the reviewed research studies show that self-efficacy enhancement and self-management strategies have a beneficial effect on health-related outcomes in patients with HF. However, the studies have pointed out many factors that impact on the effectiveness of the research such as inadequate sample size, different formats of intervention strategies, variation in disease and symptoms and in the study sample. Therefore, it is difficult to compare and discuss findings across studies precisely. Furthermore, some researchers have overloaded the patient with information and have not based their interventions on theory. Although a few studies used self-efficacy theory, the researchers of these studies did not provide a detailed description of the performance of the four major sources for developing a strong sense of self-efficacy or provide details about the nature of a structured home visit. Finally, in the dimension of research design, the one group pre-test and post-test design seems straightforward, but it has weaknesses. Likewise, the research collected questionnaire data by self-administered survey and by mail, which may introduce serious biases and yield low response rates. Based on this review of the self-management literature, although some interventions are complex, it appears self-efficacy and individual home visit are valuable factors that help people to change their health-related behaviours. However, it is still unclear which of several possible formats of self-management strategies provide the largest health benefits and whether these strategies would be associated with meaningful improvement in health-related outcomes such as dietary self-efficacy, readmission, and unplanned health care visit in the population of HF elders in Taiwan.

Conceptual Framework of This Study

This section proposes a conceptual framework for a self-management program to modify patients' HF-related behaviours. The framework for this study was modified from Bandura's self-efficacy model by McDowell et al. (2004) (see Figure 2.2). The conceptual framework for this investigation is illustrated in Figure 2.3 with five dependent variables and one independent variable. The dependent variables of the framework are: self-efficacy for salt and fluid control, HF related self-management behaviour and symptoms, health services utilisation for HF and body weight.

The independent variable in this model is an HF self-management program which is based on four information sources of efficacy expectations derived from Bandura's self-efficacy theory. These four sources include: mastery experience, social modelling, social persuasion and physical and emotional states (Bandura, 1997; McDowell et al., 2004), and are based on evidence from related research (Hiltunen et al., 2005; Lorig et al., 1999; Lorig et al., 2001b). However, efficacy expectations predict performance much better than outcome expectancies (Bandura, 1986). Some research also showed that increased efficacy expectation was a better predictor of performance of behaviour than expected outcomes (Stewart et al., 1999; Williams & Bond, 2002). The role of outcome expectancies play in improving behaviour performance is still controversial. Thus, this variable was not explored in this study (see Figure 2.2 and 2.3). This program designed to increase efficacy expectations in the abilities of self-management was more likely to be effective.

Self-management Program

Past studies have shown that giving multifarious treatments can improve compliance and reduce readmission rates among patients with HF (Benatar et al., 2003). For example, the study by Hiltunen et al. (2005) provided HF patients with the four sources of information that enhanced self-efficacy to change behaviour. There are four important information sources, which have been identified by Bandura as effectively promoting a higher sense of self-efficacy and a greater willingness, to undergo behavioural change. Each of the four sources is discussed in further detail as follows.

The first important source of information for self-efficacy is mastery experience. Individuals need to be aware of their health problem before they can attain personal mastery through experience (Lorig & Holman, 2003; Tsay, 2003), thereby assisting them to assess and become more aware of their condition is essential. Moreover, a patient's mastery experiences can be enhanced by goal setting (Resnick, 2002; Tsay, 2003). Goals for the patients in the community may focus on managing or learning positive health behaviours (Hiltunen et al., 2005). According to Bandura's (1991) theory, people have the capability of forethought. Much human behaviour is regulated by forethought. They anticipate the likely consequences of their prospective actions, set goals for themselves, and plan courses of action likely to produce the expected outcomes. Another factor that impacts on mastery experiences is self-monitoring (Tsay, 2003). Self-monitoring is valuable in helping people to achieve self-awareness, and it can provide a means of positive reinforcement for behaviour. In turn, this positive reinforcement leads to greater self-efficacy for people's performance (Bandura, 1986). In applying this source of information to those with HF, as fluid volume overload with sodium retention is a common cause of hospitalisation in patients with HF (Bennett et al., 1999; Welsh et al., 2002); so patients would need to be aware of and monitor their diet, fluids and body weight. Thus, mastery experience in these skills would play an important role in improving the performance of behaviour in patients with HF.

The second way to enhance the beliefs of personal efficacy is through social modelling. If people see others like themselves succeed by continuous effort they come to believe that they also have the capacity to do so (Bandura, 2004). Social modelling can be achieved through education and social support programs, which are particularly effective when in the form of modelling (Bandura, 1997, 1986). Lau-Walker (2004) recommended that in education for social modelling, patients need to be provided with information about the consequences and timelines of their disease in order to increase patients' self-efficacy in coping with the condition and in maintaining a change in diet and/or exercise regime. Jaarsma et al. (2000b) found that an intensive program of education and support enhanced HF self-care and the quality of self-care behaviours. Social modelling comes from observing the effects from the actions of others that may also come from many sources, including peers, family, and professionals (Williams & Bond, 2002).

Thirdly, social persuasion is a method often used as a source of self-efficacy, because it is easy to use. Social persuasion can be carried out using home visits or phone calls to give patients information and support (Burke et al., 1997; Gortner & Jenkins, 1990). Jaarsma et al. (2000a) examined HF self-care and suggested that HF patients need home visits and other interpersonal reinforcement to promote their confidence and self-care skills. Another study supports the use of telephone follow-up to monitor, encourage, and teach patients in their progress toward mastery (Hiltunen et al., 2005). Social support has been found to be associated with better adherence to diet control behaviours (Williams & Bond, 2002). Moreover, researchers found that self-efficacy in regard to health promotion, which used partners' social support, led to greater and more sustained self-efficacy (Burke, Giangiulio, Gillam, Beilin, & Houghton, 2004). A lack of social support may lead to lower self-efficacy, which in turn reduces the likelihood of a given beneficial behaviour (Bandura, 1986; Reicks, Mills, & Henry, 2004). Accordingly, social persuasion is an easy approach which provides social support through home visits and telephone call follow-ups.

Finally, physical and emotional states indicate feelings and sensations that can be experienced by people when trying to change their behaviour or lifestyle (Bandura, 2004). When people confront the necessity for a behaviour change they may face tension, anxiety, and depression that can have a negative influence on self-efficacy (Bandura, 1977a, 1986). Patients can be assisted to become aware of these feelings and sensations and to learn methods for coping and controlling them, such as feedback and follow-up information to control emotional and physical stimulation. Consequently, patients need feedback and follow-up information if they are to adhere to their new behaviours (Gortner & Jenkins, 1990; Meland et al., 1999; Tsay, 2003).

Outcome Measurements

Burke et al. (1997) reviewed the empirical literature of the past 20 years and asserted that consideration of health-related outcome is particularly important for individuals with HF. Outcome measurements need to be multidimensional including subjective and objective outcomes. Williams and Bond (2002) suggested that evaluating both subjective and objective outcomes will enable holistic examination of the effects of behavioural change strategies. Objective outcome measures for HF patients in a self-management program include the evaluation of body weight and health service utilisation. For example, Hoke (2002) assessed home self- weights to examine the effect of self-efficacy enhancing education, and Benatar and his colleagues (2003) evaluated the health service utilisation rate including readmission and length of stay to ascertain the cost of care. Also, Wright et al. (2003b) estimated the hospital admissions of HF patients that included readmission, average days in hospital and number of clinic visits. While some studies show that HF patient's frequent decompensation of the chronic state resulting in recurrent hospitalisations can be avoided by different intervention program (Cline, Israelsson, Willenheimer, Broms, & Erhardt, 1998; Harrison et al., 2002; Krumholz et al., 2002; Ledwidge et al., 2003). Therefore, health services utilisation is one of the important outcomes.

Approaches to subjective outcome measures will include evaluation of HF-related self-management behaviour and symptoms, and HF patients' self-efficacy. Functional status from the patients' perspective was found to be important for overall outcome; also it was related to length of stay, nursing home use, diminished or delayed need for costly institutional care, and longer life (LaFramboise et al., 2003). Accordingly, HF-related symptoms are closely related to rehospitalisation and overall health in patients with HF (Michalsen et al., 1998; Wright et al., 2003b). Moreover, the patient's assessment of their self-care behaviour is important to assess the effectiveness of the interventions; for example, to measure how the actual behaviours of patients with HF have changed in daily life after any intervention programs (Thompson & Stewart, 2002). Thus, the self-reported self-management behaviour of patients with HF will be estimated. Consistent with Bandura's (2004) model the subjective outcomes are important as they are the consequences of providing a self-efficacy program comprising the four sources of information. Consequently, self-efficacy training aims to enhance patients' confidence in their self-management and help them modify their illness-related behaviours. The association between self-efficacy and HF diet-control behaviour offers a wide range of opportunity for further research to increase understanding of behaviour modification. While some research using this framework for HF patients has been conducted, the few reports of such research in Taiwan indicate the necessity for measuring HF patients' self-efficacy in dietary control behaviours. As a result, there are five outcome variables in this conceptual model for this study (Figure 2.3).

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Please consult the hardcopy thesis
available from the QUT Library

Figure 2.2. Self-efficacy model

From "National chronic condition self-management conference proceedings," by J. McDowell, M. Courtney, H. Edwards, and L.pp. Shortridge-Baggett, 2004, *International collaboration in promoting self-management of chronic disease, in Dept of Health and Ageing Commonwealth of Australia: Canberra. ISBN No: 06428244 2*, p.368 – 371.

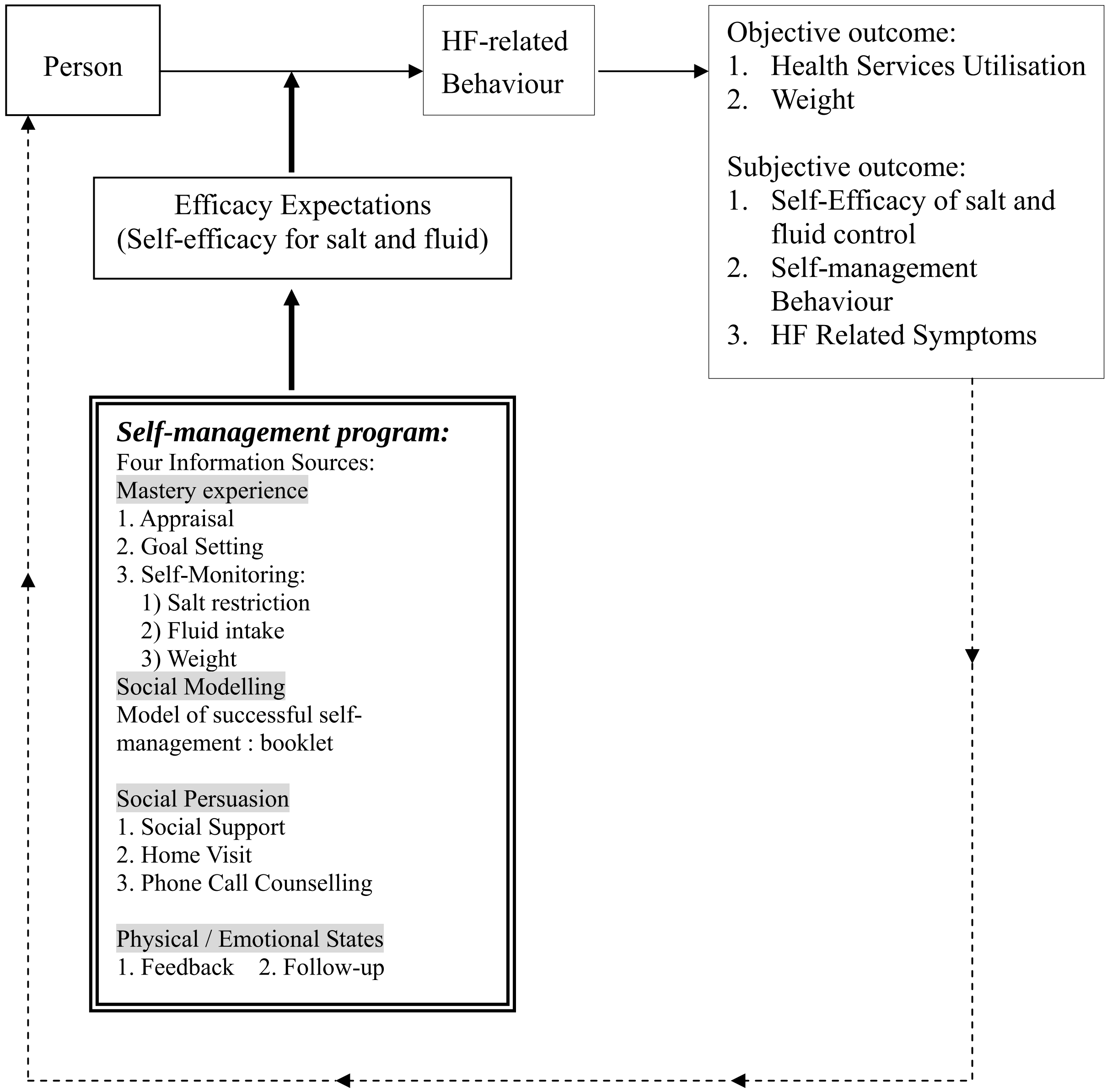


Figure 2.3. The conceptual framework for self-management program

Conclusion

In conclusion, patients with HF experience complex symptoms which require comprehensive treatment regimes. These patients need major lifestyle changes and self-efficacy to comply with the treatment regimen of their HF self-management. Diet control is an important issue for HF management. A review of previous research studies shows that inadequate diet control contributes to readmission and un-planned visits of HF patients. Many HF patients have difficulty in complying with diet control behaviour (Jaarsma et al., 2000b; Carlson et al., 2001; Salamah et al., 2002). However, self-management is an important method using multidimensional strategies that can promote patient's self-efficacy, and lead to further behaviour change. Persons with an increased perception of self-efficacy are more likely to participate in self-management activities and thus increase their adherence to the treatment regimen. Based on self-efficacy theory, appropriate and effective self-management interventions have been developed. In general, research supports the correlation between self-efficacy beliefs and behaviour outcomes. Nurses can provide leadership in enhancing the patient's confidence and modifying health behaviour by developing effective self-management strategies. Although previous self-management strategies are shown to have clear benefits for patients with HF in Western societies, the lack of studies reporting on interventions to improve health-related outcomes in older people with HF in other cultural settings indicates the need for further testing of such interventions in Taiwan. Therefore, future studies need to investigate the effectiveness of competent self-management interventions based on self-efficacy theory for HF patients in Taiwan.

According to the review of the pertinent literature on self-management programs, a number of variables need to be considered in designing further research, which includes: population, age, health status, symptoms, healthy behaviours, and self-efficacy, social support and follow-up. This study differs in several ways from previous studies that used self-management programs based on efficacy expectations and used a variety of intervention strategies. For example, the self-management was based on Bandura's four major sources of developing a strong sense of self-efficacy. In this study, the intervention included home visits, telephone and mail follow-up, education, self-monitoring (such as diary or notebook recordings, daily body weight monitoring), dietary recommendations (particularly restriction of sodium and water) and social support. Also, the strength of the intervention was increased by being more focused on specific and more important areas of self-management for HF patients, such as salt, fluid and weight control which will be incorporated in the final plan for this study. Moreover, one desired outcome from behavioural self-management is enhanced self-efficacy and health-related outcomes. The outcome measures also included evaluation of HF-related readmission, functional status, and HF patients' self-efficacy. Finally, this study used self-efficacy theory to educate patients in the performance of behaviour for improving health-related outcomes of HF in the ageing population in Taiwan.

CHAPTER THREE

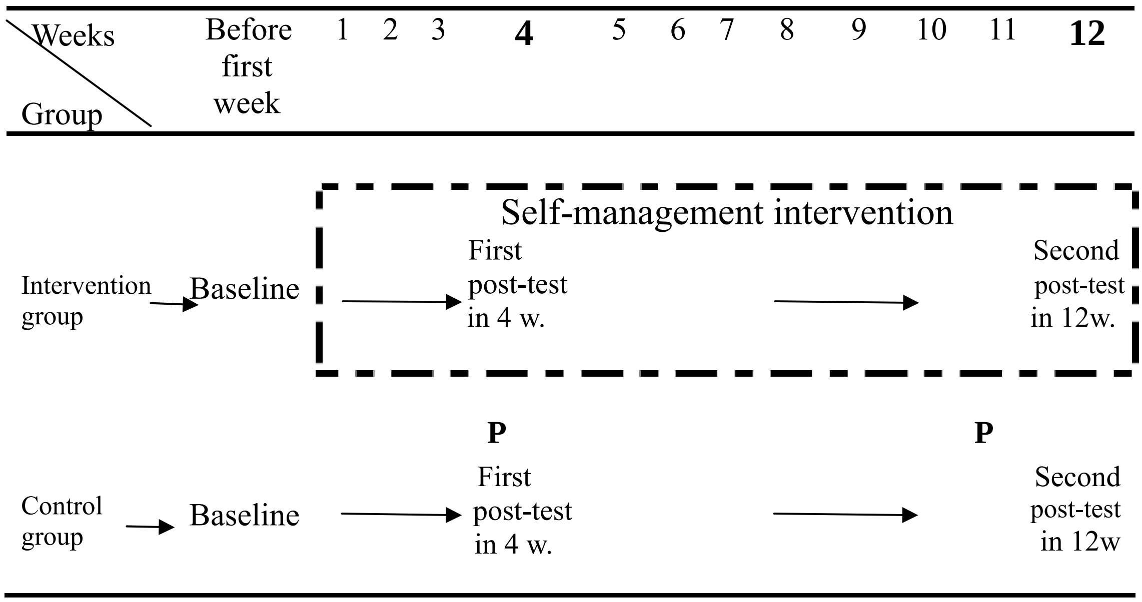
Methods

This chapter describes the methods used to determine the effectiveness of a self-management intervention on the health-related outcomes of older Taiwanese heart failure (HF) patients. The research design selected for testing the effectiveness of the intervention is described, as well as the sample and the setting for the study. The instruments for measuring the study outcomes of self-efficacy for salt and fluid control, HF self-management behaviour, HF related symptoms and the evaluation of care received are explained and the validity and reliability of these measures outlined. Also, this chapter describes the psychometric testing of the Chinese version of the modified SeSFC scale, which was conducted before the pilot study and main study. Moreover, this chapter provides details of the data collection procedure and the methods for analysing the study data as well as the introduction to the intervention protocols. Finally the ethical implications and methods of protection of human subjects and the plan for the pilot study are outlined.

Research Design

An experimental design was used to examine the effectiveness of a self-management intervention for HF patients. This design was selected because the research hypotheses in this study focused on the effectiveness of a self-management intervention on the dependent variables in comparison to the usual care. The intervention was provided to the experimental group over a period of twelve weeks including one home visit and four phone calls in addition to the usual care while the control group did not receive the self-management intervention but did receive the usual care plus three phone calls. The provision of phone calls to the control group was to provide some control over the effect of attention on participants (Harkness et al, 2005). In some research, control group subjects just receive usual care or even no treatment at all (Polit & Beck, 2004). However, in this study, the four phone calls for the experimental group, which involved consultation with patients to identify and help solve self-management program issues, differed from the phone calls for the control group. The three phone calls for the control group involved greetings and general discussions, as outlined in the appendix: "Telephone guide-control group" (see Appendix G-2). This provision of control over the effect of attention from phone calls was needed to ensure there was a greater focus on the effect of the intervention on the study outcomes (Polit & Beck, 2004).

The dependent variables were assessed at baseline before the commencement of the intervention for the experimental and control groups, and at the fourth and twelfth weeks following commencement of the intervention (see Figure 3.1).



Note. P- Phone call

Figure 3.1. Research design of self-management intervention

Sample and Setting

Setting

The study was conducted in Taiwan in 2 of 9 medical centres in the northern region of Taiwan. These two medical centres, which are located in Taipei, provide medical services for all people in that area of northern Taiwan. One of the two medical centres serves 27,000 outpatients a day from across Taiwan, with approximately 600 outpatients a day attending 10 cardiology clinics(60 outpatients per clinic) (CGMH Administration Center, 2007). The other medical centre is a regional teaching hospital with 800 beds with approximately 100 outpatients a day attending 3 cardiology clinics (35 outpatients per clinic)(Wan-Fang Hospital, 2007). Moreover, for patients' convenience, both medical centres are open all year round as well as for evening and holiday medical visits. Both of these healthcare facilities are teaching hospitals that have been awarded with "Outstanding Hospital Accreditation" in northern Taiwan.

Two out of the 9 medical centres in the northern region of Taiwan were selected for the research setting, primarily because two medical centres were needed to ensure sufficient numbers of older people with HF were able to be recruited for this study. Furthermore both are teaching hospitals that are constantly striving to improve their services, teaching and research; and were readily accessible to the researcher. Permission to recruit participants was obtained from the director of each of the two medical centres (see Appendix A-2, A-3). Ethical approval for the study was obtained from the two medical centres in Northern Taiwan and from the Queensland University of Technology (QUT) University Human Research Ethics Committee (UHREC) (sees Appendix A-1), prior to commencement of data collection.

Sample Characteristics

The population of interest for the study was outpatients with HF attending clinics in the two medical centres. All HF patients, attending outpatient cardiac clinics in the two medical centres, who met the inclusion criteria, were invited to participate in this study during the data collection period. Criteria for sample selection included:

1. Older patients who were 65 years and above;
2. Primary or secondary diagnosis of HF;
3. Documented NYHA functional class I to III;
4. Ability to speak and understand the Chinese or Taiwanese language;
5. Agreement to participate in the study.

The criterion for age samples was 65 years and above that because prevalence of HF occurred always in older people. 91% of people were 65 years and above (American Heart Association, 2008). HF is now one of the most common disease in older people (American Heart Association, 2008). Another criterion for sample selection was HF patient including primary or secondary diagnosis of HF with level of NYHA functional class I to III. This was because HF patients with NYHA functional class IV would result in inability to carry on any physical activity without discomfort. It meant if any physical activity was undertaken, their discomfort would increase. Thus, self-care would be difficult for patients with NYHA functional class IV. This factor may influence the outcome of the intervention program.

By contrast, the exclusion criteria, which were determined after interviews were with patients and the medical staff such as cardiologists or nurses who had already had a review of medical records by the researcher in the hospitals. These exclusion criteria included:

1. Unstable angina and terminal illnesses;

2. Renal failure requiring any form of dialysis;
3. Severe dementia or another debilitating psychiatric disorder;
4. Living in a long-term care facility;
5. Participation in another research protocol;

In addition, the exclusion criteria in this study intentionally excluded individuals who suffered from terminal illnesses such as advanced cancer. These individuals were excluded from this study because of the likelihood that the health-related outcomes would be directly influenced by having a terminal illness (Benatar et al., 2003; Carlson et al., 2001; Taylor et al., 2005; Shively et al., 2005). Also, renal failure, which effects fluid retention, was likely to lead to different health-related results (Laski, Kurtzman, & Sabatini, 2000; Vander, Sherman, & Luciano, 1996). Furthermore, if patients have debilitating psychiatric disorder, living in a long-term care facility, and participation in another research protocol, those criteria would effect how patients would be able to perform a self-management program at home.

Sample Size

One of the major outcome variables in this study was HF related symptoms using the HF symptom distress (HFSD) scale (Bondmass, 2002). Therefore, the sample size was estimated from a previous experimental study (Bondmass, 2002) which used 42 outpatients with HF per group. Bondmass (2002) reported a significant difference in mean HFSD scores between the pre-test (M = 32, SD = 8.06) and post-test (M = 26, SD = 10.55) assuming a baseline HFSD mean score of 32 (out of a possible score of 68), with 80 % power at the 95 % significance level (two-tailed). The sample size was estimated on the basis of the assumption that the study would calculate a difference of at least 6 units between the intervention group and the control group. Moreover, the alpha level was set at a conventional level of .05, which is used for a wide range of behavioural-research studies (Cohen, 1992). The level of acceptable power, which indicates the probability of rejecting a false hypothesis, was set at .80, a level that has been proposed for general use (Cohen, 1992).

Accordingly the estimated sample size for this study was 42 for per group. Additionally, based on previous studies, the rate of attrition can range from 8 to 20% (Abraham et al., 2002; Doughty et al., 2002; LaFramboise et al., 2003; Shively et al., 2005; Young et al, 2003). Therefore, the sample needs to be increased by 20% to 51 per group to account for attrition. Thus, 102 eligible participants were needed to ensure there were 51 participants in each group at the end of the study. Because the researcher recruited participants from two medical centres, each of the medical centres recruited 51 participants to the study. HF patients were randomly assigned to the intervention and control groups, regardless of which medical centre they came from, as outlined in the next section.

Sampling Procedure

Patients attending the clinics in two medical centres over the 12 week study period who met the inclusion criteria were randomly allocated to the intervention and control groups according to a computer-generated sequence of random numbers. Each patient who met the inclusion criteria and agreed to participate in the study was given a numbered envelope by the researcher. The envelopes were numbered from 1 to 110 and contained the baseline date set of questionnaires and another sealed envelope with the randomly determined study group which was a computer-generated sequence of random numbers: number one was for the experimental group and number zero was for the control group. After collection of the baseline data from each patient, the researcher opened the small sealed envelope to randomly assign participants to groups and advise the patient of the next point of contact. For the intervention group this was the home visit for which a provisional appointment was made and for the control group the next point of contact was via the phone. Based on this procedure, neither the researcher nor the participant was aware of treatment group assignment until after the baseline questionnaire had been completed (see Figure 3.2). This procedure of random allocation adhered to the principles of the CONSORT (Consolidated Standards of Reporting Trials) flow diagram (Moher, Schulz, Altman, 2001).

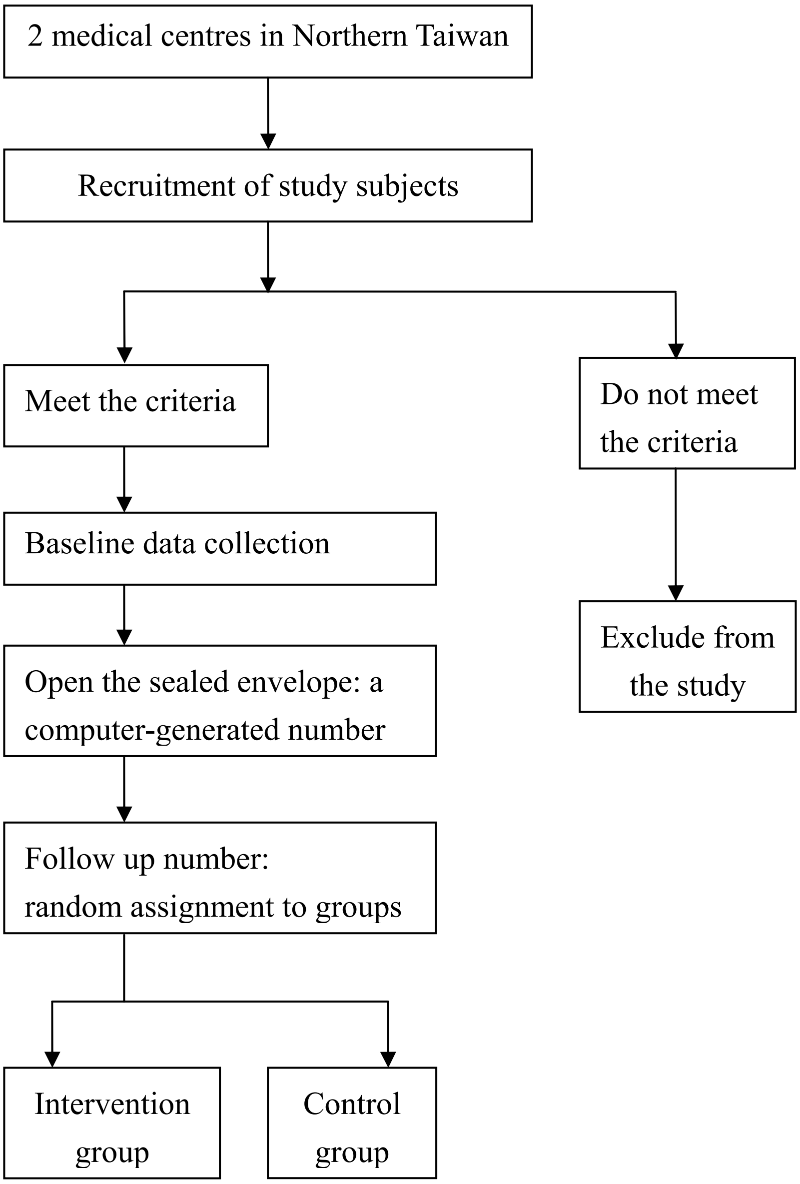


Figure 3.2. Sampling and data collection procedures.

Instruments

In order to determine the effects of self-management on the study outcomes, the following instruments were used: self-efficacy for salt and fluid control scale, HF self-management behaviour scale, HF symptom distress scale and the evaluation of care received scale. Demographic information which includes NYHA classification, health service utilisation and body weight were also collected (see Appendix C). The translation process and psychometric testing of instruments are described after the description of the instruments.

Self-Efficacy for Salt and Fluid Control Scale (SeSFC)

The SeSFC scale was a modification of a previous Chinese language instrument developed by Chiou and Ka (2000) - the "Self-efficacy for heart-related diet and exercise behaviours". While this instrument did contain items addressing heart-related diet, additional items were needed for measuring heart-related fluid intake. These modifications were based on a review of the literature on low salt and fluid self-efficacy in HF. The SeSFC scale is made up of two subscales labelled: "Resisting relapse on reducing salt intake" and "Resisting relapse on reducing fluid intake" which have nine and six items respectively. These 15 items in these two subscales were modified from this existing instrument which is described below.

The original "Self-efficacy for heart-related diet and exercise behaviours" scale (Chiou & Ka, 2000) contains four subscales designed to measure self-efficacy with diet and exercise. There are a total of thirty-two items for diet and exercise behaviours to which research subjects are asked to respond using a 5-point scale ranging from 1 "I am not sure I can do it", to 5 "I am very sure that I can do it", with higher scores indicating higher self-efficacy. The higher scores reflect greater confidence by participants' in their heart-related diet and exercise behaviours.

Chiou and Ka (2000) reported that construct and criterion-related validity of the total tool had been established. Construct validity was confirmed by factor analysis, using a principal-axis factor analysis. Principal-axis factor analysis revealed that 4 factors explained 57.98 % of the total variance for this original scale. There were good factor weights (> .40) for each item in the total tool with no item deleted. Criterion-related validity was supported by positive correlations with: general self-efficacy (r = 0.308, p<.01), healthy life attitude (r = 0.314, p<.01), healthy life style (r = 0.522, p<.01), and self-rated health status (r = 0.157, p<.01). These correlations indicated that patients who had higher self-efficacy for heart-related diet and exercise behaviours, tended to have higher levels of general self-efficacy, healthy life attitude, healthy life style, and self-rated health status. The results above revealed good construct validity and criterion-related validity.

The original "Self-efficacy for heart-related diet and exercise behaviours" scale (Chiou & Ka, 2000) demonstrated internal consistency for three different samples (a sample of 125 working parents of junior college students, a sample of 1147 participants working in urban areas, and a sample of 325 senior nursing students in a university) with Cronbach's alpha ranging from .93 to .95 and test-retest reliability of r = 0.67 (p<.001) (a sample of 125 working parents of junior college students). The first subscale for "reducing calory intake" had a Cronbach's alpha ranging from .86 to .89. Another subscale for "healthy eating behaviour skills" had a Cronbach's alpha ranging from .84 to .88. The third subscale for "resisting relapse of exercise behaviour" had a Cronbach's alpha ranging from .87 to .89. Finally, the last subscale for "resisting relapse on reducing fat and salt intake" had a Cronbach's alpha ranging from .86 to .90.

Modification of Chiou and Ka's (2000) "Self-efficacy for heart-related diet and exercise behaviours" tool for this study involved the addition of some items to enable the measurement of self-efficacy for both salt and fluid reduction. The original tool contained items for self-efficacy of salt reduction but not for fluid reduction. Modification comprised the addition of one item resulting in a nine item subscale "Resisting relapse on reducing salt intake", which measured the intake of a low-salt diet in different settings (eg. home and restaurant). Modification in regard to reducing fluid intake involved the adaptation of three items and the addition of three items resulting in a six item subscale "Resisting relapse on reducing fluid intake", which measured the intake of fluid in different settings. Further details on the items comprising this modified tool are provided in the section of the psychometric testing of the SeSFC scale later in this chapter.

Furthermore, the participants' response to each item was the same as the original tool. For example, patients are requested to respond to each item in both subscales using a 5-point scale ranging from 1 "I am not sure I can do it", to 5 "I am very sure that I can do it", with higher scores reflecting greater self-efficacy in reducing salt intake and/or dietary control. The total SeSFC score can range between 15 and 75, while the possible scores for the low-salt intake subscale range between 9 and 45, and for the fluid restriction subscale between 6 and 30. The SeSFC questionnaire is attached in Appendix C-1.2.

Heart Failure Self-management Behaviour Scale (HFSmB)

Specific HF-related behaviour was assessed using this scale which was modified from a previous instrument based on a review of the literature on measuring the behaviour that HF patients perform to maintain life and healthy functioning in this study. The original instrument was the "The European Heart Failure Self-Care Behaviour Scale", constructed by Jaarsma, Strömberg, Mårtensson, and Dracup (2003) and included 12 self-care behaviours of patients with HF. For this

12-item self-appraisal instrument, scores ranged from 12 to 60. For each item, the patient is asked to respond on a 5-point Likert scale between 1 (I completely agree) and 5 (I completely disagree). The lower scores reflect greater self-care behaviours by participants with HF.

Content validity and concurrent validity was established for the HFSmB scale. The concurrent validity refers to the ability of an instrument to distinguish individuals who differ in their present status on a characteristic (Jaarsma et al., 2003). In this scale, the authors examined the difference between patients who have had extra education for HF and patients without such education. The results showed that this scale can discriminated between both groups. The validity of the scale was confirmed.

Reliability of the scale was examined through internal consistency and test-retest reliability on 442 patients from three centres in the Netherlands, two centres in Sweden and one in Italy. Cronbach's alpha for this scale for the total sample was .81. Pearson's correlation coefficient between each item and the overall score ranged from r = 0.40- 0.74, showing that there were the strongest associations of item and total score was with item 5 (r = 0.74). However, the weakest correlations with the overall score were found in the item 12 addressing exercising regularly (r = 0.40). Jaarsma et al. (2003) indicated that this instrument is a valid, reliable and practical scale for evaluating the outcome of HF management programs. In addition, it is easy to fill in and the questionnaire takes approximately 5 to 10 minutes for patients to complete. For this study items 11 and 12, which related to having influenza vaccination and regular exercise, were not used because they were not relevant for the content of this study and they also had the weakest correlations with the overall score, with item 11 (r = 0.41) and item 12 (r = 0.40). Thus, a total of 10 items from the original scale were used in this study (see Appendix C-1.3).

As described above, both the reliability and validity of the test were acceptable for the English version of the HFSmB scale. Reliability for this Chinese version scales was tested using Cronbach's alpha. In the main study, the Cronbach alpha was .71. The process of translation is described in the section of the instrument translation later in this chapter.

Heart Failure Symptom Distress Scale (HFSD)

The HF related symptom distress scale was used to measure the symptom of distress in patients with HF. The HFSD scale was modified by Friedman and King (1995) from a previous instrument which was developed in the early 1980s. The original instrument was the "inventory of physical symptoms", constructed by Cohen and Hoberman (1983) and included 34 physical symptoms. The original instrument had a Cronbach alpha of .88 when administered to a large sample of young adults. Friedman and King (1995) later modified the "inventory of physical symptoms" to include 16 of the original scale's items in their study for populations of older women with HF. They reported a Cronbach alpha coefficient of .86 for this 16-item version of the scale. Finally, the HFSD scale was modified from Friedman and King's scale by Bondmass (2002), who included 17 physical problems/ symptoms frequently attributed to HF subjects. Cronbach alpha was .86 pre-intervention and .92 post-intervention for this most recent version of the HFSD scale.

However, there was no report for the validity of the scale by Bondmass (2002). The 17 items of the HFSD scale ask patients to rate how much each problem had bothered or distressed the respondents during the past month on a Likert-type scale using a 0-4 point scale (0= not at all to 4 =extremely). The HFSD scale total score can range from 0 to 68 by summing the item responses, with higher scores indicating patients have more distress from physical symptoms (see Appendix C-1.4).

The results of the reliability for this Chinese version of the HFSD scale indicated a Cronbach alpha reliability coefficient of .67 in this study.

Evaluation of Care Received Scale (ECR)

Patient- evaluation with care received is defined as the evaluation of patients about the care and reflects the extent to which an individual has positive or negative responses about the care received. This five item Evaluation of Care Received Scale (ECR) questionnaire measures patients' evaluation with the overall care which including usual care and the intervention program. The five components of evaluation with care received include knowledge of self-monitoring skill, having enough information and learning to live with HF, as well as getting enough social support and follow-up.

Responses for this scale were recorded on a Likert-type scale ranging from 1-5 (1= strongly disagree to 5= strongly agree). Total scores consist of summing the item responses, with high scores indicating higher ECR. Total possible scores ranged from 5 to 25. A panel for content validity testing was established comprising a gerontology nursing professional, and three nurses, all experienced in nursing patients with HF. They were asked to review the ECR Chinese version questionnaire to determine whether or not the questionnaire was sensitivity for the evaluation of the overall care received. Each expert rated the content relevance on a four-point scale, where 1 indicates totally irrelevant content and 4 indicates extremely relevant content. The final CVI for the each item was judged by the mean of the panel's responses for each item.

The content validity testing indicated that most items were acceptable with an average score of .82 (Davis, 1992; Grant & Davis, 1997) and no item considered for deletion. Moreover, in the main study, the Cronbach alpha reliability coefficient for this scale was .65. This questionnaire is attached in Appendix C-1.5.

Other Instruments

Demographic information sheet. A demographic information sheet was used to collect demographic data from participants regarding their age, gender, marital status, living arrangements, income, number of years with HF, medicine and comorbid chronic disease diagnoses. In addition, the following data were collected: NYHA classification, HF related health service utilisation, and body weight.

<u>The NYHA functional classification.</u> The NYHA functional classification system (American Heart Association, 2003) was used in this study to measure the influence of symptoms on the daily life of cardiac patients (Westlake et al., 2002). A higher grading reflects more functional impairment caused by cardiac disease. The functional status was graded according to the criteria of NYHA through a face-to-face interview. The four classes from I to IV include: I. No limitation of physical activity; II. Slight limitation in physical activity, for example, ordinary physical activity for patient will results in fatigue, palpitation, dyspnoea, or anginal pain. III. Marked limitation in physical activity, for example, patient less than ordinary physical activity still cause fatigue, palpitations, dyspnoea, or anginal pain; and IV. Inability to carry on any physical activity without discomfort with symptoms of cardiac insufficiency or anginal syndrome possibly present at rest and an increase in discomfort if any physical activity is undertaken (American Heart Association, 2003).

The validity of the NYHA classes as a measure of functional status is supported by two studies indicating it measured a distinct functional concept that was nevertheless related to functional capacity and functional performance (Rostagno et al., 2000; Zugck, Kruger, & Durr, 2000). Furthermore the NYHA functional classification system is commonly used to differentiate grading reflecting more functional impairment caused by HF.

Health services utilisation. Data on clinical and emergency visits as well as hospitalisations were collected on all patients for the 12 weeks prior to commencing the study and for the 12 week study period. The data for the 12 weeks pre-study was collected from patients' charts by the medical staff and the data over the period of the study was collected from 2 episodes of data collection. The number of each type of health service utilisation was calculated and totalled for each participant during the study period. Additionally the dates of clinical and emergency visits, as well as hospitalisations; the reason for visits and hospitalisations (diagnosis); the date of discharge, and total length of hospitalisation were estimated and recorded.

Body weight. Patients participating in the study were asked to weigh themselves daily and were instructed on the importance of using the same scales and same time to weigh themselves when at home. In the medical centre, the researcher helped patients to remove their shoes and emptied their pockets before they weighed themselves.

The demographic information sheet with all of these items is attached in Appendix C-1.1.

Instrument Translation

There were types of tools where translation was needed in this study. The first involved the translation of the original English HF Self-management Behaviour (HFSmB) and the HF related Symptoms Distress (HFSD) scales into the target language of Chinese. The second concerned the translation of the original Chinese versions of the Self-Efficacy for Dietary Control (SeSFC) scale and the Evaluation of Care Received (ECR) scale into English. The Chinese versions of tools were administered to patients and the English versions were needed for reporting in this thesis. Language and cultural differences can lead to different meanings in concepts which would affect the integrity of the measurement data (Hendrickson, 2003). Thus, Brislin's model and the content validity index (CVI) were used to translate the questionnaires in order to develop equivalent instruments.

Firstly the original English versions of the HFSmB scale and HFSD scales were translated into Chinese so that these data could be collected from Taiwanese people in this study. For that reason, a four-stage approach was used including: translation, review of the grammatical style and comprehensibility, back-translation, evaluation of linguistic and cultural equivalence. In this study, the instrument translation steps followed the "Brislin's Model of Translation" (Brislin, 1970, 1986). Brislin's model of translation is recommended as the most reliable method of developing an equivalent, translated instrument. This process ensured that the Chinese translation of all scales were comparable to the English version. The translated version of each tool was piloted with a convenience sample of three HF older subjects in northern Taiwan.

The four steps were as follows: Step 1 was to translate English version into the Chinese version by a PhD bilingual student whose mother tongue is Chinese and who has over 3 years experience studying in English; Step 2 involved review of the grammatical style and comprehensibility of the Chinese version; Step 3 was where back-translation from Chinese to English for the HFSmB and HFSD questionnaires which was undertake by another PhD bilingual student who had never seen the original English versions (Lange, 2002; Streiner & Norman, 2003); Step 4 was where the original and back-translated versions were compared for linguistic and cultural equivalence by an English monolingual person and the bilingual researcher in this study. This last process compared the original English tools with the back-translated versions for consistency (Berkanovic, 1980).

Steps 1 to 4 were repeated for each item if a difference was found until maximum equivalence between the original version and the back-translated version was achieved (see Figure 3.3). Equivalence between the original version and the back-translated version was determined by using the content validity index (CVI). Items in each of the tools were rated on the equivalence in meaning between the two language versions using a four-point scale (from 1= not equivalent to 4= very equivalent) by an English monolingual person and another two PhD bilingual students who had never seen the original English version (Polit & Beck, 2004).The final CVI for the each item was judged according to a mean level of 3 or above (Grant & Davis, 1997). Items with a CVI of less than 3 were retranslated because those items lacked equivalence with the original version (Lange, 2002) in order to produce a final version

Herdman, Fox-Rushby, and Badia (1998) highlighted the importance of expressing the original message as accurately, clearly, and naturally as possible. Even so, linguistic differences inevitably affect the translation process. For instance, in the HFSmB scale, item 3 contains the term “If I get short of breath, I take it easy.” In Chinese, this item can have two meanings: one is the “If I get short of breath, I can be unhurried to face it.” Another meaning is the “I can be relaxed in my mind when I get short of breath.” Moreover, in items 3, 5 and 8, the phrase “contact my doctor or nurse” is not an accurate expression in the Chinese language. Most Chinese people would not be able to contact their healthcare professionals; they would need to make an appointment to see a doctor when they have a health issue. Hence, the elderly in Taiwan would not understand how to contact their doctor or nurse; as they would normally just go to the clinic.

Secondly, the original Chinese version of the SeSFC scale, the ECR scale and demographic information sheet were translated into English after the psychometric properties had been established. All the steps involved in translation and backtranslation as above, were used for translating from these Chinese tools to English versions. This type of translating (from Chinese to English) was needed as this PhD thesis is in English and the publishing of associated articles will also be in English.

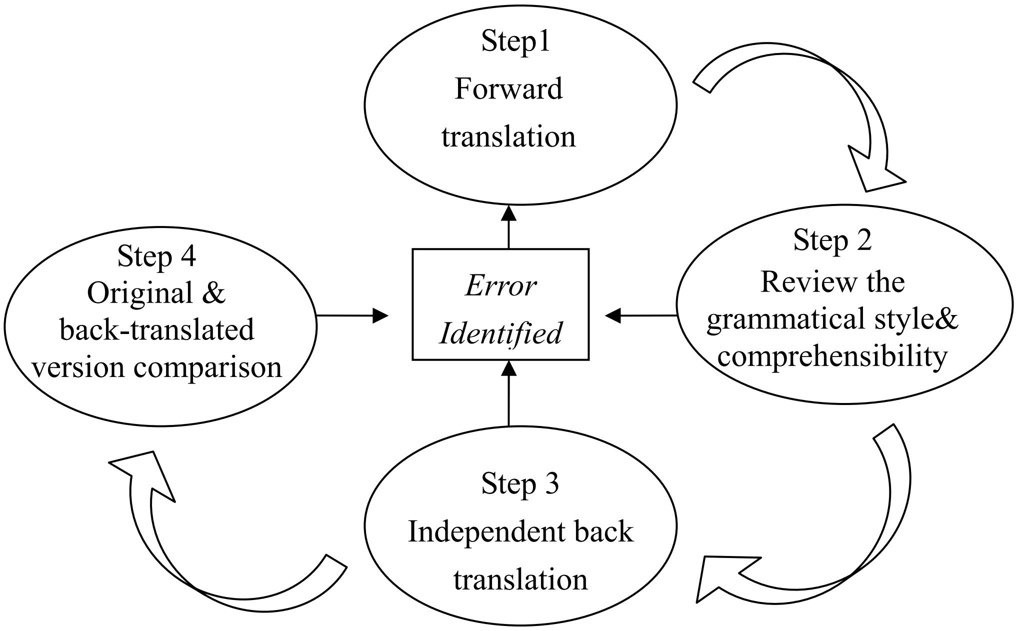


Figure 3.3. The Brislin's model for translating and back-translating.

Psychometric Testing of the SeSFC Scale

The psychometric properties of the Chinese version of this modified self-efficacy for salt and fluid control (SeSFC) scale were established by examining the content, construct, and convergent validity, as well as the internal consistency and stability to ensure the instrument was valid and reliable for Taiwanese patients. The initial face validity of the SeSFC was established by a group of Taiwanese experts in HF. A convenience sample of 96 heart disease subjects in northern Taiwan was invited to complete the SeSFC scale, prior to the pilot study.

Sample Characteristics for Psychometric Testing

A convenience sample of 96 heart disease subjects in a hospital in northern Taiwan was invited to complete the SeSFC scale, prior to the pilot study. All patients, attending outpatient cardiac clinics in the hospital, who met the inclusion criteria, were invited to participate in this testing. Criteria for sample selection included: (1) primary or secondary diagnosis of heart disease, (2) an ability to communicate orally or in writing, and (3) agreement to participate in the testing. The types of heart disease for patients' with a primary or secondary diagnosis of the heart disease included HF, hypertension, cardiovascular disease, and coronary heart disease. The reason for including a range of diagnoses was that patients with these diseases experience similar symptoms and education and counselling to prevent cardiovascular and heart organ damage (American Heart Association, 2008; National Heart Foundation of Australia, 2006). All of these patients need to attend to the modifiable risk factors such as salt diet, smoking, obesity, and hypertension are likely to directly or indirectly aggravate underlying heat disease. As current international guidelines recommend that salt moderation can prevent patients' blood pressure and the risk of cardiovascular disease and HF (American Heart Association, 2008; Hu, Qiao, & Tuomilehto, 2002).

Table 3.1 summarises the demographic data for the sample for the psychometric testing. Patients included 52 men (54.2 %) and 44 female (45.8 %). The mean age of the all participants was 70.3 years (*SD* = 8.77, range = 50 to 88 years). Most of the participants were married (72.9 %), and retired (82.2 %). Almost half of the participants were literate (49 %). A large proportion of participants had a religious faith (93.7 %) and lived with their families (92.7 %) such as spouse, daughter or son. Moreover, 69 (71.9 %) participants did not follow low salt diet. In relation to health conditions, the mean number of comorbid chronic diagnoses for all participants was 3.0 (± 0.86). In addition, 69.8 % participants took more than five medications per day and the participants' mean (*SD*) weight was 62.5 (± 11.91).

Table 3.1

Demographic Variables of the Psychometric Testing (N= 96)

Variables	Frequency	Percentage
Gender		
Male	52	54.2
Female	44	45.8
Marital status		
Married	70	72.9
No married	3	3.1
Widowed/ Divorce	23	24.0
Education		
No schooling	49	51.0
Elementary school	25	26.0
≥Junior school	22	23.0
Working status		
Having job	17	17.7
Retired status	79	82.2
Enough income		
None	24	25.0
Yes	72	75.0
Religious faith		
None	6	6.3
Yes	90	93.7
Living arrange		
With family	89	92.7
Alone	7	7.3
Following low salt		
None	69	71.9
Yes	27	28.1
Medicine of heart disease		
< 2	4	4.2
3-5 types	25	26.0
more than 5 types	67	69.8

	Range	*Mean*	*(SD)*
Age (years)	50-88	70.32	8.77
Weight (kilogram)	35-97	62.58	11.91
Comorbidities	2-6	3.04	0.86

The Modification and Addition of SeSFC Items

Psychometric testing was needed because the original Chinese instrument, "Self-efficacy for heart-related diet and exercise behaviours" developed by Chiou and Ka (2000), had been modified for the purpose of the current study. Two of the original subscales were modified to enable the examination of HF patients' self-efficacy for sodium and fluid control. The original "Self-efficacy for heart-related diet and exercise behaviours" scale (Chiou and Ka, 2000) did not contain items relating to self-efficacy for fluid control. Thus, the purpose of the modified scales (SeSFC) was to enable the assessment of whether the self-management program enhanced HF patients' self-efficacy to change their behaviours to perform fluid and sodium control. A review of the literature on self-efficacy and dietary control for heart failure served as a foundation for the modification and development of the SeSFC new items.

The SeSFC scale is made up of two subscales labelled as: "Resisting relapse on reducing salt intake" from items 1 to 9 and "Resisting relapse on reducing fluid intake" from items 10 to 15, which have nine and six items respectively, were modifications developed by the researcher. For example, items 1, 2, 3, 4, 5, 7, 8, 11, 12, and 13 were modifications from the original subscale "Resisting relapse on reducing fat and salt intake". Secondly, items 6 and 9 were from the original subscale "Healthy eating behaviour skills". Both subscales were from the "Self-efficacy for heart-related diet and exercise behaviours" scale developed in Taiwan (Chiou & Ka, 2000). Finally, items 10, 14, and 15 were added by researcher to examine fluid control. The key concepts to be measured from this composite 15-item tool are: (1) resisting relapse on reducing salty foods from items 1 to 9; (2) resisting relapse on reducing fluid from item 10 to 15 (see Appendix 3).

However, two items (Item 1 and 6) were not immediately understandable by five participants in the 15-item SeSFC scale. Therefore, for this self-reporting measure, the researcher needed to develop standard cues for providing further explanations about those items. Such explanations could be provided as all data was collected by interviews, as outlined in the data collection procedure section. For example, SeSFC item 1 asks “stick to low-salt foods when I feel depressed, bored or tense,” for which the following cue was developed “some people eat food without any limitation when their mood is unusual such as depressed, troubled or nervous.” Also, SeSFC item 6 asks “follow your low salt diet when you want to eat a favourite salty food,” for which the following cue was developed “you can control yourself don’t eat your favourite salty food such as cake, soy source pickle or cured meat.” This experience enabled the researcher to develop explanations that would be used consistently if a subject in the main study had difficulty in understanding the items.

Assessing Content Validity of the SeSFC Scale

The SeSFC scale was examined for content validity (Grant & Davis, 1997) using Lynn’s (1986) guidelines. A panel was established comprising a cardiologist, one gerontology nursing professional, and three nurses, all experienced in nursing patients with chronic HF. They were asked to review the SeSFC Chinese version questionnaire to determine whether or not the questionnaire was suitable for Taiwanese patients. The assessments included each item’s sensitivity for Taiwanese HF patients, and evaluating the degree to which the Chinese version items measured the two concepts, which included resisting relapse on reducing salty foods and fluid. Each expert rated the content relevance on a four-point scale, where 1 indicates totally irrelevant content and 4 indicates extremely relevant content.

The final CVI for the each item was judged by the mean of the panel’s responses for each item. The index for relevancy or representativeness of the total instrument is the percentage of total items judged to be content valid by receiving a score of 3 or 4. A minimum content validity index of .78 is recommended (Grant & Davis, 1997). A CVI mean score with less than .78, indicates that panel members deem those items as lacking equivalence to the original version (Lange, 2002), and that the item should be considered for deletion (Lynn, 1986). The CVI score for the SeSFC was calculated for each item as well as for the total mean score. The results indicated that all items were acceptable with an average score of .83, thus no item was considered for deletion (see Appendix C-1.4).

Assessing Construct Validity of the SeSFC Scale

Factor analysis. The construct validity of the modified SeSFC scale as a measure of self-efficacy for low-salt diet and fluid control in patients with HF was determined by using factor analysis. A variety of recommendations for estimating the sample size required for determining reliable factors ranging from 3 subjects per variable (Cattell, 1978) to 20 subjects per variable (Arrinedell & Van der Ende, 1985; Nunnally, 1978; Stevens, 1992, p. 372; Tabachnick & Fidell, 2006). Moreover, Hatcher (1994) suggested that the minimum number of subjects in the sample for factor analysis should be 100. Tabachnick & Fidell (1996, p. 640) recommend samples of 100 to 200 are adequate for factor analysis when factors are clear-cut, the numbers of items are not too sizable, and inter-item correlations are strong.

Furthermore, MacCallum, Widaman, Zhang, and Hong (1999) recommended that in determining the minimum sample size required, the researcher needs to also consider the item-to-factor ratio, the average communality of the items, and the number of items that load on each factor. When communalities are all greater than .6, and the factors are well determined (e.g., six or seven items per factor and a rather small number of factors), then a sample size of 100 is adequate. In line with the above recommendations, a convenience sample of one hundred outpatients with heart disease attending clinics in a hospital in northern Taiwan was invited to participate in face-to-face interviews. This phase was begun in late September and completed in the second week of October 2006.

Ninety-six participants completed the demographic information sheet and the Chinese versions of the SeSFC questionnaires. Criteria for sample selection included: (1) primary or secondary diagnosis of heart disease, (2) an ability to communicate orally or in writing, and (3) agreement to participate in the study. If the person had a severe health condition, such as the terminal stage of a disease, severe dementia or another debilitating psychiatric disorder, or was unable to sign the consent form, that person was excluded.

The results of factor analysis for the SeSFC items. Principal component analysis with Varimax rotation was employed for factor extraction and better interpretability of the factor loading. The results of the initial principal component factor analysis indicated that all variables had an anti-image correlation greater than 0.5, the Kaiser-Meyer-Olkin (KMO) value was high at 0.877, and Bartlett's Test of Sphericity was significant ($\chi^2 = 2145.16$, $df = 105$, $p = .000$), thereby satisfying the sampling adequacy requirement and indicating the data were appropriate for factor analysis. Examination of the Scree Plot (Figure 3.4), in which the eigenvalue of each factor in the initial solution is plotted, verifies the presence of two factors. The SeSFC scale confirmed the existence of 2 factors with eigenvalues greater than 1. The rotated matrix for the SeSFC scale is provided below in Table 3.2. The factors accounted for 83.14% of the total variance. A factor loading cut-off point of 0.40 was satisfied for each item in SeSFC scale. A 2-factor solution emerged and provided further validation that the 15-item version of the scale was consistent with the key concepts of the two subscales of the modification SeSFC scale, which included two subscales labelled as: factor I “Resisting relapse on reducing salt intake,” and factor II “Resisting relapse on reducing fluid intake.”

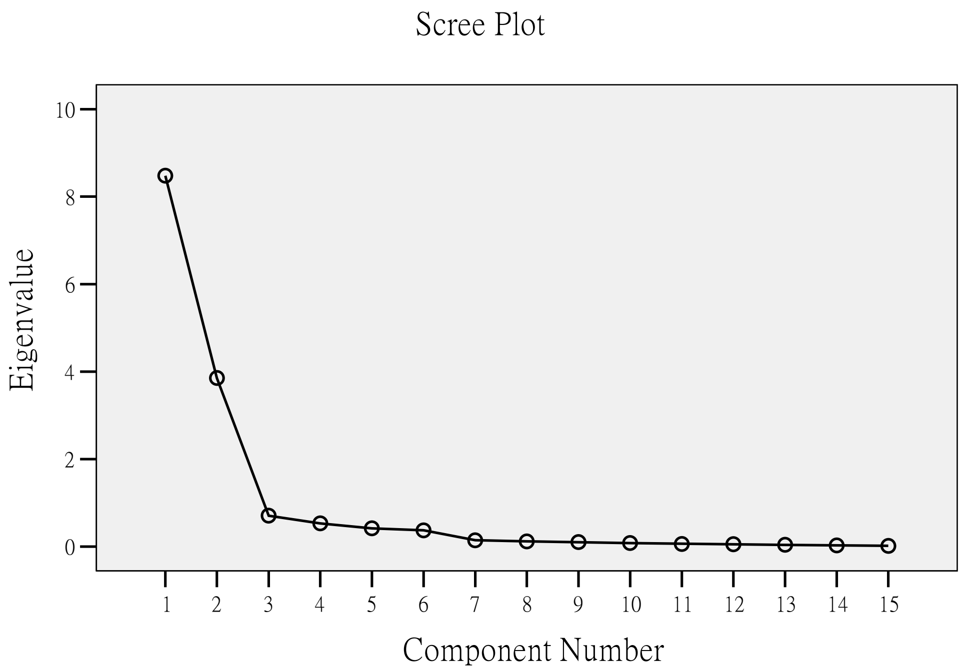


Figure 3.4. Scree plot of SeSFC scale

Table 3.2

Rotated Component Matrix (a) for SeSFC Scale Items

Factor/ Item	Component 1	Component 2
Factor I. Reducing salt intake		
1. Stick to low-salt foods when I feel depressed, bored or tense	.919	.158
2. Stick to low-salt foods when I feel too lazy to prepare food r I am in a hurry	.907	.130
3. Stick to low-salt foods when dining with friends or family away from home	.879	.224
4. Stick to low-salt foods when I have guests at home	.920	.175
5. Stick to low-salt foods when someone eats high-salt in front of me	.942	.131
6. Follow your low salt diet when you want to eat a favourite salty food	.945	.124
7. Follow low salt diet around holidays/occasions	.913	.080
8. Do not buy any snacks with salt from nearby store	.840	.087
9. Use salt –free condiments (e.g. pepper, lemon juice) instead of salty condiments (e.g. soy sauce, pepper/ salt mixture, ketchup)	.670	.337
Factor II. Reducing fluid intake		
10. Stick to fluid restriction when I feel thirsty	.106	.940
11. Stick to fluid restriction when dining with friends or family away from home	.201	.956
12. Stick to fluid restriction when I have guests at home	.193	.956
13. Stick to fluid restriction when someone drinks water in front of me	.194	.941
14. Keep the fluid in my drink lower than 1500 cc every day	.126	.942
15. Stick to record my fluid intake every day	.089	.600

Note. Extraction Method: Principal Component Analysis.

Assessing Convergent Validity of the SeSFC Scale

Convergent validity of the SeSFC was examined by comparing the SeSFC with another measure of the same trait (Polit & Beck, 2004) with all subjects completing both the SeSFC scale and the HF Self-management Behaviour (HFSmB) scale. These questionnaires were completed by interview. Convergent validity was estimated by computing Pearson product-moment correlation coefficients for scores on the SeSFC and HFSmB scales. A negative correlation was found between the SeSFC scale and HFSmB scale (r = -.60, p < .001) because lower HFSmB scores reflect greater self-care behaviours by participants with HF, while higher SeSFC scores indicate greater self-efficacy in salt and fluid control. Thus individuals who had higher levels of self-efficacy dietary control also have better HF self-management behaviour, thereby supporting the convergent validity of the SeSFC.

Assessing Reliability of the SeSFC Scale

In this sample, the reliability or internal consistency for the SeSFC scale was tested by Cronbach's alpha coefficient. The Cronbach's alpha for the total SeSFC scale was .94 and for the two subscales: reducing salt intake and reducing fluid intake, it was .96 and .95, respectively.

Summary

A series of analysis into the psychometric properties of the SeSFC scale by the same group showed satisfactory content, construct, and convergent validity, and internal consistency of the total score. Thus, the psychometric testing of the SeSFC scale was established.

Data Collection Procedure

Data collection commenced following approval from the two Taiwanese medical centres and the Queensland University of Technology (QUT) University Human Research Ethics Committee (HREC). The researcher screened patients admitted to the cardiology clinics in each of the medical centres, for their potential eligibility in the study. Firstly, the researcher determined which patients met the inclusion criteria from data in the medical charts to ensure each patient was diagnosed with HF. When patients met the inclusion criteria of this study, they were invited to participate through a face to face verbal invitation. An explanation of the study, the benefits of participating, participants' rights and the policy regarding confidentiality of information were provided (see Appendix B-1). Also, a signed consent was obtained from patients who agreed to participate in the study (see Appendix B-2).

Secondly, baseline demographic data, including body weight and NYHA functional class were collected by formal interview from the patients consenting to participate and from their medical records at the cardiology clinic of the medical centre. The medical history data from the medical records were collected with assistance from the medical staff, such as the cardiologists or nurses in the medical centre. Baseline data for the study outcomes were collected by interview for: self-efficacy for dietary control, HF self-management behaviour, HF related symptoms, and evaluation of care received. The interview method of collecting this data was used to ensure consistency in the method of collecting data, from a group of patients for whom some were not fully literate. Thus all the items of the questionnaires were read by the researcher using the questionnaire as a guide (see Appendix D) for all participants. After all baseline data had been collected the researcher gave the participants a name card and later a phone call to remind them of the next data-collection session.

Once all baseline data had been collected the participants were randomly assigned to the self-management experimental and the control groups according to a sealed envelope, which contained a computer-generated sequence of random numbers. The researcher opened this sealed envelope to assign participants to the experimental or control groups in the cardiology clinic of the selected medical centres. The researcher did not tell the participants they assigned to which groups.

Outcome measurements were taken at baseline (pre-intervention), at weeks 4, and at week 12. These times for follow-up data collection were based on previous studies indicating that the effectiveness of any intervention should be demonstrable by 12 weeks (Barnason et al., 2003; Gary, 2006; McKee, Bannon, Kerins, & FitzGerald, 2007; Oka et al., 2005). The research assistant (RA) collected data for weeks 4 and 12 by telephone using the questionnaire guide (see Appendix D). This RA who collected the data was independent from the researcher who visited and carried out the intervention for patients in the experimental group. The collection of post-test data by the RA helped to reduce bias that would arise if the researcher also collected data. The RA was blinded to the assignment of participants to intervention or control groups. The procedure for recruiting patients to the study and for measuring outcomes is shown in Figure 3.5 and the schedule and time needed for every step in data collection for this study is presented in Table 3.3.

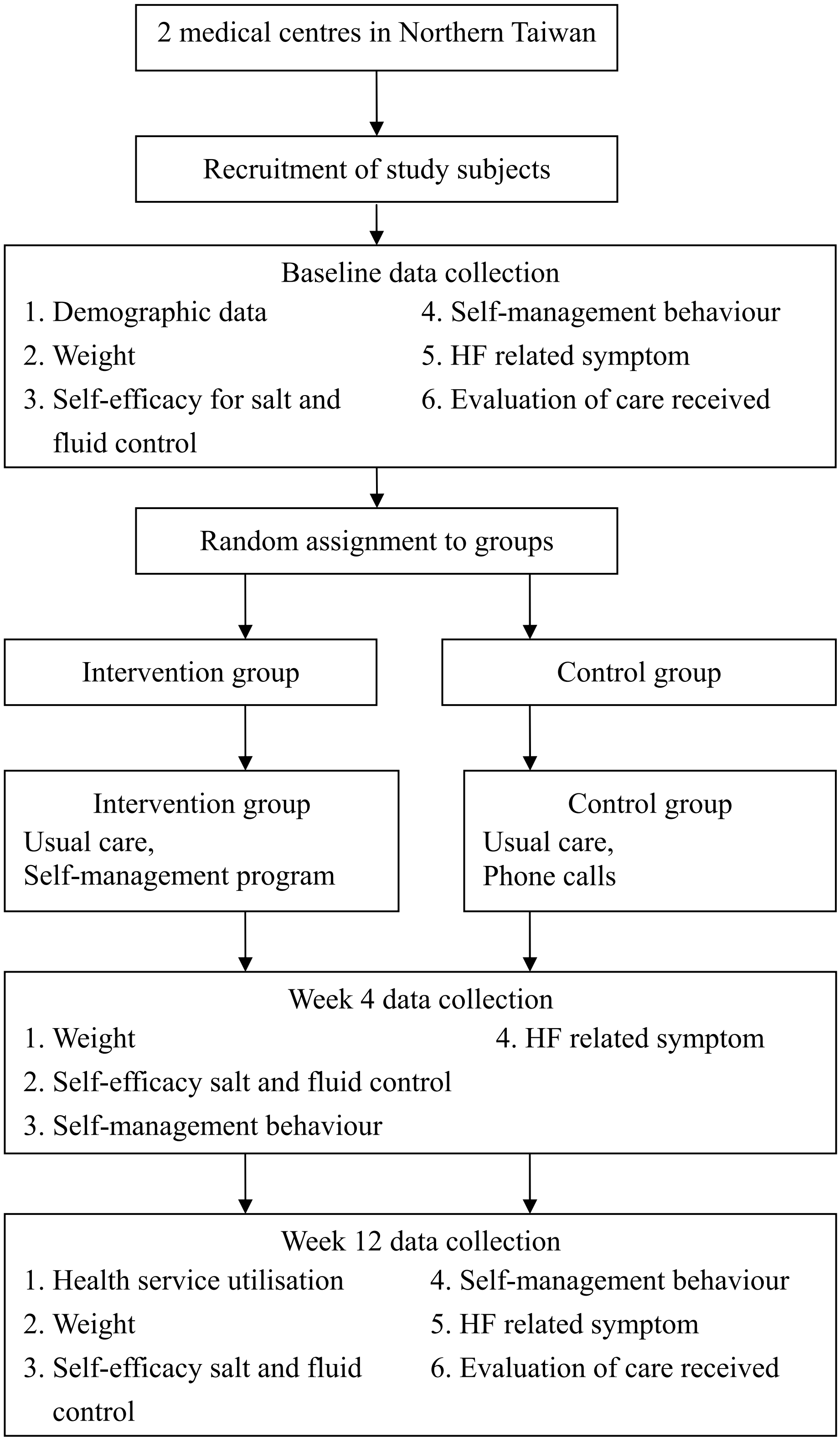


Figure 3.5. Summary of participation protocol and outcome measure

Table 3.3

Schedule and Time Needed for Data Collection

At the cardiology clinics of the medical centres		
Procedure	*Materials/Measurements*	*Time*
Explanation of the study and consent rest period	Name card	5 minutes
	Informed consent	
Baseline measures	Demographic data	10 minutes
	HF related symptom	5 minutes
	HF self-management behaviour	10 minutes
	Self-efficacy for salt and fluid control	10 minutes
	Evaluation of care received	2 minutes
Random assignment to intervention or control group	List of participants	1 minute
Telephone for collection data		
First post-test measurement	Body weight	1 minute
	HF related symptom	5 minutes
	HF self-management behaviour	10 minutes
	Self-efficacy for salt and fluid control	10 minutes
Second post-test measurement	Health service utilisation	1 minute
	Body weight	1 minute
	HF related symptom	5 minutes
	HF self-management behaviour	10 minutes
	Self-efficacy for salt and fluid control	10 minutes
	Evaluation of care received	1 minutes

Intervention

In this study, the experimental group received the newly developed self-management intervention developed by the researcher. Both the experimental and control groups received the usual care provided by nurses in the outpatients clinics of two medical centres. The following section introduces both the intervention program and the usual care. More detail on the intervention is to be found in the next chapter.

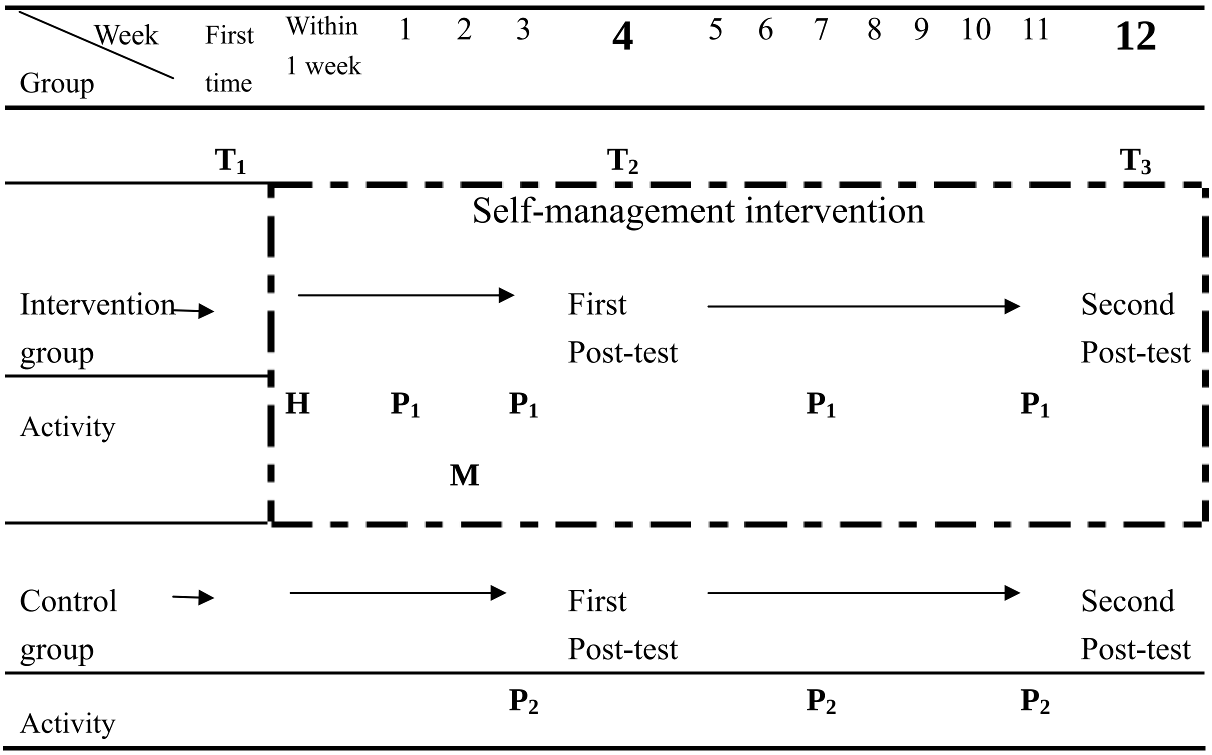
Intervention Program

The purpose of this intervention was to enhance self-efficacy through four primary sources of information: mastery experience, social modelling, social persuasion and physical and emotional states (McDowell et al., 2004). Furthermore, this program emphasised self-monitoring of dietary control and body weight for HF. The “dietary control” in this study focused on sodium and fluid restriction. Thus, this study involved the manipulation of the independent variable, a structured, individualised self-management program created to be consonant with Bandura’s self-efficacy theory (Bandura, 1986, 1997). It was provided over a period of twelve weeks. The design of the intervention integrates the four sources of information into each of the sessions: home visit within one week after enrolment, telephone follow ups at 1, 3, 7, and 11 weeks, and completion of a diary of sodium, water and body weight recordings.

In addition, the control group received phone calls at 3, 7 and 11 weeks using the “Telephone guide-control group” (see Appendix G-2). The control group phone calls differed from experimental group phone calls. The purpose of the phone calls for the control group was to control for the attention effect that may occur with the new intervention for the experimental group. The attention effect, sometimes referred to as the Hawthorne effect, refers to a placebo effect which brings about change in itself (Lundborg et al., 1999). It is important to distinguish the effect of the intervention from the attention effect. In this study design, the control group received phone calls as did the intervention group, but the content of the control group phone calls was different. The phone calls for the control group did not contain information based on the new self-management intervention for counselling and support to complete their self-monitoring behaviour (see Appendix G-1). Instead the researcher discussed with the control group patients how they were feeling. All of these procedures for the self-management intervention are summarised in Figure 3.6. A detailed explanation of the self-management intervention based on the four sources of information is provided in chapter four.

Usual Care

All participants who were in the intervention and control groups received care as usual from clinical nurses at the which medical centres according to the "Understanding of heart failure handbook" taught patients how to deal with HF. All of the study protocols for older patients with HF are described in more detail in the next chapter.



Note. $\mathbf{T_1}$- baseline data collection; $\mathbf{T_2}$- post-test at week 4; $\mathbf{T_3}$-post-test at week12; **H**- home visit; $\mathbf{P_1}$- telephone follow up; **M**- mail the recording of the page (weight, salt diet and fluid); $\mathbf{P_2}$- phone call for control group

Figure 3.6. Procedural design of self-management intervention

Data Analysis and Management Plan

Pre-analysis Phase

Before applying any statistical analysis, accuracy of data entry was assured by systematically checking each value of every variable via the statistical indices, which included the frequencies and explore functions from the Statistical Package for the Social Sciences (SPSS) for Windows statistical package (SPSS version 15). There are a number of different ways to check for errors using SPSS. In this study, data checking involved two types: wild code checking and logical or consistency checking that is performed as a check of the accuracy of the data entry (Neuman, 2000). The first was a visual check performed on all variables for the range and logic of values, followed by a check for outliers, which refer to values lying outside the normal range of values for a variable. Checking for univariate outliers was performed using the explore function from SPSS. Values lying outside of the possible range for variables can be found by inspecting frequency distributions, paying special attention to the lowest and highest values that indicate an error in data entry. The second data-checking procedure focused on internal data consistency. In this task, data were checked for errors by searching for cases where two or more variables were inconsistent. Because the questionnaires were administered in face-to-face interviews, there was little data missing.

Ahead of the statistical analysis being undertaken, the assumptions underlying the statistical methods were also checked. Firstly, the assumptions for normal distribution of the baseline data for five outcome variables with continuous data (SeSFC, HFSmB, HFSD, weight, and health service utilization) were assessed and examined prior to the inferential testing. In this study, the assumption for assessing normal distribution was undertaken by inspection of the one-Sample Kolmorgorov-Smironov test which is the preferred test for making the comparison against a normal distribution (Green & Salkind, 2005, p364).

The assumptions for normal distribution of selected demographic background data, the ECR scale, and the baseline outcome variables for continuous variables (age, weight, comorbid chronic diagnoses, health service utilization, SeSFC, HFSmB, and HFSD scale) were assessed and examined prior to the inferential testing. However, the two variables of comorbid chronic diagnoses and health service utilization violated the assumption of a normal distribution. To address the issue of skewness, square root transformation and removal of outliers were used to make the data set more closely approximate a normal distribution. Tabachnick and Fidell (2006, p72-73) define outliners as those with standardized residual values (as displayed in the scatter plot) above about 3.3 (or less than -3.3). The results of this analysis after data transformation and removing outliers were similar to the results for nontransformed data. Therefore, outliers were not removed and the nontransformed data for the ECR scale and health service utilization will be used. Thus, non-parametric tests will be used instead of parametric methods of data analysis for these variables due to the inability of this data to meet the assumptions of the parametric model.

Data Analysis Phase

The data were analysed using the SPSS version 15.0, and the level of significance (α) was set at .05. The design and aims of the study directed data analysis methods. Moreover, all randomly assigned participants were included in the analysis as required for intention-to-treat analysis. This is because the number of participants in each group is an essential element of the results. All data have a great effect upon the end results, and therefore, all patients who were randomly assigned were included in an analysis (Polit & Beck, 2004; Moher et al., 2001).

Sample characteristics were described using the counts, percentages, means, standard deviations, and frequencies. The mean and standard deviation were used to summarise continuous demographic variables and the categorical variables were summarised using counts and percentages. Moreover, the sample characteristics for the experimental and control groups were compared using Chi-square for all categorical and nominal data and t-test for continuous demographic data and baseline variables.

Accordingly, Chi-square analysis was used to evaluate the homogeneity between the intervention and control groups with categorical variables such as gender, marital status, education, working status, enough income, religious faith, and living arrangement, exercise and past medical history related to HF. The assumptions underlying Chi-square analysis were: (a) sample was randomly sampled from the population, (b) observations were from different subjects and no subject is counted twice, (c) the number of responses obtained should be large enough so that no expected cell frequencies size is less than or equal to 5 in a contingency table with two rows and two columns more than 20% (Green & Salkind, 2005, p368). If these conditions were not met, then an alternative test such as the Fisher exact test was used (Green & Salkind, 2005). In this study, the assumptions for the Chi-square analysis were examined and met.

An independent sample t-test was used to compare the difference in means between groups at baseline. This analysis was conducted based on the following assumptions: (a) scores were normally distributed, (b) the variable from the populations were equal, and (c) the scores were randomly sampled from the population and test variables were independent of each other (Polit & Beck, 2004; Green & Salkind, 2005). The independence assumption implies that the subjects are responding independently of one another (Stevens, 1992). The assumption of the independence of observations was not a problem because the participants completed the data collection separately from one another so that data from one participant were not related to other participants. When Levene's test for equality of variance was significant, the t value for unequal variances was reported. However, as the scores for health service utilisation for HF did not meet assumption of normal distribution; the non-parametric Mann-Whitney U test was used to compare difference between two groups to examine the validity of t-test analysis.

Data analysis to test the hypotheses used repeated measures analysis of variance (R-ANOVA) models to determine differences in the outcome variables (the SeSFC, HFSmB, HFSD scales and weight) over time and between the experimental and control groups. As one outcome variable (health service utilization) did not meet the assumptions for parametric data analysis a non-parametric Mann-Whitney U test was used to assess the effect of health service utilisation as well as to analyse the differences between the groups. Finally, patient's care received between two groups was also evaluated with a non-parametric Mann-Whitney U test. The analytical approaches that were used in this study are summarized in Table 3.4.

Table 3.4

Method of Data Analysis for this Study

Explanatory variables: Independent variables	Explanatory variables: Dependent variables	Normal distributed	Descriptive analysis	Homogeneity comparison	Multivariate analysis
Continuous variables					
•Age •Weight	---	Kolmorgorov-Smironov test	Mean (SD)	Independent-samples t-test	---
•Comorbidities	---	Kolmorgorov-Smironov test	Mean (SD)	Mann-Whitney U test	---
---	•SeSFC •HFSmB •HFSD •Weight	Kolmorgorov-Smironov test	Mean (SD)	Independent-samples t-test	Two-ways R-ANOVA
---	•Health service utilization	Kolmorgorov-Smironov test	Mean (SD)	Mann-Whitney U test	Mann-Whitney U test
----	•ECR	Kolmorgorov-Smironov test	Mean (SD)	Mann-Whitney U test	Mann-Whitney U test
Categorical variables					
Gender Marital status Education Working status Income Religious faith Living arrange Exercise Duration of HF HF medicine Low salt diet Ejection fraction NYHA class	---	---	Count (%)	Chi-Square (χ^2) or Fisher's exact	---

Ethical Considerations

The study was conducted in two medical centres in Northern Taiwan. The ethics application was sent to the two medical centres involved in the study along with the "Patient Information Sheet and the Consent form". The researcher contacted the Director of the research department of each medical centre by email to introduce herself and to explain the purpose of the study. Additionally the researcher met with the management staff at the medical centres and explained the research proposal. Secondly, the researcher sent a letter requesting permission to undertake the study, with a copy of the research proposal and the agreement form to the two medical centres. The two medical centres were asked to sign the agreement form for the approval of data collection and the formal approvals have been achieved already. The approvals from the medical centres, as attached in Appendix A-2 and A-3, indicated that conducting the research in the respective medical centre was supported, based on the prerequisite of conforming to research ethics approval. In addition, in order to ensure that this study was ethical and justified, the proposal was also sent out for review to the Ethics committee for the Protection of Human Subjects at Queensland University of Technology (QUT). Finally, Level 2 Expedited Ethical Clearance (research involving human participants) was sought for this research in July, 2006. A Copy of the approval obtained from the Queensland University of Technology (QUT) University Human Research Ethics Committee (UHREC) is shown in Appendix A-1.

Following ethical approval from the university and the involved in the study medical centres, subjects meeting the inclusion criteria were invited to participate. Each participant received information about the purpose and procedure of the study directly from the researcher by both a letter of explanation and by verbal communication. Potential participants were also informed that their participation in the study was voluntary and that refusal to participate or a decision to withdraw at any time involved no penalty or loss of benefits to which the participant was otherwise entitled. After the participants agreed to participate in the study, the consent form was read and then a signature of agreement was obtained. During the data collection and provision of the intervention program, a short break was taken when the participants appeared fatigued or if he/she requested a break. All data obtained from participants was assigned code numbers and did not contain the participants' name, address, or telephone numbers. Participants were informed that study information will be presented as group data only and no individual will be identified at any time throughout the study or in reports of the study.

Pilot Study

The pilot study was conducted before the main study, when the psychometric testing of the SeSFC had been completed. The purpose of this pilot study was to ensure that the protocol was realistic and to determine whether any modifications of the intervention procedure were required. Thus, the pilot study focused on the feasibility and applicability of the intervention procedure for Taiwanese elderly participants with HF. Also, the pilot study explored issues of meaningfulness and understandability as well as time, cost, and skill estimations for the study. The pilot study tested the five steps of the intervention with a convenience sample of 10 HF older patients in northern Taiwan. The five steps of the pilot study included Step 1 - recruitment of the participants, Step 2 - baseline data collection, Step 3 - random sampling, Step 4 - performance of self-management program at home visit, and Step 5 - telephone follow up for post-test data collection by a research assistant. The detail of the pilot study is described in the following chapter.

Summary

This chapter presented a description and explanation of a study using an experimental design for the purpose of determining the effectiveness of a self-management intervention for HF patients in Taiwan. Following ethical approval from the university and study medical centres 108 outpatients with HF, attending clinics in two medical centres who met the inclusion criteria were invited to participate. All participants were then randomly assigned to the self-management experimental and control groups by a computer generated list of random numbers. The intervention for this study involved a structured, individualised self-management program created consistent with Bandura's self-efficacy theory (Bandura, 1986, 1997, 2004), for 12 weeks. The purpose of this intervention, based on self-efficacy theory, was to promote skill mastery experiences, provide social modelling and social persuasion as well as to assist patients to develop awareness of their physical and emotional states, thereby enhancing self-efficacy and improving health-related outcomes. In order to examine the effects of self-management, the following outcome variables were measured at baseline and at weeks 4 and 12 after the commencement of the intervention: self-efficacy for salt and fluid control scale, HF self-management behaviour, HF symptom distress scale, and body weight. Also, health service utilisation and patient's care received scale were measured at baseline and at week12 after the commencement of the intervention.

The results of the psychometric testing of the SeSFC scale indicated that the reliability and validity of the Chinese version of the modified SeSFC scale were acceptable. The procedures for data collection, brief intervention protocol and pilot study, as well as ethical considerations were also described. Finally, all data were analysed using the Statistical Package for the Social Sciences (SPSS) version 15.0, with the level of statistical significance set at $p<.05$. A more detailed explanation of the study protocol involving self-management program and the usual care are presented in the next chapter.

CHAPTER FOUR

Development of the Self-Management Program and Pilot Testing

This chapter provides the theoretical basis as well as greater detail of the self-management program and the usual care for older Taiwanese heart failure (HF) patients used in the current study. The previous Methods Chapter described the study design, data collection tools and procedure as well as an introduction to the study protocol. In this experimental study, the experimental group received a newly developed self-management intervention. Also, both the experimental and control groups received the usual care. The purpose of this self-management program was to improve older Taiwanese HF patients' self-efficacy in their self-management behaviours including low-salt diet, fluid control, weight record and self-management behaviours. The program design, based on Bandura's (1997) four primary sources of information, integrates these information sources into the different sessions including one home visit and four telephone sessions. Moreover, this chapter describes the procedure for delivering the program. Finally, the results from the pilot study are presented detailing each step of the intervention, the pilot findings and changes needed in the intervention.

Intervention Program

Development of Self-management Program

The intervention for this study was grounded in Bandura's self-efficacy theory (Bandura, 1986, 1997), which enhances older patients' self-efficacy through four primary sources of information: mastery experience, social modelling, social persuasion and physical and emotional states. In order to improve patients' self-efficacy in managing their behaviours including low-salt diet, fluid control and daily monitoring of body weight. In this study, a self-management program involved a number of strategies including appraisal, goal setting and self-monitoring (mastery experience), a booklet providing a real story using models of people similar to the subjects in this study who were successful in self-management (social modelling), outlining the social support to be provided through home visits and telephone consultations (social persuasion), and how feedback and follow-up via telephone (physical and emotional states) would be provided. Moreover, this program emphasised self-monitoring of dietary control, which focuses on sodium and fluid restriction.

The purpose of this program was to improve HF older patients' self-efficacy in their self-management behaviours. Detailed objectives are presented to demonstrate how this purpose will be achieved. At the completion of this program, the intervention group members are expected to be able to:

1. Achieve the self-management program process.
2. Model the HF patients who were successfully in managing their behaviours.
3. Set weekly goals for weight, low salt and fluid control.
4. Carry out daily self-monitoring of their weight.
5. Reduce the amount of salt and fluid intake.
6. Report feelings of higher self-efficacy for salt and fluid control.
7. Share feelings related to managing their disease.

The new self-management program was conducted for a 12 week period with all activities being either carried out during a home visit or during the four follow-up telephone calls. The development of the self-management program plan is depicted in Table 4.1.

Table 4.1

The Content of Self-Management Program

Program	Self-management Program
Participants	Older outpatients with heart failure
Aims	To improve HF patients' self-efficacy in managing their behaviours focusing on low-salt diet, fluid control and monitoring body weight everyday.
Objectives	The intervention group members will be expected to have: 1. Achieve the self-management program process. 2. Model the HF patients who were successfully in managing their behaviours. 3. Set weekly goals for weight, low salt and fluid control. 4. Carry out daily self-monitoring of their weight. 5. Reduce the amount of salt and fluid intake. 6. Report feelings of higher self-efficacy for salt and fluid control. 7. Share feelings related to managing their disease.
Content	1. Explain the concept and process of self-management program. 2. Utilise "Self-management Booklet" to guide patients live with HF. 3. Learning self-monitoring skills. 4. Provide social support and feedback.
Program sessions	One home visit and Follow-up phone calls at weeks 1, 3, 7, and 11
Home visit objectives	1. Understand the self-management program process. 2. Get information about the model of successfully living in HF. 3. Set weekly goals for weight, low salt and fluid control.
Phone call objectives	1. Discuss issues arising with self-monitoring (weight, salt and fluid). 2. Set new goals for next week. 3. Remind participants about the models who were successful in HF Self-management. 4. Share feelings related to the self-management of their disease.

In addition, the self-management booklet used in this study was designed to provide a self-management program. The concept of the booklet is based on the four primary sources of Bandura's self-efficacy model which was modified by McDowell and others (2004). Information for this booklet was gathered from several publications (Krum et al., 2006; National Heart Foundation of Australia, 2002; Juillie`re et al., 2006). The core components of the booklet involved an introduction, two real stories, HF self-management for goal setting, self-monitoring and evaluation to address the four primary sources of self-efficacy: mastery experience, social modelling, social persuasion and physical and emotional states.

For example, this booklet assisted participants to develop the skills of appraisal, goal setting and self-monitoring to determine achievement of mastery by participants. In regard to social modelling, a model of a patient who had been successful in self-management of their HF was provided through this booklet. Also, there was a page in the booklet which provided opportunity for patients to record their daily body weight and the amount of salt and fluid intake. Patients were encouraged to return this page by mail to the investigator who could then provide relevant social support, feedback and follow-up to address participants' physical and emotional states.

The booklet is eight pages in length and in order to ensure the booklet was readable, clear, and understandable for the elderly, large characters, colourful pictures and lay language were used (see Appendix E). The validation of the content of the "Self-management booklet" was derived by clinical experts in the field of cardiology which includes a cardiologist, one nursing professional, and two PhD students to strengthen the intervention, which was executed prior to the pilot study.

Theoretical Opinion of Four Primary Sources

A detailed explanation of the self-management intervention based on the self-efficacy theory four sources of information: mastery experience, social modelling, social persuasion, physical and emotional states are provided in the following section:

Mastery experience. An essential source of self-efficacy beliefs is one's interpretation of purposive performance, or mastery experience, in the past. Simply put, individuals measure the effects of their actions, and their interpretations of those effects help contribute to their efficacy beliefs (Bandura, 1986, 1997). Bandura (1982) states that interventions should build self-efficacy by involving the participants in different experiences those allow them to experience success and learn from failure. The steps of the mastery experience of the intervention included appraisal, goal setting and self-monitoring.

<u>Appraisal</u> is where the researcher helps patients to assess and become more aware of their weight, symptoms and dietary habits in relationship to their sodium and fluid intake. Simply put, individuals through assessment of themselves could become aware of their problems. The first step in problem solving is that patients become aware of their problems (Lorig & Holman, 2003), with the most common barrier to accessing self-management support resources being lack of awareness (Jerant, von Friederichs-Fitzwater, & Moore, 2005). A major goal of promoting mastery in self-appraisal is to ensure that patients are aware of the relationship between their symptoms and their sodium and fluid intake. Thus, the researcher guided patients in appraising their health-related behaviours including the monitoring of their daily body weight, salt and fluid intake.

<u>Goal setting</u> is an effective strategy to support self-management behaviours

(Bodenheimer, MacGregor, & Sharifi, 2005). It can enhance a patient's performance of behaviours. Bandura observed that people have the capability of forethought (Bandura, 1991) so they can anticipate the likely consequences of their prospective actions, set goal for themselves, and plan courses of action likely to produce desired outcomes. Accordingly, setting goals are useful strategies for improving one's behaviour and appraising progress towards meaningful change (Becker, Stuifbergen, Rogers, & Timmerman, 2000; Stuifbergen, Becker, Timmerman, & Kullberg, 2003). In addition, by taking incremental steps toward reasonable goals, the participants are able to articulate and monitor their achievement over time (Becker et al., 2000). Goal attainment needs a specific timeframe with the goal being precise and measurable. For instance, participants were encouraged to set attainable objectives such as "decreasing a cup of tea or water a day", or "decrease one kind of favourite salty food during a week" by the researcher during the home visit or phone calls. Then, the evaluation of goal attainment used colourful pictures of the five points for each behaviour outcome, with scaling as follows: +1 (slightly better outcome), +2 (much better outcome), 0 (no any change), -1 (slightly poorer outcome), and -2 (much poorer outcome) (see Appendix E, p.9) (Becker et al., 2000; Stuifbergen et al., 2003). This system made it easier to assess goal achievement. If the goals were achieved, recognition was given in the form of praise from the researcher or family. However, if the goals were not achieved, the researcher had discussion with patients to find out the reasons and to encourage them to set other more attainable objectives.

Self-monitoring has been defined as patients being able to assess and evaluate their actions, deepen their self-awareness, and obtain positive reinforcement, all of which contribute to achieving mastery (Bandura, 1986). The researcher instructed the participants how to self-monitor their key behaviours related to fluid and sodium control every day. Moreover, the researcher provided a return-prepaid page for the patient to record his/her daily body weight, salt and fluid intake. The return-prepaid pages were a good strategy for monitoring patients' behaviours that because the return-prepaid pages could activate patients' monitoring behaviours and help researcher to discuss with patients (Wakefield, Mentes, Diggelmann, & Culp, 2002). The focus in developing self-monitoring skill was placed on long term change in behaviour, for example, if failure occurred, the patient was reminded of the opportunity for a fresh start tomorrow. There were three self-monitoring behaviours in this study: fluid intake, salt restriction and body weight.

Firstly, self-monitoring of fluid intake was important for patients to remember as fluid intake for those with HF should generally be limited to 1.5 litres per day (The Task Force of the Working Group on Heart Failure of the European Society of Cardiology, 1997). For self-management of fluid intake, the researcher taught participants how to measure and record their liquid intake every day. For example, fill a pitcher with all the water the person needs in a day, with a so-called sip-and-go cup nearby. This made it easier to count how much they drank. Another way to monitor fluid intake was to provide a return-prepaid page (see Appendix E), which for the patient record his/her daily fluid intake to help them assess their daily water intake outcomes (Wakefield et al., 2002). Furthermore self-monitoring of their body weight can also provide them with information about the fluid balance in their body as weight gain often means that fluid is building up in the body with 1kg of body weight equalling 1 litre of body fluid (Heart Foundation, 2003).

Secondly, salt restriction which is needed because salt causes the body to retain fluid in patients with HF. Dietary sodium should be limited to below 2000 mg per day in order to help reduce fluid retention (Heart Foundation, 2003). Accordingly these patients should eat low salt foods, avoid processed and high salt foods and the addition of any salt during cooking or at the table. The strategies for reducing salt intake include: eating plenty of fresh fruit and vegetables; checking when shopping the food labels and choosing products low in salt (containing less than 120mg of sodium per 100grams serve); avoiding highly salted seasoning, processed foods and takeaway foods that are high in salt, and finally to use garlic, herbs and spices instead of salt (Heart Foundation, 2003). The researcher provided a high-salt diet checklist which indicated foods to be avoided: smoked foods, cured meat or fish, canned food, salty snack food (potato chips, salted nuts, popcorn, prepare condiment (salt, soy sauce…), prepackaged frozen food, and any fast food. Participants in the experimental group were requested to record whether they ate any of the high salt foods listed above. Moreover, other way to monitor salt intake was to provide a salt intake sheet (see Appendix E) to help them assess how many different kinds of salty food are in their daily food. The researcher taught patients to write down 10 kinds of favourite salty foods, and then to count how many kinds of these foods they ate every day. Finally, the salt intake sheet could help patients understood whether they needed to reduce salt intake.

Finally, in encouraging participants to weigh themselves regularly, the researcher should advise patients of the importance of using the same scales at the same time every day when weighing themselves and to record the body weight. For example, when a patient woke up in the morning the first step was to go to the toilet, then the second step was to weigh him/herself, with the same type of clothing on, and finally to write down his/her body weight in body weight log (see Appendix E).

Furthermore patients were advised that if their body weight increased by more than 1.5 kg in a 24-hour period, they needed to consult their doctor before their condition deteriorates (Stewart et al., 1999; Shah, Den, Ruggerio, Heidenreich, & Massie, 1998). Patients should be taught the warning signs of dyspnoea, oedema, abdominal bloating which are indicted their body weight increased seriously (Heart

Foundation, 2003). The Heart Foundation (2003) suggested that these behaviours need to become part of every HF patient's daily routine.

Social modelling. Two models of successful self-management of diet were provided in this study. A "Self-management booklet" was developed by the researcher to provide two models who had adopted the change to the recommended self-weighing and reduction in salty diet and fluid intake. These booklets were developed for use by the researcher during the home visit for the intervention group. The provision of a social model is useful in developing self-management as the observation of persons (models) perceived as similar to oneself, who are successful in performing a task, can influence judgments of self-efficacy and gave individual an example that it is possible to be successful (Bandura, 1992). This is particularly so when the task has previously been perceived as difficult. Thus, the researcher provided two real stories in a booklet about other HF patients of similar age and interests, who demonstrated being able to judge his or her own ability to manage their fluids and diet. The researcher discussed how the models: Grandmother A-Yun and Uncle A-Tu were successful in looking after her/himself. These model patients demonstrated the benefit of doing something that could reduce some of the problems arising with HF and also showed that these actions led to a better quality of life as occurred for Grandmother A-Yun and Uncle A-Tu. This enabled the patients in the current study to compare their own way of managing HF with the models of other similar person's successful management of HF. Also, for reminding the patients of these models during the intervention phase, the researcher telephoned each subject at 1, 3, 7, and 11 weeks during the intervention phase.

Social persuasion. The researcher provided verbal recommendations and encouragement for the patients to monitor their body weight, symptoms and dietary habits regarding sodium and fluid intake. Reminding people to continue their positive behaviour was important for older persons whose cognitive function and therefore memory may be impaired (Maughan, 2003). The reminding strategies also provided older people with social persuasion and positive reinforcement for their low salt diet and water intake behaviour. Social persuasion usually comes from supportive others, including health care professionals and family members (Williams & Bond, 2002). In addition, home visits or phone calls are other good sources of reminders (Gortner & Jenkins, 1990) and a colourful sheet for daily record is a practical method of reminding older people to drink less water (Faruque, 1998).

<u>Social support</u> can be helpful in preventing deterioration in patients' HF status. Social support is an interpersonal transaction involving emotional concern (expression of caring, encouragement), aid (service and information), and affirmation (constructive feedback, acknowledgment) (Pender, Murdaugh, & Parsons, 2002). Tillotson & Smith (1996) considered social support to be an external motivator, which influence to achieve behaviour of reinforcement. Moreover, family support predicted beliefs in treatment effectiveness, and both social support and beliefs in treatment effectiveness were associated with better dietary self-care (Skinner & Hampson, 1998). Therefore a lack of social support may lead to lower self-efficacy, which will in turn reduce the likelihood of a given behaviour. In this study, researcher and family gave verbal support via home visit and telephone following up. For example, the researcher discussed participants' problem in doing self-management behaviours which may act as a source of efficacy information relevant to the task at hand.

<u>Phone call consultations</u> were used to provide further verbal persuasion for helping patients to change their behaviour and to solve any problems related to

self-management as they arose. Phone call consultations were provided by the researcher for the participants at 1, 3, 7 and 11 weeks to provide on-going encouragement and reminders. The researcher utilised the “Telephone guide” (see Appendix G) and “Self-management program content” (see Appendix F) to follow up patients’ behaviours and give social support.

Physical and emotional states. In the feedback and follow-up sessions of the program, examples of problems or stressful situations and how to identify such problems and to cope with stressful situations were provided as outlined in the “Self-management booklet”. The examples of Grandma A-Yun and Uncle A-Tu in the booklet, provided patients with models of how self-monitoring helps them to become more aware of their behaviours and feelings and how alternative behaviours regarding their diet and fluids can lead to improved outcomes. The researcher encouraged participants to note their progress in performing self-management tasks and to discuss their records including their daily sodium, fluid and body weight during the telephone follow-up sessions. The aim of these strategies was to help patients continuing realistic behaviours including low-salt diet, fluid control and daily monitoring of body weight. Moreover, the researcher provided feedback through the phone call consultations to the patient by reviewing her/his body weight change, discussing what this change meant and assisting the patient to develop more positive attitudes toward her/his current level of ability. If the patient could not achieve her/his goal, the researcher discussed the possible reasons with participants and encouraged them to set other more attainable objectives for next week.

Activities in the Self-management Program

As mention before, the design of the intervention incorporates the four sources of information into each of the sessions. This section follow in study procedure to describe how activities in the self-management program.

Firstly, each subject from the experiment group was visited within one week after recruitment. The intervention was performed at the subjects' home. The researcher introduced the "Self-management booklet" (see Appendix E) to help patients understand the implementation of the self-management intervention. Home visits aimed to assist the patient to assess, discuss and encourage self-management of their condition. It followed the "Self-management program content" (see Appendix F). An outline of all activities is summarised in Table 4.2. The activities of home visit were provided using the following steps:

1. Introduce the schedule of self-management program.
2. Brief assessment of personal behaviours related to HF (Appraisal: mastery experience and Feedback: physical and emotional states).
3. Discuss warning signs of HF related symptoms and the effects on their life (Appraisal: mastery experience).
4. Discuss relationship between symptoms and personal behaviours related to HF (e.g. daily self-weigh, fluid and salt restriction).
5. Give patient the "Looking after yourself-- Self-management booklet".
    (a) Discuss "How successful grandmother A-Yun (for female participants)or uncle A-Tu (for male participants)was in looking after her/himself" then ask questions such as "What have you learned from grandmother A-Yun's story?" and suggest that "If grandmother A-Yun can do it, so can you (Model: social modelling)?
    (b) Persuade the patient that they have ability to engage in self-management

(Model: social modelling and Social support: social persuasion).

(c) Encourage setting of attainable objectives such as "decreasing a cup of tea or water a day", or "decrease one kind of favourite salty diet during a week" (Goal setting: mastery experience).

6. Make an action plan: (Self-monitoring: mastery experience)
   (a) Teach participants to monitor low salt diet, fluid, and weight every day.
   (b) Teach participants to record daily in the page such things as fluid and salt intake, as well as body weight and then encouraged to return this page through mail to investigator.
7. Inform the family about the benefits of self-management and their role in helping the patient in self-management activity if patients live with family (Social support: social persuasion).
8. Encourage the patient to discuss any questions or feelings with the researcher and/or family (Social support: social persuasion).

Second, during the 12-week intervention phase, except for the home visit, the researcher telephoned each subject at 1, 3, 7 and 11 weeks for counselling and support, as well as to remind patients to complete their monitoring behaviours following the "Telephone guide-intervention group" (see Appendix G-1). During the intervention phase, patients also were instructed to post a return-prepaid page fortnightly on three occasions in regard to their daily sodium, water and body weight. The content of the telephone consultations at weeks 1, 3, 7 and 11 after recruitment is provided in the following steps:

Week 1: telephone consultations

1. Ask the patients about any concerns, thoughts and/or feelings they have related to self-management of their condition (Feedback: physical and emotional states).
2. Identify if there are any problems and help patients to solve these problems

(Social support: social persuasion).

3. Discuss with the patients the successes and failures in their self-monitoring.
   (a) Provide encouragement and praise for positive behaviour changes made (Feedback: physical and emotional states).
   (b) Set new attainable goals for next week.
4. Remind patients of the models in the booklet (Model: social modelling).
5. Remind patients about using their monitoring behaviours (Self-monitoring: mastery experience).

Week 3: telephone consultations

1. Ask the patients about any concerns, thoughts and/or feelings they have related to self-management of their condition (Feedback: physical and emotional states).
2. Identify the problems and help patients' to find solutions for their problems (Social support: social persuasion).
3. Discuss with patients the extent to which their goals are to achieve success or avoid failure (Feedback: physical and emotional states).
   (a) Provide encouragement and praise for positive behaviour changes made.
   (b) Work with patients to set new attainable goals for next week when unable to attain their goals.
4. Remind patients of the models in the booklet (Model: social modelling).
5. Remind patients about using their self-monitoring behaviours (Self-monitoring: mastery experience).
6. Remind patients to mail a return-prepaid page (Feedback: physical and emotional states).

Week 7 and 11: telephone consultations

The contents of the telephone consultations at week 7 and 11 were the same as week 1 in order to continue setting goals for monitoring, maintenance, and change.

Table 4.2

Self-Management Program Activities Outline

Activities outline	Source of information	
Activities of Home visit (Within one week)		
1. Introduce the program.		
2. Brief assessment behaviours.		
3. Discuss HF related symptoms.	Appraisal:	ME
4. Discuss relationship between symptom and daily self-weigh, fluid and salt restriction behaviours.	Appraisal:	ME
5. Give patient the booklet.		
• Discuss the model such as grandmother A-Yun or uncle A-Tu	Model:	SM
• Persuade the patient about benefits of self-management.	Model:	SM
• Encourage to set attainable objectives.	Goal setting:	ME
6. Make an action plan:		
• To monitor low salt diet, fluid, and weight every day.	Self-monitoring:	ME
• To record daily in the page (fluid and salt intake, and body weight).	Self-monitoring:	ME
	Social support:	SP
7. Inform the *family about program and helping patient in self-management activity.	Social support:	SP
8. Encourage the patient to discuss with the researcher and/or family.		
Activities of Phone call (Week 1, 7 and 11)		
1. Ask the patients thoughts and feelings about self-management.	Feedback:	PE
2. Identify problems and solve these problems.	Social support:	SP
3. Discuss their self-monitoring.		
• Provide encouragement and praise for behaviour changes.	Feedback:	PE
• Set new goals for next week.		
4. Remind patients of the models in the booklet.	Model:	SM
5. Remind patients about using their monitoring behaviours.	Self-monitoring :	ME
Activities of Phone call (Week 3)		
1. Ask the patients thoughts and feelings about self-management.	Feedback:	PE
2. Identify problems and solve these problems.	Social support:	SP
3. Discuss their self-monitoring.		
• Provide encouragement and praise for behaviour changes.	Feedback:	PE
• Set new goals for next week.		
4. Remind patients of the models in the booklet.	Model:	SM
5. Remind patients about using their monitoring behaviours.	Self-monitoring:	ME
6. Remind patients to mail a return-prepaid page.	Feedback:	PE

Note. ME: Mastery experience; SM: Social modelling; SP: Social persuasion; PE: Physical and emotional states; *Family: Main caregivers who prepare diet for patient.

Usual Care

In this study, all participants who were in the intervention and control groups received the usual care, which was patient education taught patients how to deal with HF. The usual care was provided during the patient's hospital admission. The clinical nurse used "Understanding of heart failure handbook" to teach patients which focused on improving the patients' general knowledge of HF including the cause, symptoms, complications, medications, and activity and dietary recommendations for those with HF. The nurses gave suggestions to help the patient overcome any problems, such as if shortness of breath interrupts sleep, extra pillows could be used to make breathing easier. If the problems continued or more serious problems arose they were advised to see their doctor. Also, non-pharmacological management was taught regarding how to live with HF such as the types of lifestyle changes that can be beneficial and the importance of adherence to drug therapy and the possible side effects of drug therapy. However, there was no clear strategy provided in the usual care that demonstrated the performance of health-related behaviours and how to evaluate outcomes for usual care.

While the intervention group was receiving the self-management program, the control group only received phone calls at 3, 7 and 11 weeks using the "Telephone guide-control group" (see Appendix G-2). The "Telephone guide-control group" guided the researcher in greeting and listening to control group patients during the phone calls, which differed from the telephone follow-up for the intervention group. As discussed earlier the telephone contact for the control group was used to control for the effect of attention from phone calls for the intervention group that may have accounted for any differences between groups. This type of control allows for the effect of the actual self-management program to be tested. The intervention and usual care differ from each other (see table 4.3).

Table 4.3

The Differences of Self-Management Intervention and Usual Care

Model / Subject	Usual care	Self-management intervention
Content	Common health education provided in hospital about HF include: • Symptoms • Complications • Activity • Medications • Dietary suggestion	Self management knowledge and skills include: • Appraisal, • Goal setting, • Self-monitoring (e.g. weight, salt and fluid) • Social support • Feedback • Follow-up • Phone Call Counselling • Model of successful self-management
Theoretical basis	No particular theory, Patient education of heart failure	Self-efficacy theory- enhanced self-efficacy through four primary sources: • Mastery experience, • Social modelling, • Social persuasion, • Physical and emotional states.
Motivation	External motivation	Internal motivation Enhance self-efficacy, patient self-aware themselves have ability to perform health-related behaviours.
Equipment	HF information sheet	• Self-management booklet • Daily record sheet • A return-prepaid envelope • Phone Call Counselling
Procedure	Following up content of HF information sheet by health educator.	Following up content of self-management intervention: • Home visit for self-management education and training self-care skills (within one week after enrolment) • Telephone follow ups for motivational counselling (at 1, 3, 7, and 11 weeks)
Evaluation	Assessment from patients' condition.	Objective outcome: • Health service utilisation • Body weight Subjective outcome: • Self-Efficacy for salt and fluid control • HF self-management behaviour • HF Related Symptoms

Pilot Study

Following development of the intervention a pilot study was conducted to determine the applicability of the intervention procedure for Taiwanese older participants with HF. The phases of the pilot study are described below.

Intervention Procedure

The pilot study was important for the researcher to gain experience in carrying out the intervention prior to the actual investigation, to ensure that the intervention was able to be implemented, to ensure that the protocol was realistic, and,to see if any modifications were required. This pilot study was provided by the researcher and the research assistant for the two weeks period. The pilot study which was carried out to test the five steps of intervention, using a convenience sample of 10 HF older patients in northern Taiwan, was completed in October 2006 (see Figure 4.1). Moreover, the sample characteristics for the pilot study were the same as for the sample in the main study. With regards to outcome measurements, which were assessed at baseline (pre-test) before the commencement of the intervention for the experimental and control groups, and then, one round of post-test data was collected by a research assistant through telephone calls following commencement of the intervention. There were five steps in this pilot study.

Firstly, for recruitment of participants the researcher contacted older persons with HF in the cardiology clinics of the medical centres. Older persons who met the inclusion criteria were invited to participate during face-to-face interviews in the cardiology centre office. The researcher explained the purpose and procedure of the study, as well as the participants' rights, the policy regarding confidentiality, and the benefits of participating.

Next, older persons agreeing to participate in this research then signed consent forms. Baseline data were collected by interview for participants' who had consented to be in the study. Interview format was used to collect demographic data and the patients' responses to: self-efficacy for dietary control scale, HF self-management behaviour scale, HF symptom distress scale and evaluation of care received scale.

Third, according to a list of random numbers participants were randomly assigned to the self-management intervention and control groups. The researcher gave all participants the researcher's name and contact number and informed them that later they would receive a phone call to remind them about the data collection and for the intervention group to remind them about the home visit within one week.

Fourth, the researcher carried out the self-management intervention for the intervention group in their home. The length of times was same as in the main study.

Finally, once post-test data was collected by a research assistant through telephone calls within one week. The collection of baseline and one occasion of post-test data enabled the researcher to determine whether all scales in this study were easy to understand by older Taiwanese persons. Furthermore each respondent was asked to comment on the questionnaire and to identify any words or questions that were difficult to understand, as well as to estimate the amount of time needed to complete the data collection by research.

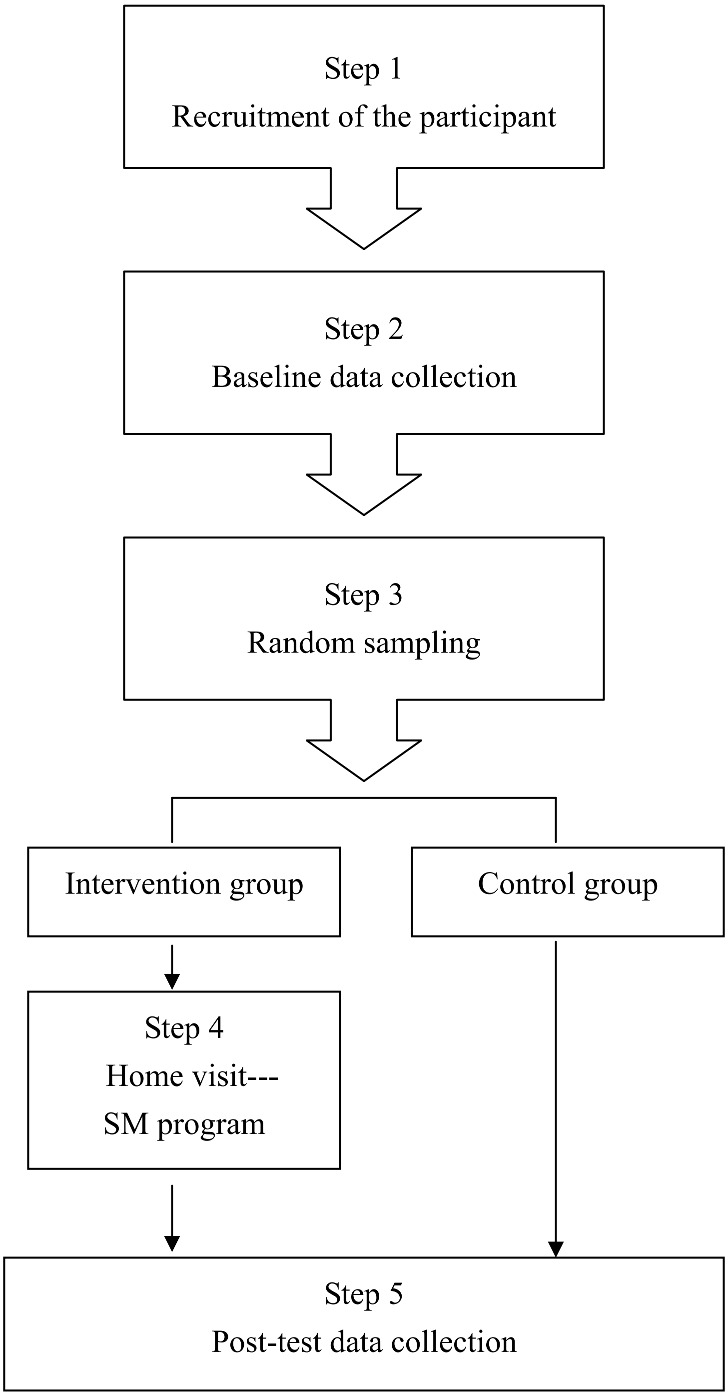


Figure 4.1. Procedure of pilot study

Pilot Sample Characteristics and Results

Baseline questionnaire data was obtained by face-to-face interview from ten elderly participants, and one round of one-week post-test data was collected by a research assistant through telephone calls. The time required for the interviews was sixty minutes. The mean age of the ten participants in this pilot study was 71.3 (*SD* = 6.29, range = 66 to 87 years) years. Most of the participants were married (80 %), and all were unemployed (100 %). Almost half of the participants were literate (60 %). A large proportion of participants had a religious faith (70 %) and lived with their families (90 %) such as spouse, daughter or son. Moreover, 7 (70 %) participants did not have any regular exercise. As for health conditions, half of the participants had been diagnosed with HF for less than one year (50 %), and two persons (20 %) reported they had HF for more than 2 years. In addition, 70 % participants took more than five medications per day and with less or equal to 40 % ejection fraction (EF) indicating unusual heart function). The majority of participants (90 %) had a New York Heart Association Functional Classifications (NYHA) of II indicating minimal symptoms and slight limitation in physical activity. There were only 20 % participants who reported maintaining a low salt diet. The participants' mean (*SD*) weight was 63.2 (± 11.89) and the mean number of comorbid chronic diagnoses for all participants was 3.7 (± 0.67). There was almost no health service utilization within the last week.

Because of the small sample size, non-parametric statistics were used. Mann-Whitney *U* test was used to examine the differences in pre-test and post-test in the self-efficacy for salt and fluid control (SeSFC), HF self-management behaviour (HFSmB), HF related symptoms (HFSD), weight and evaluation of care received (ECR). The Table 4.4 shows the means (*SDs*) of participants' five outcome variables for the two data collection episodes for the two groups.

The result of the Mann-Whitney *U* test indicated that there was no significant difference in the SeSFC, HFSmB, HFSD, weight and PHCR between the experimental and control groups in the pre-test and post-test. Moreover, there were no significant difference between the pre-test and post-test in the experimental group and control group for all of outcome variables by Wilcoxon Signed Ranks test.

Table 4.4

Comparison of the Outcome Variables according to Group at Pre-test and Post-test

Items \ Group		Experimental (n= 5)		Control (n= 5)		Mann-Whitney *U* test	
		M	*(SD)*	*M*	*(SD)*	*z*	*p*
Pre-test (Baseline)	SeSFC	39.4	(4.98)	41.6	(6.95)	-.63	.53
	HFSmB	30.6	(4.51)	28.6	(2.07)	-.94	.35
	HFSD	4.2	(3.11)	4.4	(1.52)	-.21	.83
	Weight	59.2	(13.90)	67.2	(9.20)	-1.15	.25
	PHCR	5.6	(0.55)	6.8	(1.30)	-1.53	.13
Post-test (Week1)	SeSFC	43.4	(4.56)	40.0	(6.78)	-.73	.46
	HFSmB	27.0	(2.35)	30.2	(1.64)	-1.92	.07
	HFSD	3.8	(2.95)	4.2	(1.30)	-1.19	.23
	Weight	58.8	(13.97)	67.4	(9.61)	-1.15	.25
	PHCR	15.6	(4.10)	11.0	(1.87)	-1.79	.07

Findings of Pilot Study

The findings from the pilot study indicated that following five steps of the intervention had been successfully used in the research. However, there were some unanticipated problems that needed to be addressed before commencing the main study including: recruitment of the participants and home visits.

Firstly, in regard to recruitment of the participants, the initial contact with patients was difficult in the outpatient clinics because the patients seemed to be avoiding the researcher and had no time for the researcher to discuss the research and invite them to participate in the study. The patients were more concerned about collecting their medications before going home. After discussion with the doctor, it was realized that the patient had limited time available for staying to talk with the researcher about the proposed study. Thus, a different recruitment strategy was needed. Following discussion with the doctor a new recruitment procedure was used: the doctor transferred the patient to the researcher after the patient had seen the doctor, and then, a brief explanation of the study was provided by the researcher. Then the researcher accompanied the patients when they went to get their medications which took approximately fifteen to twenty minutes. This gave the patient more time to think about any questions they may have and to receive answers from the researcher. This time helped to establish the relationship between the patients and the researcher. Subsequently, the researcher led patients who were interested in the study to an independent room to provide a detailed explanation of this study, the benefits of participating, participants' rights and the policy regarding confidentiality of information provided if they participated in the study. Another adjustment to the recruitment procedure was the use of an independent room for data collection to avoid disturbance from the clinics.

Secondly, some people requested that the home visit be in the evening.

However for two patients home visits were better during the daytime because they had more energy during the day than at night and as the majority older people went to sleep early in the evening in this study. It was also easier for the researcher to find the right address during the day time and most important for the researcher to reduce any exposure to risk associated with interviews with participants in their homes during the night time. With aged related decline in memory, one participant had forgotten when the researcher would be visiting them. Thus, the researcher needed to remind participants by telephoning them before the home visit. Finally, in the total sample ($N = 10$), there were seven participants who did not have a set of scales for weighing themselves at home. Thus, the researcher provided scales for all participants.

In addition, based on the data collection experience, the HFSmB, HFSD and PHCR scales were easily understood by the older people in this pilot study. All responded that the questions were easy to follow and that the questionnaires including the HFSmB, HFSD and SmPS scales took 15, 10, and 5 minutes, respectively. Generally, for the SeSFC scale, there was good acceptance of the questionnaires. However, items 1, 6, and 10 of the SeSFC scale needed more explaining to participants which is mentioned in more detail in the psychometric testing of the SeSFC scale section of chapter three.

The pilot study provided and opportunity for the researcher to become more familiar with the process of conducting the intervention for older patients with HF. However, there were some issue need to address including instruments, procedures for recruitment of the participant and home visits. Furthermore, this pilot study sample was not large enough, nor did it have reliable descriptive statistics about the problems uncovered, however, the pilot study did develop a method of conducting a self-management program for the older with HF in Taiwan.

Modifications for the Main Study

In order to provide a self-management program for older patients with HF in the main study, two main modifications were required as follows:

1. Procedure for recruitment of the participants: it would be through the doctor who agreed to transfer the patients to the researcher after his consultation, and then, the researcher would explain the study in an independent room after patients had obtained their medicine and pay, which give patient more time to consider participating in this study.
2. The researcher would remind participants of the pre-arranged home visit by phone before the visit to ensure they remembered that the researcher would be visiting them. Also, home visits for the main study would be conducted during the daytime.

Summary

This chapter presented a detailed explanation of how to the self-management program was developed from Bandura's self-efficacy theory (Bandura, 1986, 1997). It clearly explained the design of the intervention which incorporated the four primary sources of information into each of the sessions including appraisal, goal setting and self-monitoring (mastery experience), a real story for models of successful self-management (social modelling), social support (social persuasion), feedback and follow-up (physical and emotional states). A detailed explanation of the self-management intervention based on the four sources of information and every step of the self-management program and usual care were provided.

Finally, a pilot study with a sample of ten participants was conducted. The pilot study assisted the researcher to become more familiar with the process of conducting an intervention to older patients with HF. Also, the findings of the pilot study including recruitment of the participant and home visits issue and future adjustments for the main study were presented. Results from the main study, the effectiveness of a self-management program for HF elder patients is presented in next chapter.

CHAPTER FIVE

Results

The aim of this experimental study was to examine the effectiveness of a self-management intervention on the health-related outcomes of Taiwanese patients' with heart failure (HF). This chapter, which reports the results of the statistical analyses, is presented in four main sections. The first section reports the characteristics of the sample and comparison of these characteristics between groups. The second section describes the baseline results for the outcome variables of: self-efficacy for salt and fluid control, HF self-management behaviour, HF related symptoms, health service utilisation and body weight in older people with HF in Taiwan. Moreover, the evaluation of participant's care received is also reported. The third section reports the findings of the testing of the hypotheses and the evaluation of care received. Finally this chapter also presents participants' feedback during the home visit and telephone follow-up.

Characteristics of Sample

In this study, 108 eligible participants agreed to participate in this study and were recruited between the third week of October 2006 and the middle of January 2007, and then all participants were randomly assigned to the self-management intervention (experimental) and control groups. The intervention group received the "Self-management intervention" for 12 weeks including a home visit and four phone calls. The control group did not receive any new intervention except for three phone calls during the study procedure. All of study procedure was completed in the middle of March 2007. While initially there were 54 participants in each group at time 2, 15 participants had withdrawn-seven participants being from the intervention group and eight participants from the control group. Therefore, only 47 participants in the intervention group and 46 participants in the control group completed this study. The primary analysis was intention-to-treat which involves all patients who were randomly assigned to groups. The number and reasons for the drop-out of participants per group is presented in Figure 5.1. Overall there was a 14% withdrawal rate in this study.

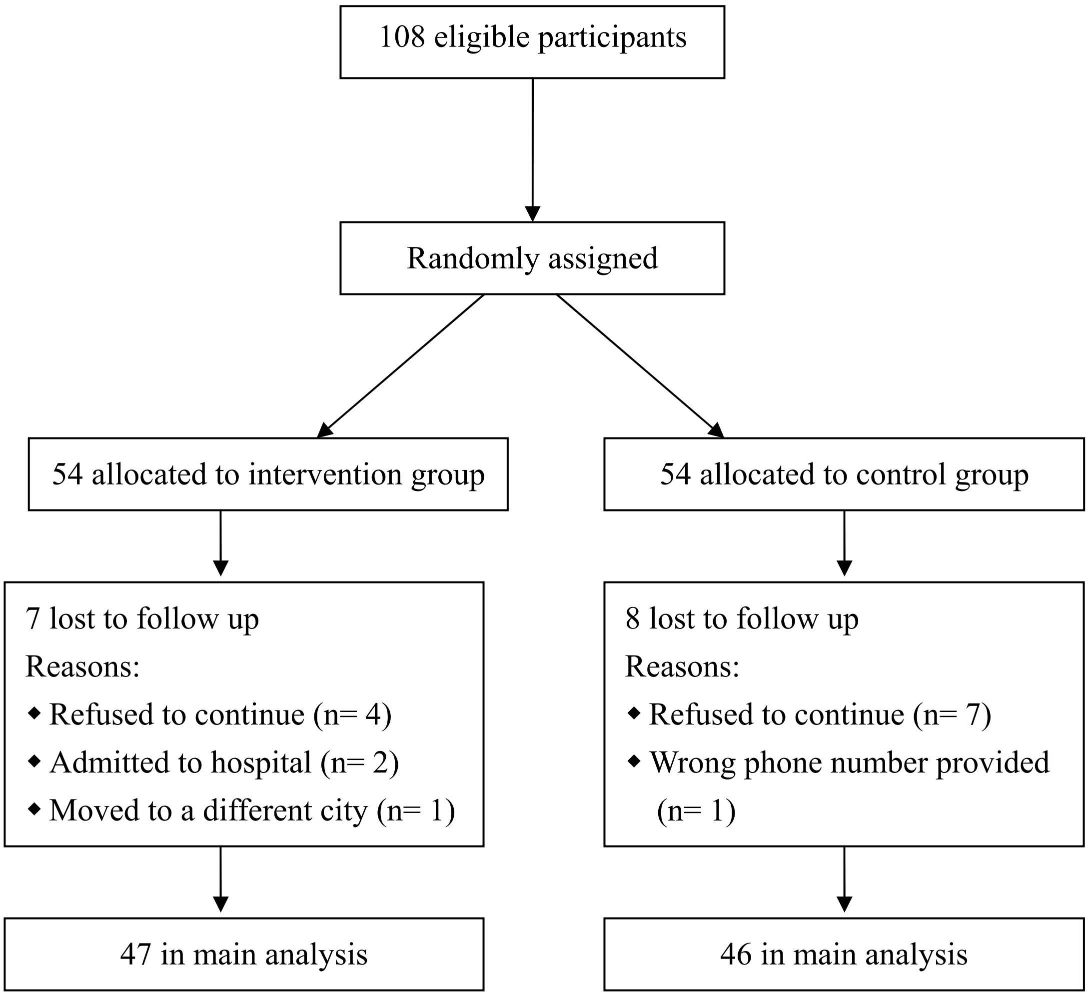


Figure 5.1. The number of patients actively followed up during the trial

Comparison of Baseline Demographic Variables between Two Hospitals

The participants for the study were recruited from 2 medical centres in northern Taiwan. Chi-square analyses and independent t-tests were conducted to compare baseline demographic variables between those recruited from hospital A and those recruited from hospital B in the study. There were no significant differences in baseline demographic variables for the participants from the two hospitals in the study (p> .05) (see Table 5. 1).

Table 5.1

Comparison of Baseline Demographic Variables between Two Hospitals

Variables	hospital A (n = 56)		hospital B (n = 52)		χ^2	p
	n	%	*n*	%		
Gender						
Male	36	64.3	37	71.2	.58	.47
Female	20	35.7	15	28.8		
Marital status						
Married	39	69.6	34	65.4	.22	.64
No married	17	30.4	18	34.6		
Education						
No schooling	25	44.6	20	38.5	.96	.80
Elementary school	16	28.6	17	32.7		
≥Junior school	15	26.8	15	28.8		
Working status						
Having job	10	17.9	8	15.4	.63	.89
Retired status	27	48.2	28	53.8		
Housewife	19	33.9	16	30.8		
Enough income						
None	37	66.1	39	75.0	1.03	.31
Yes	19	33.9	13	25.0		
Religious faith						
None	3	5.4	7	13.5	2.11	.15
Yes	53	94.6	45	86.5		
Living arrange						
With family	52	92.9	43	82.7	2.63	.11
Alone	4	7.1	9	17.3		
Exercise						
None	33	58.9	34	65.4	.48	.49
Yes	23	41.1	18	34.6		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Age	71.96	5.19	72.12	5.82	-.14	.89

In addition, Chi-square analyses and *t*-tests were conducted to compare the baseline study variables for the groups of participants recruited from hospital A and those recruited from hospital B in the study. The results showed that there was no significant difference between the participants recruited from hospital A and those recruited from hospital B in the study for medical history ($p > .05$) (Table 5. 2).

Table 5.2

Comparison of Participants' Baseline Study Variables between the Two Hospitals

Variables	hospital A (n = 56)		hospital B (n = 52)		χ^2	*p*
	n	%	*n*	%		
Duration of HF						
1-12 months	27	48.2	18	34.6	3.89	.14
1-2 years	21	37.6	19	36.5		
> 2 years	8	14.3	15	28.8		
HF medicine						
3-5 types	9	16.1	14	26.9	1.89	.17
more than 5 types	47	83.9	38	73.1		
Ejection fraction (%)						
≤20	5	8.9	5	9.6	1.08	.78
21-40	38	67.9	36	69.2		
> 40	13	23.2	11	21.2		
NYHA class						
I	4	7.1	4	7.7	3.00	.22
II	33	58.9	38	73.1		
III	19	33.9	10	19.2		
Following low salt						
None	39	69.6	36	69.2	.002	.96
Yes	17	30.4	16	30.1		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Weight (kilogram)	65.36	11.31	62.27	12.16	1.37	.17
Comorbidities	3.71	.83	3.88	.86	-1.05	.30
Health service utilisation	1.30	.63	1.35	.59	-.36	.72

Comparison of Baseline Demographic Variables between Participants who Continued and Discontinued in the Study

Chi-square analyses and independent t-tests were conducted to compare baseline demographic variables between those who had completed and those who had discontinued participation in the study. There were no significant differences in baseline demographic variables between those who had continued and those who had discontinued participation in the study ($p > .05$) (see Table 5. 3).

Table 5.3

Comparison of Baseline Demographic Variables according to those who Continued and Discontinued in the Study

Variables	Continued (n = 93)		Discontinued (n = 15)		χ^2	*p*
	n	%	*n*	%		
Gender						
Male	63	67.7	11	73.3	.19	.67
Female	30	32.3	4	26.7		
Marital status						
Married	65	69.9	8	53.3	1.62	.20
No married	28	30.1	7	46.7		
Education						
No schooling	40	43.0	5	33.3	1.23	.75
Elementary school	38	40.9	7	46.7		
≥Junior school	15	16.1	3	20.0		
Working status						
Having job	15	16.1	4	26.7	.99	.32
Retired status	78	83.9	11	73.7		
Enough income						
None	28	30.1	6	40.0	.59	.44
Yes	65	69.9	9	60.0		
Religious faith						
None	9	9.7	1	6.7	.14	.71
Yes	84	90.3	14	93.3		
Living arrange						
With family	83	89.2	12	80.0	1.04	.31
Alone	10	10.8	3	20.0		
Exercise						
None	55	59.1	12	80.0	2.39	.12
Yes	38	40.9	3	20.0		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Age	71.92	5.52	72.73	5.34	-.53	.60

In addition, Chi-square analyses and *t*-tests were conducted to compare the baseline study variables for the groups of participants who had continued and those who had discontinued participation in the study. The results showed that there was no significant difference between the participants who had continued and those who had discontinued participation in the study for medical history ($p > .05$) (Table 5. 4).

Table 5.4

Comparison of Participants' Baseline Study Variables according to those who Continued and Discontinued in the Study

Variables	Continued (n = 93)		Discontinued (n = 15)		χ^2	*p*
	n	%	*n*	%		
Duration of HF						
1-12 months	38	40.9	7	46.7	.66	.72
1-2 years	34	36.6	6	40.0		
> 2 years	21	22.6	2	13.3		
HF medicine						
3-5 types	19	20.4	4	26.7	.30	.58
more than 5 types	74	79.6	11	73.3		
Ejection fraction (%)						
<40	70	75.3	14	93.3	2.44	.12
>40	23	24.7	1	6.7		
NYHA class						
I	7	7.5	1	6.7	1.54	.46
II	63	67.7	8	53.3		
III	23	24.7	6	40.0		
Following low salt						
None	64	68.8	12	80.0	.76	.38
Yes	29	31.2	3	20.0		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Weight (kilogram)	64.01	11.63	63.00	13.04	.31	.76
Comorbidities	3.75	.79	4.07	1.10	-1.35	.18
Health service utilisation	1.36	.67	1.35	.60	.11	.92

Differences in Characteristics of Sample between Groups

Demographic data are reported in Table 5.3. Of the total sample (N = 108), the majority were males (68 %) and the mean (*SD*) age was 72.04 (± 5.48), ranging from 65 to 87 years. The majority of the sample (67.5 %) was married. The educational level was similar at 41.6 % for no schooling and at 58.3 % for up to 6 years of elementary school and more than 6 years of school. Approximately half of the participants were retired (50.9 %) and 32.4 % participants were housewives. A large proportion of participants (70 %) reported they had just enough money for their life when they described their income. Most participants had a religious faith (90.7 %) and were living with family (88 %) such as spouse, daughter or son. In addition, there were 67 (62 %) participants did not have any regular exercise.

Chi-square analysis for categorical variables and *t*-test for continuous variables indicated there was no significant difference between the intervention and control groups for: gender, marital status, education, working status, income, religious faith, living arrangements, exercise or for age ($p > .05$) (see Table 5.5).

Table 5.5

Homogeneity across Groups for Sample Characteristics

Variables	Experimental (n = 54)		Control (n = 54)		χ^2	*p*
	n	*%*	*n*	*%*		
Gender						
Male	36	66.7	37	68.5	.04	.84
Female	18	33.3	17	31.5		
Marital status						
Married	35	64.8	38	70.4	.38	.54
No married	19	35.2	16	29.6		
Education						
No schooling	23	42.6	22	40.7	.28	.95
Elementary school	23	42.6	22	40.7		
≥Junior school	8	14.8	10	18.5		
Working status						
Having job	10	18.6	8	14.8	.58	.45
Retired status	27	50.0	28	51.9		
Housewife	17	31.5	18	33.3		
Enough income						
None	15	27.8	17	31.5	.18	.67
Yes	39	72.2	37	68.5		
Religious faith						
None	6	11.1	4	7.4	.44	.51
Yes	48	88.9	50	92.6		
Living arrange						
With family	48	88.9	47	87.0	.09	.77
Alone	6	11.1	7	13.0		
Exercise						
None	33	61.1	34	63.0	.04	.84
Yes	21	38.9	20	37.0		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Age	72.20	5.66	71.87	5.34	-.32	.75

In addition, the detail of the 108 participants' medical history is also reported in Table 5.4. Among all participants, 45 (41.7 %) reported having been diagnosed to have HF within the last year; while 40 (37 %) participants had HF for 1-2 years and 23 (21.3 %) participants had HF for more than 2 years. In regards to HF medication, 85 (78.7 %) participants took more than five medications per day (i.e. diuretics, angiotensin converting enzyme (ACE) inhibitors, beta-blockers, digoxin and statins) and 23 (21.3 %) took five or less medications per day. The majority of participants (*n* = 84, 77.8 %) had a clinically significant ejection fraction (EF) (less or equal to 40 %), while 24 participants (22.2 %) had an EF of more than 40%. In addition, most of the participants (*n* = 71, 65.7 %) had a New York Heart Association Functional Classifications (NYHA) of II indicating minimal symptoms and slight limitation in physical activity and 29 participants (26.9 %) were classified as class III as they showed moderate symptoms and limitation in physical activity. Furthermore, only 32 (29.6 %) of participants maintained a low salt diet, while 76 (70.4 %) participants stated they did not eat a low salt diet. The participants' mean (*SD*) weight was 63.87 kilograms (± 11.77) and the mean number of comorbid chronic diagnoses for all participants was 3.80 (± 0.84). The mean (*SD*) level of health service utilization was 1.32 (± 0.61) within the last three months.

Homogeneity between the two study groups, which was determined using Chi-square analysis for categorical variables and *t*-test for continuous variables, indicated there was no significant difference for: duration of HF, HF medication, ejection fraction, NYHA class, adhering to low salt diet, body weight, comorbidities or health service utilization (p>.05) (see Table 5.6).

Table 5.6

Comparison of the Medical History according to Group

Variables	Experimental (n = 54)		Control (n = 54)		χ^2	*p*
	n	*%*	*n*	*%*		
Duration of HF						
1-11 months	22	40.7	23	42.6	.81	.67
1-2 years	22	40.7	18	33.3		
> 2 years	10	18.5	13	24.1		
HF medicine						
3-5 types	11	20.4	12	22.2	.06	.81
more than 5 types	43	79.6	42	77.8		
Ejection fraction (%)						
≤20	3	5.6	5	9.3	.55	.76
21-40	39	72.2	37	68.5		
> 40	12	22.2	12	22.2		
NYHA class						
I	6	11.1	2	3.7	2.88	.24
II	36	66.7	35	64.8		
III	12	22.2	17	31.5		
Adhering to low salt						
None	37	68.5	38	70.4	.04	.84
Yes	17	31.5	16	29.6		
	Mean	*(SD)*	*Mean*	*(SD)*	*t-test*	*p*
Weight (kilogram)	64.13	12.00	63.61	11.65	-.23	.82
Comorbidities	3.81	.85	3.78	.84	-.23	.82
Health service utilisation	1.31	.64	1.33	.58	.16	.88

Baseline Outcome Variables

This section reports the baseline results of participants' self-efficacy for salt and fluid control (SeSFC), heart failure (HF) self-management behaviour (HFSmB), HF related symptoms (HFSD), and body weight, health service utilisation, and evaluation of care received (ECR) scale in older people with HF in Taiwan. Moreover, intervention and control groups were compared for all outcome variables and the evaluation of care received.

Self-Efficacy for Salt and Fluid Control (SeSFC)

The mean (*SD*) total baseline level of self-efficacy in adhering to a low salt diet and fluid restriction for the 93 participants who remained in the study was 42.3 (± 9.95), with the mean ranging from 22 to 73 out of possible range of 15 to 75. The higher score reflects better self- efficacy for salt and fluid control in HF patient. Moreover, the mean (*SD*) total baseline level of SeSFC for the experimental group was 41.02 (± 9.95) and for the control group was 43.63 (± 9.86). There was no significant difference (t = 1.37, p = .17) at baseline in the self-efficacy for salt and fluid control between the intervention and control groups (see in Table 5.8).

Heart Failure Self-management Behaviour (HFSmB)

The mean (*SD*) total baseline scores for participants' HF self-management behaviour was 29.41 (± 3.43) with the mean ranging from 19 to 39 out of a possible range of 10 to 50, with lower scores reflecting greater self-care behaviours. The mean (*SD*) total baseline HFSmB for the experimental group was 29.50 (± 3.70) and for the control group was 29.31 (± 3.16). There was no significant difference (t = -.28, p = .78) at baseline in the total mean scores for HF self-management behaviour between the experimental and control groups (see in Table 5.8).

Heart Failure Symptoms Distress (HFSD)

The mean total baseline score for the HFSD scale was 5.23 (± 3.46), the mean ranging from 0 to 16 out of a possible range of 0 to 68, with higher scores indicating patients have more distress from physical symptoms. The mean (*SD*) total baseline level of HFSD for the experimental group was 5.15 (± 3.60) and for the control group was 5.31 (± 3.35). There was no significant difference (t = .25, p = .80) at baseline in the total mean score for the HF related symptoms between the experimental and control groups (see in Table 5.8).

Weight

The mean baseline weight was 63.87 kilograms (*SD* = ±11.77) ranging from 35 kg to 106 kg. There was no significant difference in the mean weight for the experimental group (64.13, *SD* = ±12.00) and for the control group (63.61, *SD* = ±11.65) (t = -.23, p = .82) (see in Table 5.8).

Health Service Utilisation

The total rate of health service utilisation for all participants includes the number of clinic visits, emergency department (ER) visits and hospitalizations during 12 weeks after commencement in this study.

As the data for this variable was not normally distributed additional analysis with Mann-Whitney *U* test was used to examine the validity of *t*-test analysis for comparing the results for the two study groups. The results from both the Mann-Whitney *U* test (Z = -.29, p = .77) and the *t*-test result (t = .16, p = .88) indicated there was no significant difference at baseline in the health service utilisation between the intervention and control groups. Thus, the *t*-test analysis result was reported for this outcome variable (see Table 5.8). Moreover, most participants reported that they had not been hospitalised and had not visited the emergency department. However, they had visited the clinic during the previous12 weeks. There were no significant differences at baseline for the mean level of frequency for hospitalizations, clinic visits, and ER visits between the intervention group and control group (see Table 5.7).

Table 5.7

Comparison of the Mean Frequency for Baseline Health Service Utilisation according to Group

Source	Experimental (n=54)		Control (n=54)		*t-test*	*p*
	Mean	*(SD)*	*Mean*	*(SD)*		
Health service utilisation	1.31	.64	1.33	.58	.16	.88
hospitalizations	0.06	.23	0.06	.23	.00	1.00
clinic visits	1.31	.54	1.31	.54	.00	1.00
ER visits	0.02	.14	0.06	.23	1.01	.31

Evaluation of Care Received (ECR)

Five items made up the ECR scale, which measured the patient's evaluation with care they had received in the preceding 12 weeks. The mean (SD) total baseline ECR score was 6.50 (± 1.46) ranging from 5 to 11 out of a possible range of 5 to 25, with higher scores indicating more positive evaluation of care received. There was no significant difference in the total mean score for evaluation of care received in the experimental (6.30, ± 1.44) and control group 6.70 (± 1.46), (t = 1.46, p = .15).

Table 5.8

Comparison on the Baseline Score of all Outcome Variables according to Group

Source	Range	Experimental (n = 54)		Control (n = 54)		*t-test*	*p*
		Mean	*(SD)*	*Mean*	*(SD)*		
SeSFC scale	15 - 75	41.02	(9.95)	43.63	(9.86)	1.37	.17
HFSmB scale	10 - 50	29.50	(3.70)	29.31	(3.16)	-.28	.78
HFSD scale	0 - 68	5.15	(3.60)	5.31	(3.35)	.25	.80
ECR scale	5 - 25	6.30	(1.44)	6.70	(1.46)	1.46	.15
Weight (kg)	35 - 106	64.13	(12.00)	63.61	(11.65)	-.23	.82
Health service utilisation	---	1.31	(0.64)	1.33	(0.58)	.16	.88

In summary, there were no significant differences in baseline outcome variables of: self-efficacy for salt and fluid control, HF self-management behaviour, HF related symptoms, health service utilisation for HF and body weight ($p>.05$). Moreover, there were no significant differences in baseline data for the evaluation of care received between two groups. The means, standard deviations and comparison for the all outcome variables for the baseline and two groups are presented in Table 5.8. The next section presents the results of the hypotheses testing.

Effectiveness of the Intervention Program

The two groups were compared to examine if there were differences for Taiwanese HF patients' health outcomes including primary outcomes (self-efficacy for salt and fluid control, HF self-management behaviour and HF related symptoms) and secondary outcomes (body weight and health service utilisation for HF) between participants who received a self-management intervention focussing on low-salt diet and fluid control and those who did not. In order to answer this research question, the research tested the following five hypotheses. Finally, the two group's evaluation of care received was evaluated.

Self-efficacy for Salt and Fluid Control

The total self-efficacy for salt and fluid control (SeSFC) score can range between 15 and 75, with higher scores reflecting greater self-efficacy in salt and fluid control. Table 5.9 shows the means (*SDs*) for participants' self-efficacy for salt and fluid control for the three time points for the two groups. The mean SeSFC score for the experimental group increased by 10.15 points from baseline to week 4 and then slightly decreased by 0.87 points at week12. However, the mean score on the SeSFC scale for the control group decreased slightly by 1.79 points from baseline to week 4, and then increased by 1.15 points at week 12. This examination of the marginal means indicated that the SeSFC scores for the experimental group increased immediately following the intervention, however, decreased slightly at the week 12 follow up. In addition, whilst the SeSFC scores for the control group decreased slightly following the intervention their scores had increased at week 12. Overall the intervention improved the SeSFC scores for the experimental group participants (Figure 5.2).

Table 5.9

SeSFC Mean Scores by Group at Three Time Points

Group / Times	Experimental (n=47)				Control (n=46)			
	M	*(SD)*	95% CIs		*M*	*(SD)*	95% CIs	
			Lower	Upper			Lower	Upper
Time1 (Baseline)	41.55	(10.15)	38.59	44.52	43.57	(10.31)	40.57	46.56
Time2 (Week 4)	51.70	(4.73)	49.66	53.75	41.78	(8.83)	39.72	43.85
Time3 (Week12)	50.83	(5.35)	48.85	52.81	42.94	(8.09)	40.93	44.94

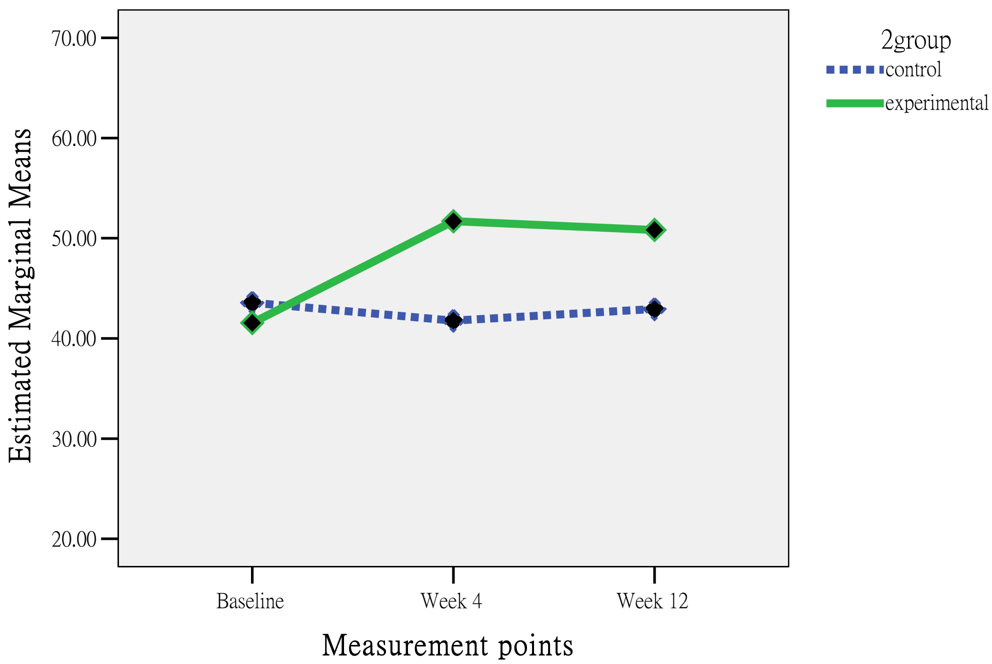


Figure 5.2. Change in mean SeSFC scores between groups at three time points

Repeated measure analysis of variance (R-ANOVA) was conducted for the dependent variable of self-efficacy in dietary control using a 2 (groups) × 3 (data collection times) factorial model (Table 5.9). The assumptions for the R-ANOVA model were examined and met. However, the Mauchly's test of Sphericity assumption was violated ($p<.05$), so that the ANOVA results were interpreted using the multivariate Wilks' lambda test, which indicates the proportion of variance unaccounted for by predictors. The multivariate tests indicated a significant group main effect, F (1, 91) = 12.69, $p<.01$, a significant time main effect, Wilks' Λ= .72, F (2, 90) = 17.84, $p<.001$, and a significant group-by-time interaction effect, Wilks' Λ= .57, F (2, 90) = 34.24, $p<.001$(Table 5.10 and Table 5.11). The associated Partial Eta squared was .432, which indicated a large effect size. There were significant effects for self-efficacy in dietary control over time and according to group.

Therefore, post-hoc tests were computed to assess on which occasions the difference was significant. The comparisons were performed by using the Bonferroni adjustment for multiple comparisons. The result of pairwise comparisons reported that there were significant differences in the means for self-efficacy for dietary control between Time 1 and Time 2 ($p<.001$), as well as between Time1 and Time3 ($p<.001$). However, there was no significant difference reported between Time2 and Time3.

Independent pairwise comparisons with Bonferroni adjustment were conducted to interpret the significance of the between subjects effects of group by time, where the p level was set at .017. These tests showed that the intervention group had significantly better self-efficacy for salt and fluid control than did the control group at Time 2 (week 4) (t = -.6.74, p = .00), and Time 3(week 12) (t = -5.56, p = .00) but not at Time 1 (baseline data) (t = .95, p = .35).

Given the significant interaction between the three time periods and the two groups (p<.001) the null hypothesis was rejected and the alternative hypothesis was supported. Thus, participants who received a self-management intervention had significantly higher scores in dietary and fluid self-efficacy than the control group who did not receive the intervention.

Table 5.10

R-ANOVA for SeSFC Scores within Subjects

Source	*Wilks' Λ*	*F*	*df*	*Error df*	*p*
Time	.72	17.84	2	90	$.000^{***}$
Group× Time	.57	34.24	2	90	$.000^{***}$

Note. $^{***}p< .001$ (2-tailed).

Table 5.11

R-ANOVA for SeSFC Scores between Subjects

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Between-Subjects					
Group	1935.10	1	1935.10	12.69	$.001^{**}$
Error (between)	13876.33	91	152.49		

Note. $^{**}p< .01$, two-tailed.

Heart Failure Self-management Behaviour

The lower HF self-management behaviour (HFSmB) scores reflect greater self-care behaviours by participants with HF. Table 5.12 presents the means (*SDs*) of participants' self-management behaviour over the three time points for the two groups. The mean HFSmB score for the experimental group decreased by 3 points from baseline to week 4 and then slightly increased by 0.94 points at week 12.

However, the mean HFSmB score for the control group increased slightly by 1.35 points from baseline to week 4, and then decreased to 0.39 points at week 12 (Figure 5.3).

Table 5.12

HFSmB Mean Scores by Group at Three Time Points

Group / Times	Experimental (n=47)				Control (n=46)			
	M	*(SD)*	95% CIs		*M*	*(SD)*	95% CIs	
			Lower	Upper			Lower	Upper
Time1 (Baseline)	29.21	(3.68)	28.20	30.22	29.17	(3.27)	28.15	30.19
Time2 (Week 4)	26.21	(1.93)	25.61	26.82	30.52	(2.25)	29.91	31.14
Time3 (Week12)	27.15	(2.50)	26.53	27.77	30.13	(1.68)	29.51	30.76

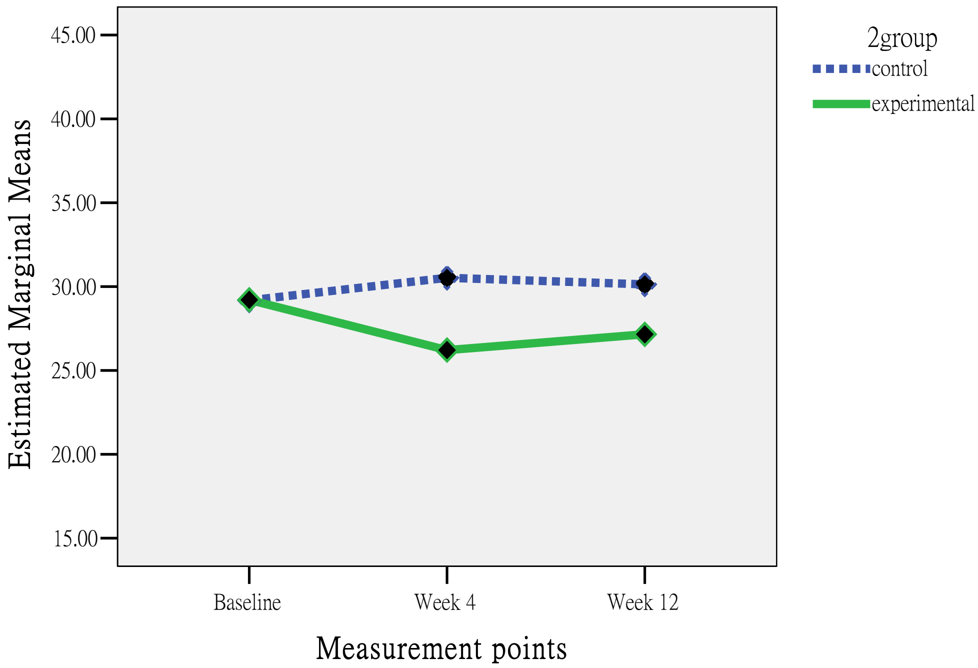


Figure 5.3. Change in mean HFSmB scores between groups at three time points

R-ANOVA model was conducted for the dependent variable of self-management behaviour using a 2 (groups) × 3 (data collection times) factorial model (Table 5.12). The assumptions for the R-ANOVA models were examined and met. Mauchly's test of Sphericity assumption was violated (p<.05), so the ANOVA results were interpreted using the multivariate tests of Wilks' lambda. The multivariate tests indicated a significant group main effect, F (1, 91) = 152.65, p<.01, a significant time main effect, Wilks' Λ= .70, F (2, 90) = 19.62, p<.001, and a significant group-by-time interaction effect, Wilks' Λ= .32, F (2, 90) = 94.44, p<.001(Table 5.13 and Table 5.14). The associated Partial Eta squared was .235, which indicated a medium to large effect size. There were significant effects for self-management behaviour over time and group.

Thus, post-hoc tests were computed to assess on which occasions the difference was significant. The comparisons were performed by using the Bonferroni adjustment for multiple comparisons. The result of pairwise comparisons reported that there were significant differences in the means for HF self-management behaviour between Time 1 and Time 2 (p<.001), as well as between Time1 and Time3 (p<.001). However, there was no significant difference found for HFSmB between Time2 and Time3.

Independent pairwise comparisons with Bonferroni adjustment were conducted to interpret the significance of between subjects' effects of group by time, where the p level was set at .017. The tests showed that the intervention group had significantly better HF self-management behaviour than the control group at Time 2 (week 4) (t = 9.92, p = .00), and Time 3(week 12) (t = 6.76, p = .00) but not at Time 1 (baseline data) (t = -.05, p = .96).

Given the significant interaction between the three time periods and the two groups (p<.001) the null hypothesis was rejected and the alternative hypothesis was supported. Thus, participants who received a self-management intervention had significantly higher levels of self-management behaviour than did the control group who did not receive the intervention.

Table 5.13

R-ANOVA for HFSmB Scores within Subjects

Source	*Wilks' Λ*	*F*	*df*	*Error df*	*p*
Time	.93	3.16	2	90	.047*
Group× Time	.68	21.67	2	90	.000***

Note. $^{*}p< .05$, $^{***}p< .001$ (2-tailed).

Table 5.14

R-ANOVA for HFSmB Scores between Subjects

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Between Subjects					
Group	407.49	1	407.49	39.12	.000***
Error (between)	948.03	91	10.42		

Note. $^{***}p< .001$ (2-tailed).

Heart Failure Symptoms Distress

Lower HF related symptoms (HFSD) scores indicate patients have less distress from the physical symptoms of HF. Table 5.15 presents the means (*SDs*) of participants' HF related symptoms for the three points and two groups. The mean HFSD score for the experimental group gradually decreased by 1.22 points from baseline to week4, and then continue to decreased 1.02 points at week12. However, the mean HFSD score for the control group increased slightly by 0.04 points from baseline to week4, and then increased slightly by 0.48 points at week12 (Figure 5.4).

Table 5.15

HFSD Mean Scores by Group at Three Time Points

Group / Times	Experimental (n=47)				Control (n=46)			
	M	*(SD)*	95% CIs		*M*	*(SD)*	95% CIs	
			Lower	Upper			Lower	Upper
Time1 (Baseline)	5.28	(3.66)	4.25	6.30	5.35	(3.39)	4.31	6.38
Time2 (Week 4)	4.06	(2.70)	3.21	4.92	5.39	(3.19)	4.53	6.26
Time3 (Week12)	3.04	(1.98)	2.26	3.83	5.87	(3.28)	5.08	6.66

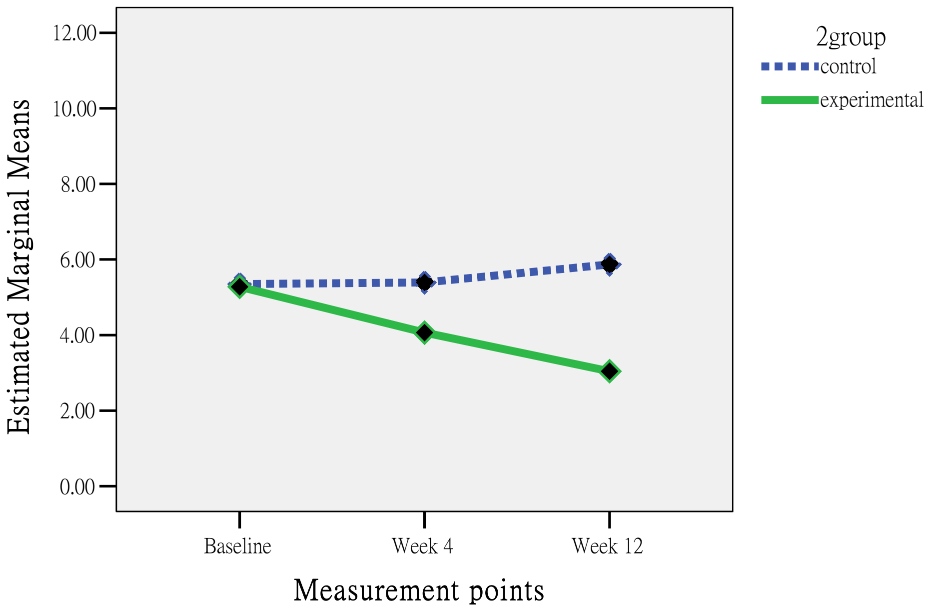


Figure 5.4. Change in mean HFSD scores between groups at three time points

R-ANOVA model was conducted for the dependent variable of in HF related symptoms using a 2 (groups) × 3 (data collection times) factorial model (Table 5.15). The assumptions for the R-ANOVA models were examined and met. There was a significant group main effect, F (1, 91) = 5.62, p<.05, a significant time main effect, F (2, 182) = 9.29, p<.001, and a significant group-by-time interaction effect, F (2, 182) = 23.10, p<.001 (Table 5.16). The associated Partial Eta squared was .213, which indicated a medium to large effect size. There were significant effects for HF related symptoms over time and according to group.

Thus, post-hoc tests were computed to assess on which occasions the difference was significant using Bonferroni adjustment for multiple comparisons. The result of pairwise comparisons indicated that there were significant differences in the means for HF related symptoms between Time 1 and Time 2 (p<.001), as well as between Time1 and Time3 (p<.001). However, no significant difference was found between Time 2 and Time 3.

Independent pairwise comparisons with Bonferroni adjustment were conducted to interpret the significance between subjects effects of group by time, with the p level was set at .017. There tests showed that the intervention group had significantly better HF related symptoms than the control group at Time 3 (week 12) (t = 5.02, p = .00) but not at Time 1 (baseline data) (t = .10, p = .92), and Time 2 (week 4) (t = 2.17, p = .03).

Accordingly the null hypothesis was rejected and the alternative hypothesis of a significant interaction between the three time periods and the two groups (p<.001) was supported. Thus, participants who received a self-management intervention had significantly lower HF related symptom scores than the control group who had not received the intervention.

Table 5.16

R-ANOVA for HFSD Scores by Between and Within Subjects

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Within Subjects					
Time	35.60	2	17.80	9.29	.000***
Group× Time	88.50	2	44.25	23.10	.000***
Error (within)	348.72	182	1.92		
Between Subjects					
Group	138.37	1	138.37	5.62	.02*
Error (between)	2242.02	91	24.64		

Note. * $p < .05$, *** $p < .001$ (2-tailed).

Weight

Table 5.17 shows the means (*SDs*) of participants' weight for the three time points and two groups. The mean rate of weight for the experimental group decreased by 0.57 kg from baseline to week 4, and dropped by 0.21 kg from week 4 to week 12. However, the mean rate of weight for the control group increased by 0.72 kg from baseline to week 4, and then decreased by 0.18 kg at week 12 (Figure 5.5).

Table 5.17

Weight Mean Scores by Group at Three Time Points

Group / Times	Experimental (n=47)				Control (n=46)			
	M	*(SD)*	95% CIs		*M*	*(SD)*	95% CIs	
			Lower	Upper			Lower	Upper
Time1 (Baseline)	63.55	(12.07)	60.17	66.94	64.48	(11.27)	61.06	67.90
Time2 (Week 4)	62.98	(11.08)	59.43	66.53	65.20	(12.70)	61.61	68.78
Time3 (Week12)	62.77	(11.72)	59.21	66.32	65.02	(12.80)	61.43	68.61

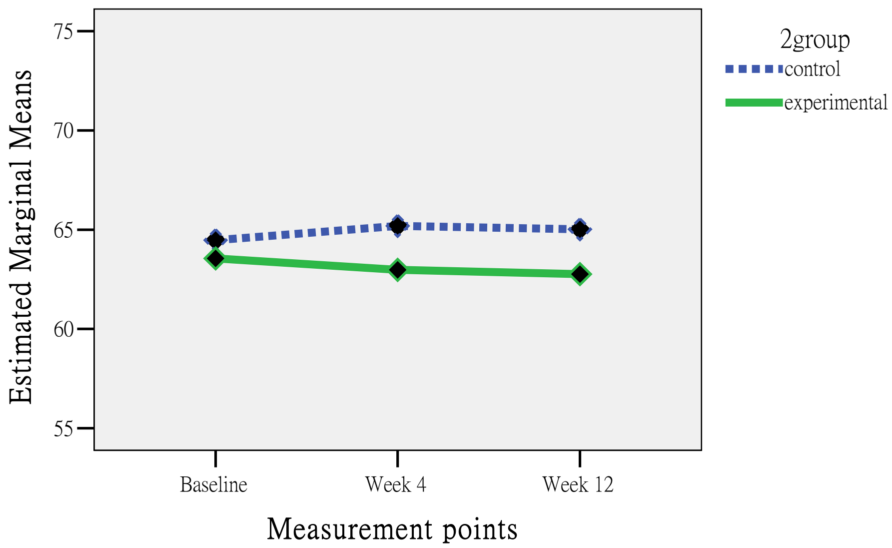


Figure 5.5. Change in mean weight rates between groups at three time points

R-ANOVA model was conducted for the dependent variable in self-management behaviour using a 2 (groups) × 3 (data collection times) factorial model (Table 5.17). The assumptions for the R-ANOVA models were examined and met. However, Mauchly's test of Sphericity assumption was violated (p<.05), so the

ANOVA results were interpreted using the multivariate tests of Wilks' lambda. The multivariate tests indicated no significant group main effect, F (1, 91) = .53, p>.05, no significant time main effect, Wilks' Λ= .97, F (2, 90) = 1.57, p>.05, and no significant group-by-time interaction effect, Wilks' Λ= .97, F (2, 90) = 1.24, p>.05 (Table 5.18 and Table 5.19). There were no significant effects for body weight over time and group. Independent pairwise comparisons with Bonferroni adjustment were conducted to interpret the significant between subjects effects of group by time where the p level was set at .017. The results of the three t tests showed there were no significant differences in body weight between the intervention and control group at each of the time points.

As a result of this analysis, there was evidence to accept the null hypothesis and conclude that there was no significant interaction between the three time periods and the two groups (p>.001). It meant that the body weight for participants who received a self-management intervention did not differ from the body weight for the control group who did not receive the intervention. Hypothesis 4 was not supported.

Table 5.18

R-ANOVA for Weight within Subjects

Source	*Wilks'* Λ	*F*	*df*	*Error df*	*p*
Time	.97	1.57	2	90	.22
Group× Time	.97	1.24	2	90	.30

Table 5.19

R-ANOVA for Weight between Subjects

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Between Subjects					
Group	225.78	1	225.78	.53	.47
Error (between)	38747.86	91	425.80		

Health Service Utilisation

The health service utilisation rates for the two points and two groups at pre-test (baseline) and post-test (week 12) are shown in Table 5.20. The mean rates in health service utilisation in the experimental group decreased slightly from 1.36 (*SD* = ± 0.67; 95 % CI. 1.16 to 1.56) at pre-test to 1.34 (*SD* = ± 0.64; 95 % CI. 1.15 to 1.53) at post-test, which was not a significant reduction according to the Wilcoxon Signed Ranks test ($Z = -.30$, $p = .76$). The mean rates in health service utilisation in the control group increased from 1.35 (*SD* = ± 0.60; 95 % CI. 1.17 to 1.53) at pre-test to 1.48 (*SD* = ± 0.78; 95 % CI. 1.25 to 1.71) at post-test, but there was no significant difference using the Wilcoxon test ($Z = -1.50$, $p = .13$).

However, the frequency data for health service utilisation was not normally distributed. Although square root transformation was used to address the potential issue of the skewness, the data set were not the normal distribution. Thus, non-parametric tests were used instead of parametric methods for this variable. The results of the Mann-Whitney *U* test used to examine the validity of the *t*-test analysis. The results of the Mann-Whitney *U* test ($Z = -.97$, $p = .33$) was same as the *t*-test result ($t = -.93$, $p = .35$) showing there was no significant difference in the health service utilisation between the experimental and control groups in the post-test. In other words, the mean post-test health service utilisation of experimental group was not significantly lower than the mean post-test health service utilisation of the control group. Furthermore, the majority participants reported that they had no hospitalisations and had not visited emergency department, although they had visited the clinic during the past 12 weeks. There were no significant differences at post-test (12 weeks) for mean of hospitalisations, clinic visits, and ER visits between the intervention group and control group (see in Table 5.21). Hypothesis 5 was not supported.

Table 5.20

Comparison of Health Service Utilisation between Group at Pre-test and Post-test

Group	Experimental (n=47)		Control (n=46)		*t-test*	*p*
	M	*(SD)*	*M*	*(SD)*		
Pre-test (Baseline data)	1.36	(0.67)	1.35	(0.60)	.11	.92
Post-test (Week12)	1.35	(0.64)	1.48	(0.78)	-.93	.35

Table 5.21

Comparison of Each Health Service Utilisation between Group at Pre-test and Post-test

Source	Experimental (n=47)		Control (n=46)		*t-test*	*p*
	Mean	*(SD)*	*Mean*	*(SD)*		
Hospitalizations	0.04	.20	0.04	.21	-.02	.98
Clinic visits	1.30	.59	1.43	.72	-1.00	.32
ER visits	0.04	.20	0.00	.00	1.43	.16

Evaluation of Care Received

Total ECR scores ranged from 5 to 25, with high scores indicating higher evaluation of care received. An independent sample *t*-test was used to compare the mean difference in baseline and Time 2 (week 12) between groups. Table 5.22 shows the means (*SDs*) of participants' care received scores for the two points and two groups. The mean evaluation of care received score for the experimental group increased by 12.55 from baseline to week 12, which was a significant increase according to the Wilcoxon Signed Ranks test (Z = -5.99, p<.001). A smaller increase in the mean evaluation of care received score for the control group, by 2.67 from baseline to week 12, was also significant difference over time using the Wilcoxon test (Z = -5.29, p<.001).

However, the ECR data were not normal distributed, it was examined by Mann-Whitney *U* test to examine the validity of the *t*-test analysis. The result of the Mann-Whitney *U* test (Z = -8.39, p<.001) was same as the *t*-test result (t = -26.53, p<.001) showing there was a significant difference in the evaluation of care received between the experimental and control groups in the post-test. In other words, the mean post-test in evaluation of care received of experimental group was a significantly higher than the mean post-test evaluation of care received in the control group who had not received the intervention.

Table 5.22

Comparison of the Evaluation of Care Received according to Group at Pre-test and Post-test

Group	Experimental (n=47)		Control (n=46)		*t-test*	*p*
	M	*(SD)*	*M*	*(SD)*		
Pre-test (Baseline data)	6.19	(1.39)	6.67	(1.55)	-1.58	.12
Post-test (Week12)	18.74	(1.74)	9.34	(1.68)	-26.53	$.000^{***}$

Note. $^{***}p< .001$ (2-tailed).

To sum up, three hypotheses were supported indicating that there was an improvement in health outcomes including self-efficacy for salt and fluid control, HF self-management behaviour and HF related symptoms between participants who received a self-management intervention focussing on low-salt diet and fluid control and those who did not. However, there were no significant differences (p>.05) in secondary outcomes (weight and health service utilisation) between the intervention and the control groups. In addition, the mean level of evaluation of care received in the experimental group had increased significantly in the post-test to a greater extent than in control group. Finally, participants who received the self-management intervention had a more positive evaluation of care received than the control group who did not receive the intervention. The next section reports the findings of the factors influencing the intervention program.

Participants' Feedback

This section reports on comments from participants and their family during the home visit and telephone follow-up calls. Thirty-two percent (n = 15) of participants and their family members in the intervention group and 13 % (n = 6) in the control group expressed their opinions to the researcher and/or RA during the home visit and telephone calls. Generally the participants' comments related to their health including the issues of faith and family, but often included additional descriptions of their feelings about the program and their relationships with their family.

In order to learn more about the factors influencing the intervention program, the notes that were taken by the researcher and RA during the home visit and/or telephone calls were translated into English. The resultant transcribed texts were read in their entirety and re-read line by line several times for the content to be reported as accurately as possible. These comments were classified into two themes including 'health and faith' and 'health and family'. Thus the themes and supporting statements made by the participants and family members are reported in this chapter and would be discussed in the next chapter.

Health and faith

Some common themes emerged from the descriptions of the participants. Firstly, 9 (10 %) participants indicated that their self-management behaviours were natural and not influenced by the participants themselves or anyone else. Those participants stated that the way they looked after themself was related to their faith, that is, dependent on God or fate and on one's desire to enjoy life. For example, one man was candid on this point, "I believe that health is dependent on yourself and fate. I think everything is set up ready when we are born. So, you don't think you want to change something." Another woman said, "Regarding health, I believe my Buddha helps me to stay healthy. It wastes time to do something yourself trying to keep healthy." Similarly, a widow remarked, "No matter how you try to do something to help me, if something is going to happen, it will happen. For example, if I am going to die, I will die. It (intervention program) is not useful for my health." Moreover, the following excerpt is an example of health related to faith, some participants expressed:

> Mostly, I feel humans are so powerless, we need to depend on God. Regarding keeping healthy, I feel health is not related to our behaviours because it is related to fate and depending on God, who to me, is Buddha. It is very powerful to my life. For example, if I feel ill, I pray and read the Buddha bible, and then I feel better, to me, nothing is more important then my God."

Health and family

Fifteen (16.1%) participants made comments about health and dietary control. They indicated that in general terms they could not choose what they ate because of family issues. For instance, a widower said, "My daughter in law prepares food for me, so, I have no choice, I just eat what she prepares for me and never complain." In another example of this issue a participant said, "Actually, I don't care about what I eat. But when my wife had diabetes and she needed to control her diet, I tried to match my diet with hers because we always eat together." Likewise, another example of health and diet control was:

> Being a mother, I always care about my children and my grandchildren. I don't care what I eat; I like cooking a lot and preparing the food that my son favours. I don't think about myself because to me family is more important

then myself.

Another participant had an interesting reason for improving the management of her disease. Her story was as follows:

> I really want to take care of my health because I live alone. My opinion is that if I have a healthy condition it will decrease the burden and stress on my children. Those actions I use to keep me healthy include eating a low salt diet and exercise regularly. So, I would like to follow what you (researcher) teach me for keeping in good health.

Finally, there were different points from other participants. For participants in the intervention program, a number of families shared their opinions to the researcher. For example, one family said, “For my mother, it is difficult to do what you said and eat healthy food because she did not follow what you said. Therefore, she just eats or does what she wants.” As this point, the member of another family stated, “My father didn’t tell the truth in answering your questions, because he feel embarrassed to tell you or the doctor what he really does. He always says one thing and does another. I don’t think he will follow up this booklet”. Another patient’s family also demonstrated this point:

> We try to control her food because my mother has heart disease. Moreover, since she gets older, I think eating low salt diet is important for her. However, she did not like to change or control her diet. This is a mission impossible to change her”

In addition, there were 8 participants who said that they are glad to receive the intervention program because their health problems did influence their life. An example of this concern from participants was:

> The only time that I will try to control my diet and achieve health behaviours

> is when I have disease. So, I did not care about healthy behaviour before when I am healthy. So, now I would like to receive this intervention program.

Moreover, upholding old customs emerged as another main idea from the narratives of the participants. Participants said that their eating habits and customs were valuable to them. Several participants' comments revealed that their eating pattern had not changed as they aged, and they preferred to eat the way their generation had eaten (*n* = 9, 9.7 %). For example, one man said, "To me, because I am old, I would like to enjoy my life to eat my favourite foods instead of suffering food deprivation." Another participant explained how they ate as they got older:

> I feel if we get old, it is important to have the appetite to eat, no matter how healthy the food is. To me, tell you the truth, it is foolish behaviour to be concerned about "dietary control" when people are in their old age. I feel I am older and not healthy anymore. I just enjoy the food that I like because the life is near the end."

Summary of the Findings

This chapter has presented the results of comparisons between the experimental and control groups for the three primary and two secondary outcomes. Additionally the additional information provided by participants has been reported. This section provides a summary of those findings. The characteristics of sample and medical history data show that the experimental and control groups were equivalent at baseline for demographic and disease characteristics as well as for baseline measures of the outcome variables and evaluation of care received. The findings for the five hypotheses indicated significant improvement in the Taiwanese HF experimental group patients' health outcomes of: dietary and fluid self-efficacy, HF self-management behaviour and HF related symptoms compared to Taiwanese HF patients in the control group. However, there were no significant differences in weight or health services utilisation between the intervention and control groups. Moreover, participants who received the self-management intervention had a higher level of evaluation of care received than did those in the control group.

The additional findings identified the effect of the health care received from the descriptions of the participants related to two themes: keeping health and faith, and health and dietary control. Regarding keeping health and faith, participants responded in this theme tended to depend on God and fate to guide them in their health. For health and dietary control, some participants placed priority on maintaining family harmony by following family eating rules and by sacrificing their own wants to meet the wants of other family members.

The next chapter will discuss these results through comparison with previous research and literature, the strengths and limitations of this study, the implications of this study for nursing practice, education, research and policy, and finally recommendations for future research will be presented.

CHAPTER SIX

Discussion and Conclusion

The purpose of this study was to examine the effectiveness of a self-management intervention in older people with heart failure (HF) in Taiwan. The results showed that subjects who received this self-management program intervention reported significantly greater improvement in the primary outcomes of self-efficacy for salt and fluid control, HF self-management behaviour, and HF related symptoms than the control group. However, there was no significant difference in the reduction of weight or health service utilisation between the two groups. This chapter discusses the study results comparing and contrasting these findings with previous research and literature concerning self-management programs for those with HF. Furthermore, factors influencing the self-management program and the methods used to conduct the study are also discussed. The strengths and limitations of the study are addressed along with strategies which could be employed in future studies to control for limitations. In the final section, the implications of this study for nursing education, practice, research, and policy are discussed finishing with recommendations for further research.

Effectiveness of the Intervention Program

Overall, the findings of this current study indicate improvement in most of the outcomes relating to the self-management intervention for a group of Taiwanese older patients with HF. The intervention was based on the four sources of information proposed by Bandura (1986, 1997) to assist people in improving self-efficacy expectations about their ability to engage in self-management. Furthermore in accord with Bandura's (1997) recommendation the interventions were specific to the area of self-management, namely HF. In Taiwan, there are few reports of studies investigating the promotion of self-management in older patients with HF. Thus, in order to understand the effectiveness of this programme, it is necessary to examine which health outcomes indicated significant changes between groups and over time due to the self-management program for Taiwanese older patients with HF.

The results of this study showed that there were significant improvements in the intervention group in the primary outcomes of self-efficacy for salt and fluid control, HF self-management behaviour, and HF related symptoms. However, no significant reduction occurred in the secondary outcome variables of body weight and health service utilisation. Thus three of the hypotheses for this study were supported. Furthermore, the intervention group showed more favourable evaluation about the care they received during the 12 week study period than the control group. The discussion of the effectiveness of the intervention program in terms of the five study hypotheses is presented as follows.

Self-efficacy for Salt and Fluid Control

The results provide support for the first hypothesis, with improvements found in the experimental group patients' self-efficacy for salt and fluid control after receiving the self-management program in this study. Overall, the mean salt and fluid control self-efficacy scores (SeSFC) for the intervention group had increased significantly through the program at weeks 4 and 12 follow-up, compared to those in the control group who received the usual care. In this study, the improved self-efficacy for salt and fluid control for the experimental group, with no such change in the control group, provides support for the effectiveness of the self-management program.

Several studies have demonstrated that self-management programs influence the enhancement of self-efficacy, a key component for patients' self-management of chronic disease (Barnason et. al., 2003; Lorig & Holman, 2000; Lorig et al., 2001b; Siu et al., 2007). Moreover, as Arnold et al. (2005) indicated, higher self-efficacy has been associated with healthier behaviors. They recommended that interventions should not only aim at improving health functioning but that it is most important to also enhance the self-efficacy of patients with HF. Thus, in the current study, where the intervention was based on the four sources of self-efficacy theory to improve ability of self-efficacy, the results were consistent with Bandura's self-efficacy theory (1986, 1991, 1997), which advocates the necessity of these sources for increasing self-efficacy as well as promoting success on a given task.

This improvement in patients' self-efficacy is similar to the findings of previous studies of self-management programs for patients with a range of chronic conditions such as diabetes, lung disease, arthritis and heart disease (DeWalt et al., 2006; Lorig et al., 2001a; Lorig et al., 2001b; Siu et al., 2007; Wright et al., 2003b). For example, DeWalt et al.'s study (2006) found that a heart failure self-management program, designed for patients with low literacy, led to greater improvement in HF self-efficacy for the intervention than for the control group. In another example, Lorig et al. (2001a,b) evaluated the outcomes of a chronic disease self-management program based on self-efficacy theory. The results of the study indicated statistically significant improvements in self-efficacy in the intervention group in comparison to the control group. Also, in recent study, Siu et al. (2007) showed that a self-management program for patients with chronic disease, based on self-efficacy theory led to significantly higher levels of self-efficacy in managing their illness, and in the use of more cognitive methods to manage pain and symptoms. All the studies listed above showed that the self-management program increased the opportunity to reinforce patients' self-confidence (DeWalt et al., 2006; Lorig et al., 2001a; Lorig et al., 2001b; Siu et al., 2007; Wright et al., 2003b).

Previous research by other investigators has demonstrated that self-management programs do not always lead to improved self-efficacy. One study by Allison and Keller (2004) that was inconsistent with our study findings, found that a self-efficacy based nursing intervention for physical activity in older adults did not show an effect on the self-efficacy for physical activity in older patients with cardiac diseases. One explanation for the difference in the findings from the current study may be the nature of the telephone follow-ups for the control group. Although the control group in the current study received three telephone follow-ups, the content differed from the telephone follow-ups used for the intervention group. In contrast, the telephone follow-up content for the control group in Allison and Keller's study (2004) was similar to the content received by their intervention group, which is likely to have influenced the results.

Another study (Ross, Moore, Earnest, Wittevrongel, & Lin, 2004) provided patients with access to their medical records and used the internet to assist patients in their self-management of HF. A significant effect on their primary outcome of self-efficacy could not be demonstrated in Ross et al's study which may have been because their intervention did not seem to address the four sources of the self-efficacy theory for helping patients improve their self-efficacy. Ross et al's (2004) intervention program just included three components (the medical record, an educational guide, and a messaging system), with no mention about a research framework in research design. While the current study demonstrated positive outcomes for the use of a theoretically based self-management program, there are few studies reporting the use of theoretically based programs in this field. It may be that intervention programs are based on theory, and that there is an absence of detail in reporting this (Shaw et al., 2007).

The findings in the current study of the effectiveness of a self-management program for older people with HF in Taiwan, demonstrates that a self-management program based on four sources of Bandura's theory was important in advancing patients' self-efficacy in HF self-management.

Heart Failure Self-management Behaviour

The improvement in self-management behaviour, which included daily weighing, low salt diet and fluid control, recognising whether symptoms had worsened, and seeking treatment, was found in the current study at the 4 and 12 weeks follow-up by participants who received the self-management intervention. This intervention was able to enhance HF patients' ability to manage their health behaviour, which is consistent with other studies based on the self-efficacy theory. Significant improvements in self-management behaviours of older people with HF have also been found in other studies using self-management programs that emphasise the four primary sources of information (Lorig et al., 2001a; Lorig et al., 2001b; Siu et al., 2007).

Siu et al., (2007) found that a self-management program, based on self-efficacy theory led to significantly higher levels of self-management behaviour for a Chinese population with chronic disease. The finding of improved self-management behaviour supported our study results, as did another study of HF patients by Wright et al. (2003b), who showed that an intervention using self-management strategies was successful in achieving improved self-management behaviour. In their study, the patients in the intervention group in comparison to the control group were significantly more likely to have an action plan, monitor their symptoms, perform daily weighing, and know to seek help if their weight increased. These self-management behaviours are similar to those in the current study which included daily weighing, recognising whether symptoms had worsened, and seeking treatment which were also more improved in the experimental group than the control group. As Hardman (2002) indicated that a successful HF self-management program requires that patients with HF need to improve their behaviours which includes following a low sodium diet, monitoring for signs of fluid retention, identifying symptoms of worsening heart failure, and taking appropriate action. While there are some similarities in the outcomes used to determine the effectiveness of different HF self-management programs, the specific self-management behaviours of exercise and cognitive symptom management in Siu et al's (2007) study differed from the outcomes used in the study by Wright et al. (2003b) and in our study.

However, the intervention program used by Elzen et al. (2007) had less success in showing improvement in the performance and maintenance of self-management behaviours. Their self-management program was also based on the self-efficacy theory (Bandura, 1997) which consisted of six weekly sessions of 2.5 hours each. There were 10-13 participants in each of the 6 training groups in the intervention group. There were two leaders who followed a detailed manual to teach participants in each training group. This education program incorporated strategies to enhance self-management behaviour including weekly action-planning and feedback, participants modeling behaviour and problem-solving for each other, interpretation of symptoms, group problem-solving and individual decision-making. However, no significant improvement in self-management behaviour of older patients was found at six weeks and six months in their study conducted in the Netherlands. Possible reasons for the absence of significant improvements in this study may be: ceiling-effect because the participants already had a high level of functioning and thus there was little room for improvement; or that their study used a general rather than a specific measure of behaviour.

The ceiling-effect may have been an issue in Elzen et al.'s (2007) study as participants already had a high baseline level of self-efficacy and health status, and knew much of the information about various aspects of self-management in the Netherlands. It because in the Netherlands, patients with chronic diseases usually do not see only a physician, but also a specialised nurse who provides them with information. This indicates why participants may already have had a high level of self-management skills, and therefore, there was little room for improvement. In contrast in our study, the participants had a low baseline level of self-management behaviour, and did not know much information about the various aspects of self-management. Therefore, there was significant room for improving patients' self-management behaviour in our study.

Secondly the current study used a disease specific scale to determine the level of self-management behaviour whereas in Elzen et al.'s (2007) study self-management behaviour was measured with a widely used general scale for this outcome. For example, Elzen et al. (2007) compared self-management behaviour with exercise, cognitive symptom-management, and communication with a physician between the groups with chronic disease. However, as mentioned before, the current study used a specific scale for HF to determine patient's level of HF related self-management behaviour. Thus, a general questionnaire might have been too broad to measure and detect the specific self-management behaviour of patients with a specific disease. Moreover, the absence of specific self-management behaviours for the different diseases of patients in Elzen et al's study differed from the specific HF behaviours used in the current study.

Our study was consistent with the findings of the studies which showed that a self-management program could improve patient's self-management behaviours. On the other hand, in Elzen et al. (2007) study showed that the outcome of behaviour no significant improvement may be affected by the ceiling-effect and the use of a general questionnaire to measure the outcome of specific behaviour. Finally, further research is needed to conclusively determine the effects of the self-management program.

Heart Failure Related Symptoms

The results of this study indicated that the intervention was successful in decreasing HF-related symptoms in the intervention group. The HF-related symptoms for the intervention group had decreased consistently over the 12 week period in contrast to the control group which showed no decrease over the 12 week period. Our results were generally consistent with those of previous studies (Lorig et al., 2001b; Lorig & Holman, 2003; O'Connell, 2004; Wright et al., 2003b). Wright et al.'s (2003b) evaluation of a self-management program for patient with HF demonstrated significantly less severe symptoms (as classified by NYHA functional class) in the intervention group. Similar results were also found in other research studies using randomised controlled trials (Benatar et al., 2003). These studies showed that self-management led to significant reduction in symptoms and improvement in HF patients' health status.

In contrast to this, Lorig et al.'s (1999) evaluation study of a self-management education intervention for persons with one or more chronic conditions found no differences in pain/physical discomfort, shortness of breath, or psychological well-being in treatment subjects, when compared with control subjects. However, the intervention was successful in increasing health producing behaviours and reducing health distress and social activity limitations. One explanation for this different result between our study and Lorig et al.'s (1999) study might be the participant characteristics. For example, the participants in our study had a specific disease of

HF. However, in Lorig et al.'s (1999) study, participants were a heterogeneous mix of participants, with a range of chronic diseases characterised by different symptoms. Because of the heterogeneity of the patients, not all had the same symptoms. Thus, these differences in symptoms may have led to an underestimation of individual improvements because the results contained data from subjects who either did not have a target symptom or who already had achieved acceptable levels on that outcome.

Some of the findings relating to symptoms, concerned those that patients need to recognise early to avert hospitalization for symptom management. First, in our study, some participants reported that they had difficulty in distinguishing between HF related symptoms and other symptoms of disease such as influenza, lung disease and heart disease. Such difficulty may delay patients seeking help when such action could avert a hospital admission (Francis, 1998; Friedman, 1997; Smith, Koehler, Moore, Blanchard, & Ellerbeck, 2005; Wright et al., 2003b). For example, in the current study, one participant said, "I got a cold recently. I was fatigued, coughed, felt weak and had shortness of breath for two weeks. Sometimes, I did not know if it was related to my heart disease or related to the influenza." As this example demonstrates and which is noted by Johansson and coworkers (2004), patients have poor ability to physically sense or recognize symptoms as HF related (Hägglund, Boman, Olofsson, & Brulin, 2007). Patients may have difficulty in distinguishing between HF related symptoms and symptoms of other chronic diseases. In our study, 68% participants did not know whether their symptoms were HF related or not, which is similar to Jurgens, Hoke, and Riegel's (2007) findings that elders may have particular difficulty in determining the meaning of these symptoms due to their non-specific nature or the presence of other comorbid diseases. This explanation may also apply to the recognition of HF related symptoms in

Taiwanese patients in the current study. It is important therefore that, teaching and analysis of different types of symptoms of chronic disease for patients are needed and further research studies are needed concerning patient's self-management of chronic disease.

In summary, this self-management program demonstrated that there was an improvement in symptom status in the experimental group during the 12 weeks of follow-up. However, there was a trend indicating participants had difficulty in distinguishing between HF related symptoms and other symptoms of other disease that may delay the patient obtaining suitable treatment for their disease. Moreover, patients may have different symptoms in different situations. Thus, clinicians need to develop reliable and sensitive self-report and observer rated specific measures to help patients to recognise symptoms early to avert hospitalization for symptom management.

Clinical Significance

Most studies rely on statistics to assess whether two groups are significantly different following intervention program. While statistical significance is an important tool for interpreting the results of the research, it does not necessarily indicate meaningful or clinically significant differences between groups or individuals (Ogles, Lunnen, & Bonesteel, 2001). Clinical significance differs from statistical significance with the former accentuating change due to a treatment or intervention that is practically meaningful for a client (Johnson, Dow, Lynch, & Hermann, 2006). Kendall (1997) emphasize that it is important that evaluations of the outcomes of psychological treatments are not only statistically significant but also need to consider the clinical significance, that is, whether the intervention is also meaningful for patients.

In the current study, the results showed statistically significant differences in the primary outcomes of self-efficacy for salt and fluid control, HF self-management behaviour, and HF related symptoms between the intervention and control groups. The self-management program based on self-theory was effective in improving patient's self-efficacy and their self-management of their disease. The effect size of the difference between the experimental and control groups was large for the levels of self-efficacy for salt and fluid control. In this study, the large effect size of 0.43 could also be seen as clinically significant with a difference of 9.3 points (out of possible range of 15 to 75) in the mean self-efficacy for salt and fluid control scores between the two groups. It clearly showed that patients made a real improvement in self-efficacy for salt and fluid control which was considered a meaningfully change. Furthermore an effect size of between medium and large, which was found in HF self-management behaviour (effect size = 0.24) and HF related symptoms (effect size = 0.21), indicated that the program was able to detect changes between groups and overtime following a HF self-management program. The clinical significance for the mean difference in HF related self-management behaviour (i.e., 2.1 points, out of possible range of 10 to 50), and HF symptoms (i.e., 2.2 points, out of possible range of 17 to 68) scores between the two groups is lower than for self-efficacy scores reported above. Clinically significant improvement from those who had intervention program in the outcomes of self-efficacy for salt and fluid control, HF related self-management behaviour, and symptoms.

It showed that the self-management program made a real different for patients. Thus, the program is worth replicating in clinical practice in Taiwan. In today's world, the choices for treatment programs are increasingly. Finally, each researcher needs to focus on what therapy will provide the most predictable treatment for the patient as well as on what therapy clients believe have the most important effects on their lives. Thus, further research addressing both statistical and clinical significance may give more understanding for the effectiveness of responses to intervention program within the intervention group.

Weight and Weight Monitoring

There was no significant effect on body weight levels after the self-management program had been provided to the experimental group across the 12 week period of the study. Only a limited number of studies had previously assessed the effect of self-management programs on the control of weight levels in older people with HF. Although recording of weight by patients has been recommended as an intervention outcome for HF patients (Albert et al., 2002; Hamner, 2005), the comparison of body weight before and after an intervention in this population has actually had little past research. Most previous studies just examined the behaviour of daily recording of body weight as an outcome variable (Albert et al., 2002; Eastwood, Travis, Morgenstern, & Donaho, 2007; Feldman, Murtaugh, Pezzin, McDonald, & Peng, 2005; Hoke, 2002; Smith et al., 2005; Wright et al., 2003b). It was therefore difficult to compare and contrast the results of the present study with those of previous studies. However, this study did provide new information for consideration of measuring body weight in future studies.

A possible explanation for the lack of any significant effects on body weight in the current study maybe the 12 week period over which the study was conducted (Keller & Hedley, 2002). This may be too short a period of time for the goal of weight change. It is possible that sustained follow-ups over a longer period of time may have demonstrated a greater difference with respect to weight. Moreover, Sethares (2003) explored the effect of a tailored nursing intervention, which included education and practice with self-care for women with HF. Her study showed that there were no significant changes in weight for the intervention group, which may be due to the fact when the progression of the disease is stable, there was seldom change in weight. Patients in the current study were enrolled in the outpatient setting while they were clinically stable thereby making it difficult to improve weight for these patients.

Another explanation for the lack of a significant improvement in weight may be that it is quite difficult to significantly decrease the weight of older patients (Chen, 1999). Moreover, the Department of Health in Taiwan (2004) in an investigation of the nutritional status, knowledge, attitude, and behaviour of 2432 older subjects found a high prevalence of obesity among older people (Hsu, 2003, Zhang et al., 2007), and that it was difficult to reduce their body weight (Chernoff, 2005). In contrast, Tsay (2003) tested the effectiveness of self-monitoring by patients with end-stage renal disease by recording their body weight and fluids. However while patients in the intervention group did have a reduction in body weight, the typical participant was younger at approximately 58 years compared to HF patients in the current study whose mean age was older at 72 years.

Although the current study of older patients with HF in Taiwan did not yield any evidence for the effectiveness of the self-management in reducing body weight, regular weighing did increase significantly in the intervention group in our study. Regular weighing may be more important than reducing body weight for the improvement of patients' condition. Friedman (1997) emphasises the importance of additional reinforcement in the regular monitoring of weight and reporting weight change by those with HF. Although 81% of participants in the intervention group did not change their weight, most participants (85 %) in the intervention group had weighed themselves everyday in the current study. These patients knew the importance of monitoring their daily weight and they changed their goal accordingly.

An example of this approach as stated by a participant is: “Weight gain is wrong for my health. I did not lose weight for long time. My weight usually is around 68 to 72 kilogram. Thus, I could set my goal such as - I weigh myself everyday or I keep my weight as usual, which was easier to attain than a decrease in weight.”

Furthermore, a statistically significant improvement in adherence to the treatment plan was found in regard to daily weighing in the intervention group compared with the control group. The self-management intervention had a positive impact on knowledge of weight monitoring in this study. For example, at 12 weeks follow-up, over 85% of patients in the intervention group indicated that they performed weight monitoring and knew what to do if they had a weight gain. This contrasted with only 10% of patients weighing themselves in the control group and that only 20% of patients in the control group were aware that they should take action if their weight increased. No patients in the control group kept a record of their daily weight or recorded their weight.

In fact, weight monitoring has become one of the standard topics for outpatient HF education (Eastwood et al., 2007). The importance of weight monitoring in HF self-management intervention was also reported in a systematic review by Jovicic, Holroyd-Leduc, and Straus (2006). Weight monitoring received particular emphasis in the present study. The advice given was individualised and reinforced for each intervention group member during one-on-one home visit and phone counselling. The aim of this counselling was to produce a weight decrease in the intervention group member’s individual weight after the self-management program was completed. Moreover, the most important outcome was expected to be that all intervention members’ efficiency of monitoring their weight change might improve and that they might take action if their weight increased or decreased by more than 1.5 kilogram in any 24-hour period. Advice given to participants was as follows:

"When your weight is up by 1.5 kg in a 24-hour period, you are retaining fluid and you need to call me or go to see your doctor."

Finally, although this study found no significant reduction in body weight in experimental group patients, most of the subjects in the experimental group had a significantly higher level of regular weighing behaviour in comparison with those in the control group. Moreover, the role of decrease in weight is still contentious in HF. Thus, it could be that weight reduction is not needed for future studies.

Health Service Utilisation

There was no statistically significant difference in health service utilisation (total of number of hospitalizations, emergency department visits, and clinic visits) between the intervention and control groups at baseline or at week 12. Although emergency department utilization was higher in the intervention than the control group, the intervention group did not differ significantly from the control group in ER visits and total health service utilisation. Similar findings were reported by Ross et al. (2004) with their intervention group having more emergency department visits than the control group. It seems implausible that provision of a self-management program would not lead to decreased health service utilisation, but the control group was similar in its' use of overall health services.

Similar findings for total health service utilisation were found in the research by Riegel, Carlson, Glaser, Romero, and Tomas (2006) who reported no significant decrease at 6 months in hospitalizations which included HF days in the hospital, the HF readmission rate, HF cost of care, all-cause HF hospitalizations and cost (Jaarsma, 1999). Moreover, another study highlighting readmission as an outcome reported no significant reduction for the experimental group (Ross et al., 2004).

In marked contrast to the findings of the Riegel et al.'s (2006) study are the results from the study by Wright et al. (2003b), which investigated the impact of multidisciplinary programs on patients with HF. The intervention group (n =100) who had lower readmission rates compared to the control group had been encouraged to attend three education sessions and to follow-up self-management strategies by assessing diary use and self-weighing behaviour for 12 months. As found in a systematic review by Jovicic et al. (2006) on randomized controlled trials of self-management interventions, patients enrolled in self-management programs targeted for patients with HF decreased overall hospital readmissions and readmissions for HF. Thus, several studies have reached the conclusion that HF patient's frequent decompensation into a chronic state resulting in recurrent hospitalizations can be avoided by the use of the intervention program (Cline et al., 1998; Harrison et al., 2002; Hudson et al., 2005; Krumholz et al., 2002; Strömberg et al., 2003).

However, these studies' findings differed from the current study. The possible explanations warrant consideration. First, with regard to the progression of the disease in the present study, health status and symptoms were more stable than in other studies and progression was well controlled for most outpatients with HF. For example, there were just 26.9% participants in the current study classified as NYHA class III compared to patients in the Strömberg et al. (2003) study whose NYHA class III had approximately 70% (Harrison et al., 2002). Furthermore, in our study, the mean number of health service utilisations was 1.31 in the intervention and 1.33 in the control group. There were low rates of health service utilisation in both groups which may be due to the fact that disease progression for all patients was more stable in this study. It was obvious that the participants already had a low rate of health service utilisation and therefore there may be no room for any improvement. Due to disease progression, in the case of HF, admission and readmission to hospital occurs when the disease is not well controlled. HF patients with an exacerbated condition where the disease is not well controlled are readmitted more often and sooner than HF patients with less well controlled disease progression (Schware & Elman, 2003). Furthermore, most participants (*n*= 63, 68 %) had had HF for more than one year and they continued with their follow-up clinic visits. The average health service utilisation was once or twice for all outpatients during the 12 week period. Thus, patients in the current study were enrolled in the outpatient setting while they were clinically stable. Improving health service utilisation for stable outpatients may be more difficult to achieve for this type of situation.

Second, another possible reason for the difference between the other studies and ours could have been the resources available. In Taiwan, public health insurance differs from Western countries (Bureau of National Health Insurance, Taiwan, 2007). Most people have public health insurance in Taiwan but the public health insurance has limitations. Patients usually go to see a doctor at a clinic or hospital only when they have a health problem, because there is no general practitioner or specialised nurse who provides them with medical information at home in Taiwan. Furthermore the cost is high for most Taiwanese when they utilise medical services. Indeed, the majority of older patients are concerned about the medication fee from the health care insurance cover. The health insurance bodies regulate the amount of prescriptions that chronic patients can obtain from a clinic at any one time, with the maximum period for which prescriptions are valid is 3 months (Bureau of National Health Insurance, Taiwan, 2007). Most patients in this study follow this rule. Thus, the patients with chronic disease regularly receive prescriptions from the doctor once every one to three months, depending on their health status (Bureau of National Health Insurance, ROC, 2007). In this study, the data clearly showed that the average health service utilisation for these outpatients was once or twice during the 12 week period. It was obvious that the policy of health system effected patients to utilise the frequency of health service. Moreover, the clinic visits might give adequate control over the disease, that is patient's disease seemed to be well controlled in the Taiwanese health system in this study.

The third reason could be the short duration of 12-week follow up assessments about health service utilisation in the current study. Intervention studies that have assessed the outcome of health service utilisation over a 6-month period did find a reduction in the rate (DeWalt et al., 2006; Eastwood et al., 2007; Hudson et al., 2005; Krumholz et al., 2002; Strömberg et al., 2003; Wright et al., 2003b). Other studies focusing on self-management training have also demonstrated a lower rate of hospitalisation in the intervention group over a 12 month period as in the study by DeWalt et al. (2006). In the future, assessment of outpatients' utilisation of health services over a longer period of 6-months may be more appropriate for determining the effectiveness of self-management interventions on decreasing hospital utilisation (Taylor et al., 2005).

However, another viewpoint is that increased health service use could be seen as a positive outcome if it helps to keep patients well. Mendoza-Sassi, Beria, and Barros (2003) propose that having a regular source of care should be encouraged, especially among underserved patients, as this can reduce the health services utilisation gap, and improve the quality of health care. Patients can then take advantage of the health service utilisation to get improve their health. If this view is accepted, a high rate of health service would not be surprising and it would possibly be seen as a positive outcome of a program.

Therefore, the three reasons for the failure to find reduction in health service utilisation in the current study are: progression of the disease, limited available resources and the short duration of follow up. On the other hand, consideration is also needed on the appropriateness of using reduction of health service utilisation as an outcome when an increase in this outcome may be more useful.

Summary

In summary, the effect of the self-management in the older Taiwanese population with HF is mainly similar to that found in studies in Western cultures. The self-management program based on self-efficacy theory was found to improve the outcomes of self-efficacy for salt and fluid control, self-management behaviour and HF related symptoms. However, body weight and health service utilisation showed no significant reduction in the experimental group in comparison to the control group. This discrepancy could be explained by the older age and shorter follow-up period in our study, which might have influenced the outcome of body weight. Moreover, some studies suggest that regular weighing may be more important than reducing body weight for the improvement of patients' condition. Thus, future researcher needs to consider whether the role of weight reduction is needed for outcome measurement. Also, the follow-up period might have caused differences to the rate of health service utilisation in the current study. Furthermore, the lack of decrease in health service utilisation may be due to the patients' disease progression and resources available. Therefore, those reasons should be addressed in further research. The results demonstrated that this self-management program could be applied effectively in a Taiwanese population with HF.

Influences on Self-management Program

This section discusses the factors influencing the self-management intervention. Some possible variables that may have contributed to the significant results in the self-management program include the use of a theory-based intervention program, the strategies used in the self-management program to promote the self-efficacy. Also other factors identified from participant's feedback and participants' evaluation of care received will be discussed. Although the evidence from this study indicated that the self-management program was beneficial for improving most of the patients' health outcomes, these variables may have also influenced the self-management program and the study outcomes and need to be noted for future studies. All of these variables are explained in the following sections.

Theory-based Intervention

Self-efficacy expectations have been found to predict a person's behaviour (Perkins & Jenkins, 1998; Schweitzer et al., 2007) where participants with high self-efficacy tend to have better self-management behaviour. The theoretical framework for the study was the efficacy expectations from the self-efficacy theory, which provided a basis for designing the program for enhancing self-efficacy which in turn would promote self-management in older outpatients with HF. The framework proposes that a self-management program was based on four sources of information relating to efficacy expectations. The current study applied these four sources of information to the self-efficacy expectations of older people with HF in regard to self-efficacy for salt and fluid control, self-management behaviour, and control of HF related symptoms. The findings were consistent with the theoretical postulates of Bandura who argued that self-efficacy is a potent cognitive factor mediating the effectiveness of any treatment aimed at helping people to change behaviour (Bandura, 1997).

The current study showed that the theoretically based self-management program did lead to significantly improved self-efficacy for salt and fluid control, HF related self-management behaviour, and HF related symptoms, for the intervention group compared to the control group. Self-efficacy has been shown to influence self-management abilities (Dishman et al., 2005; Riegel, Carlson, Glaser, 2000). As Burckhardt (2005) indicated, programs combining education strategies with the self-efficacy model that focuses on self-management are effective in changing patients' behaviour. Self-management is proposed by Jovicic et al. (2006) to be a system designed to help patients achieve their goals and return to their maximum level of self-care ability. The self-efficacy theoretical framework used in the current study underlines the importance of theory-based interventions, and their use in enhancing self-efficacy as a means of encouraging positive behavioural change (Carlson et al., 2001; Tsay, 2003). Thus, the results of this study indicated that research studies could be designed based on this theoretical framework. It is useful to use a theory-based intervention to enhance self-efficacy as a means of encouraging positive behaviour change (Borsody et al., 1999). The knowledge gained from this theory-based study could encourage future researchers to design a theory-based intervention to facilitate self-management among patients diagnosed with HF.

Furthermore, the earliest self-management studies did not mention the theoretical model underpinning the design of intervention but later programs came to be based on Bandura's self-efficacy theory: the Arthritis Self-Management Programme (ASMP) (Cohen, Sauter, DeVellis, & DeVellis, 1986; Lorig et al., 1986) and the Chronic Disease Self-Management Program (CDSMP) (Lorig et al., 2001a).

While later studies may have used theory to inform their programs, which few have explained in any detail the theoretical model underpinning the design of self-management interventions (Foster et al., 2007; Newman et al., 2004; Shaw et al., 2007). Few conceptual models exist for the self-management program of older people with HF. As in the literature reviews, there were 33 studies to investigate intervention for improving health outcomes. Intervention based on theoretical model was not mentioned in twenty-three of the included studies (Barnason et al., 2003; Benatar et al., 2003; Cline et al., 1998; Collins et al., 2004; DeWalt et al., 2006; Dunagan et al., 2005; Dykes et al., 2005; Feldman et al., 2005; Gary, 2006; Hudson et al., 2005; Jaarsma et al., 1999; Jolly et al., 2007; Kasper et al., 2002; Krumholz et al., 2002; Kutzleb & Reiner, 2006; Ledwidge et al., 2003; Rich et al., 1996; Ross et al., 2004; Shively et al., 2005; Sidorov, Shull, Girolami, & Mensch, 2003; Sisk et al., 2006; Strömberg et al., 2003; Wright et al., 2003b). Six studies were based on self-efficacy theory (Allison & Keller, 2004; Barlow, Wright, Turner, & Bancroft, 2005; Elzen et al., 2007; Lorig et al., 2001a; Lorig et al., 2001b; Siu et al., 2007). Four studies were based on a different theory (Eastwood et al., 2007; Schreurs et al., 2003; Shearer, Cisar, & Greenberg, 2007; Smith et al., 2005). Thus, there are an insufficient number of studies for determining the effectiveness of interventions based on theoretical models because investigators did not mention that. As a systematic review on the different group by Shaw et al. (2007), on the effectiveness of self-management education in improving health outcomes for adults with epilepsy, found an insufficient number of studies for determining the effectiveness of interventions based on theoretical models because investigators rarely reported them.

The Strategies Promoting Self-efficacy

Self-efficacy has been showed to be highly correlated with actual behaviour changes (Flynn et al., 2005; Schweitzer et al., 2007). As Lenz and Shortridge-Baggett (2002) indicate, patients with higher levels of self-efficacy make greater behavioral changes and are more likely to follow instructed actions. Thus, if the aims are to have greater patient self-management of HF and better outcomes, then efforts to increase patient's self-efficacy are needed (Lenz et al., 2002). An intervention can enhance the patient's confidence to modify health behaviour and facilitate patient's ability of self-management that may be due to use of effective strategies (Rucker-Whitaker et al, 2006). Therefore, this section discusses the effective strategies used in the current study and several suggestions for improving the effective strategies will also be explained in the following statements.

First, our intervention focused on several self-management skills, which were based on the four information sources of efficacy expectations to improve patient's self-efficacy, have particular relevance for patients with HF: appraisal, goal setting, self-monitoring, social modelling, social support and feedback. In the current study the provision of these kinds of skills in the delivering the self-management program to patients with HF, assisted them to more easily perform self-management behaviour. According to Lorig et al., (2003) self-management programs should be flexible and able to be tailored to the patients' circumstances to help them achieve self-management skills. Moreover, Michie, and Johnston (2004) reported the more precisely the strategies are specified, the more participants are likely to be able to carry them out. In the current study, patients in the intervention group were significantly more likely to have an action plan, goal setting, recording of their daily sodium and fluid, perform daily weighing, and monitor symptoms. Interventions using several self-management strategies enhanced the intervention to be more successfully in the outcomes. Michie and Johnston (2004) suggested that the intervention specify what, who, when, where, and how that might to assist the implementation of intervention and also help the development of effective interventions.

Second, in our study, the researcher helped patients to manage their disease through the home visit and telephone follow-up. As Jaarsma et al. (2000a) suggested HF patients need home visits and other interpersonal reinforcement to promote their confidence and self-care skills. The provision of home visits was a key component of the HF self-management program in the current study, as indicated by most patients reporting that they did not usually receive any support and follow-up after discharge from hospital. Such visits would provide benefit by facilitating them to deal with their disease at home. The uncommon occurrence of home visits was demonstrated by patients surprise at the researcher's concern about their health status and visits to each of them at home. Furthermore, the telephone follow-up provided social support and feedback that emphasised encouragement of participants to implement the program. Social support is needed when working with HF patients (Flynn, 2005). These telephone follow-up calls provided social support to the patients, which is likely to have enhanced their self-efficacy and their self-management behaviours thereby improving the HF outcomes. Increasing self-efficacy is associated with sustained positive behaviour change (Handley, 2006). Thus, the intervention combining telephone follow-ups may be useful to strengthen the behaviour change. The patients need feedback and follow-up information if they are to adhere to their new behaviours (Gortner & Jenkins, 1990; Meland, Maeland, & Laerm, 1999; Tsay, 2003). The researcher was able to assist patients in the performance of the HF self-management program through the home visits and telephone follow-ups.

Third, in this study, the booklet provided to each patient in the intervention group, provided social modelling or vicarious experience with a real story of a person/model, somewhat similar to themselves, of successful HF self-management.

Social modelling aims to provide people with the opportunity to observe others achieving success, thereby, enabling them to gain a sense of self-efficacy regarding their own ability to execute the same behaviours (Bandura, 1986). However, our study found that some participants were not interested in reading this real story. Wu's (2006) study showed that patients could be taught to modify their behaviour through the combination of a booklet with a DVD recording of the model. The video system has become the dominant vehicle for disseminating typical information and across societies which may be because television occupies a large part of people's lives. The story of the person who had successfully managed her/his HF in the current study should have used a video rather than a written booklet. Videotaped instruction proved popular and appeared to motivate patients to continue self-care (Reo & Mercer, 2004). Winfery and Weeks (1993) have also reported that people could modify their behaviour in the long-term by watching videotapes, which could be replayed to remind them to improve their behaviour change. As Weeks et al.'s (2002) study indicated that videotape modeling was more appropriate for encouraging confidence and motivation about performing the behaviours correctly than illustrations. Thus as the booklet depicting social modelling in the current study was not well received by all patients, the use of other systems, such as videos or CDs, for portraying models of desired behaviour could perhaps yield better results.

In summary, this self-management program for HF patients was effective in enhancing self-efficacy for self-management behaviours and achieving better level of health. The provision a self-management program based on self-efficacy theory in this study assisted the patients to adopt self-management behaviour. Moreover, this program provided patients with support for them to change their behaviour through the home visit and telephone follow-ups. Also, the self-management booklet enabled people to observe the behaviours of others and then manage their disease. Further research is needed to conclusively determine the effects of the self-management strategies and the methods of delivery to establish the effectiveness of the self-management program.

The next section will discuss the findings concerning participants' evaluation of care received and the feedback provided by participants on the self-management program itself.

Participants' Feedback

All of participants' feedback included the notes that were taken by the researcher during the home visit, telephone calls and data collection as well as the results from participants' evaluation of care survey will be discussed in follow section.

Discussion of participants' comments

In order to examine other factors influencing the intervention program, the following section discusses the participants' comments related to the program they received. These comments were classified into two themes including 'health and faith' and 'health and family'.

<u>Health and faith.</u> Some people indicated they found peace of mind in the belief that health is a matter of faith; that is, they believe that health is subject to the will of God or to fate. Furthermore some may look upon aging as a natural process and take the view that their role is just to enjoy life as best as they can. The two topics of health and faith were identified from statements such as 'depend on God/fate' and 'enjoying last part of life'.

First, in regard to depending on God/fate, participants in this study emphasized that they did not care about being healthy, because health was decided by God and depended on fate. Nine informants believed that everything is already determined before they were born, and only God can control their fate. For example, one man stated, “I believe that health is dependent on God and fate. I think everything is set up ready when we are born. Human beings are so powerless; therefore, my health is related to fate and depends on God, I don’t need to change anything”. Such comments indicate that some people perceive health and disease as natural processes, and they have a fatalistic perspective in their approach to life events (Chen, 2001; Lu & Chen, 2002). Furthermore they believe that illness or other mishaps are the results of bad luck (Yeo et al., 2005). Moreover, Guo and Chiou (1997) indicated that the most frequently used coping behaviours among older people are “accepting the situation as it is” and “letting things follow their natural course”. Older people do not wish to change their life anymore. When they felt poorly they adopted some strategies that involved appeals to God (Yeo et al., 2005). For example, they went to the temple to pray and worship God, and that left them feeling peaceful.

Second, whether or not older people have a disease, they may think that they have earned the “right” to indulge themselves after a lifetime of healthy eating and take the attitude that they should enjoy life while they can. A typical expression of this idea was offered by one informant: “When we get old, we don’t need to care too much about how to eat. Just enjoy the food that you like because life is short and near the end.” Moreover, several participants’ comments revealed that their eating patterns had not changed as they aged, and they preferred to eat the way their generation had eaten because the last part of life must be enjoyed. Alarmingly, these fatalistic views regarding eating patterns and faith may have adverse effects on the health behaviours of older persons. Some beliefs expressed by the current sample are especially noteworthy. For example, an older female said that even when she took care of herself, if she was going to get sick, she would get sick, especially when she got older. This means that nobody can help to prevent her from getting sick. The strategies they adopted were to achieve peace of mind rather than to stay healthy. As Lin, Chen, and Huang (1997) mentioned, elderly people in Taiwan had pessimistic attitudes regarding nutrition, and they tended to ignore what they knew about good eating behaviour. Thus, because of their comments the researcher may need to consider more intensive intervention to motivate their behaviours in future studies so that for those who are not motivated because they see the length of time they live to be dependent on luck or God and also they want to enjoy life and not to have restrictions at the end of their life.

Health and family. Family values are as strong as religious beliefs for the Taiwanese. When the participants in this study explained their health behaviour to the researcher during the interviews, they emphasized the importance of the family. Their comments related to two main topics, namely ‘following the family habit’ and ‘decreasing family burden’.

First, following the family habit relates to older people’s dependence on their families. One man, for example, said, “When we get older, we always have to depend on our families. I better get used to it, because now I am old, and I need a lot of care from my family.” This sentiment was also found in a study by Lu and Chen (2002) where a participant mentioned the need “to raise the children in order to get care from them when I get older.” For older people, the home is a place where older persons can feel safe and rely on protection (Tang, 2000). This may be why Chen (1996) suggested that older persons living with children turn out to be more dependent on children than other older people did not live with their children. Thirty-four percent of participants in the intervention group mentioned that they accepted whatever food was prepared by their families, ate and liked the foods that the families liked, and sensed that fitting in with their families was a key component of wellness. For instance, a widower said, “I am old and sick, I need to depend on my daughter-in-law to prepare food for me, so, I have no choice, I just eat what she prepares for me and never complain.”

Another aspect related to following the family habits is that it is an important way to maintain good relationships with the family. Two participants stated that nothing was more important than peaceful relationships among family members. This belief supported Veeck and Burns’s (2005) idea that the Chinese tend to identify with their families, take care of their families, and maintain good relationships with their family members. Sometimes following family eating rules had disadvantages for older people in their attempts to adopt food habits that were more appropriate for their preferences, age and health condition. They have to eat what is available to them at home, and often have to do without their favourite foods.

Moreover, because they value the rules of “keeping quiet” and “not having too many opinions when you get older,” they do not openly engage in interpersonal conflicts. Based on the Chinese philosophy, conflict should be avoided if it would disturb the harmony between the person and the environment or among persons (Chen, 2001). Hence, they may ignore the preferences and needs of their own nutrition. Likewise, Veeck and Burns (2005) revealed that the Chinese tend to “take care of” and “please” their families, and they tried to preserve the identity of their families and the relationships among their members. An example of this was, “As a mother, I always care about my children and my grandchildren. I don’t care what I eat; I would like to cook a lot and prepare the food that my son favours. I don’t think about myself because to me family is more important then myself”.

Secondly, the participants engaged in healthy behaviour to stay healthy because it would decrease family burden which is important to their family. Although the aging process has affected the health of many, twelve participants

(25.53 %) in intervention group commented that they were aware of the importance of healthy-behaviours practices in regard to the future progress of their disease progress. For six informants, one reason for achieving good health was to decrease the burden for their children. One woman shared on this point: “I really want to take care about my health because I am living alone. My opinion is that if I am healthy it will decrease my children’s burden and stress.” Another woman made the same point: “I plant vegetables and eat them; therefore, I can eat healthy food to stay healthy. For this reason, I don’t need to depend on my family.” Similarly, an elderly widow remarked, “I am directly responsible for my health. In that way, I don’t need to depend on my children, and I can reduce the burden on them.”

In short, potential influences on the outcomes of this study were a matter of religion, faith, family, and the meaning of their lives. The fundamental categories and subcategories identified in this study are evident in participant’s statements. Thus, these statements contribute to an understanding of the factors influencing the outcomes of the intervention program in the older population with HF in Taiwan. The future researcher needs to consider the intervention of the cultural appropriateness in Taiwan.

All participants also were surveyed other opinions about the receiving care during intervention program which are outlined in the next section.

Evaluation of care received

Overall, the intervention group had significantly more positive evaluation of the care they received than the control group, thereby suggesting that the self-efficacy based self management program did offer benefits. The feedback obtained from participants on their evaluation of care during the study demonstrated that all aspects of the program were well received by the intervention group. The items in this tool addressed the main areas of care and broad outcomes for patients with HF. So participants in the intervention group indicated they knew enough about the skill of self-monitoring, had enough information, were learning to live with HF, and were getting enough social support and follow-up. These participants felt that this program format and content were effective. For example, a participant stated, “It (program) let me feel I can manage my life. I did not like my health being controlled by other people. I have more confidence in myself to deal with my disease now”. Remme, et al. (2004) reported their intervention program increased the perception of disease and care in patients with HF. Thus, our study indicated that the intervention group who received the self-management program had more awareness and understanding of health care compare to the control group who did not receive the intervention.

Outcome Measurement

This section will discuss the issues arising from the outcome measurement used in the study. The instruments used in the study had acceptable validity and reliability, and the HF self-management behaviour scale, HF symptom distress scale, and the evaluation of care scale were easy to understand and respond to. However, there were some issues for outcome measurement need to discuss and suggest for future study.

Self-efficacy for salt and fluid control scale

While the Self-efficacy for Salt and Fluid Control scale (SeSFC) scale was a useful tool for measuring self-efficacy of salt and fluid control, there were difficulties in patients understanding some of the items. Both the researcher for baseline and the RA for follow-up data collection used set cues to provide more explanation of each item when patients did not understand a SeSFC item. Participants in this study often misinterpreted the meaning of self-efficacy. They had difficulty distinguishing between the different levels (1-5) of rating for something they had already done and for rating their confidence in doing something in the present. The SeSFC items required responses about current behaviour which Taylor-Davis and Smiciklas-Wright (1993) observed, may make it difficult for older patients who are more likely to base their response on past performances and old beliefs than on recent or ongoing behaviour.

Additionally, some individuals appeared to define self-efficacy differently. The meaning of self-efficacy was difficult to understand in the older population in this study. The face-to-face and telephone interviews used in the current study to collect survey data, provided the researcher and the RA with an opportunity to explain the meaning of any unclear item. For example, some participants in this study had difficulty in understanding the meaning of "with how much confidence do I have in sticking to low-salt foods when I feel depressed, bored or tense." and "with how much confidence do you follow your low salt diet when you want to eat a favourite salty food." The SeSFC scale is in need of revision to make the meaning simpler to enable reading and understanding, if it is to be administered to older people. This should be considered for future study.

Self-management behaviour change

Future studies need to consider using other validated approaches, such as behaviour observation in the measurement of behaviour change. In the current study, HF self-management behaviour was assessed by means of self-report of the data from older adults, which could be attributed to some potential bias. As Taylor-Davis and Smiciklas-Wright (1993) reported, inaccurate responses from elders are often attributable to lack of motivation to answer accurately. One bias in this study that is associated with self-report measurement is that, when subjects have been repeatedly exposed to the same measures, they may become bored and lose their motivation to answer accurately (Munro, 2005). For example, some of participants in the current study refused to answer questions by telephone collection when they became too tired. As one subject said, “It would take too long for me to answer questions. May I tell you some other day and then I’ll have more energy for talking?” Therefore, the length of the questionnaire exposure to measures and fatigue effects may have influenced their answers. The answers that were obtained from participants’ self-report may be questionable. In addition, self-reported measures may be shown to overestimate effects for important health outcomes (Deakin, McShane, Cade, & Williams, 2005). As a family stated, “My father didn’t tell the truth in your questions, because he felt embarrassed by the doctor, and then he always says one thing and does another. I don’t think he will follow up this booklet.” It showed that assessing self-reports of behaviour has limitations. This suggests that some patients did not answer honestly and may be related to a perception of the social desirability of responses. Moreover, there are no operational definitions to examine behaviour change by Bandura. In order to understand exactly the change of self-management behaviour in people, further development of reliable measures for observing behaviour change would be useful.

Evaluation of care received scale

Further development would be beneficial for the tool measuring patients’ evaluation of care received which included the intervention program and any other usual care received by either group. In this study, the evaluation of care received (ECR) scale did not only focus on the evaluation with the program but also sought to determine patients' evaluation on the different aspects of the self-management program. This focus on the self-management program meant that patients in the control group were likely to have lower ratings, as they had not received this program. Thus this scale may have been too specific for examining both intervention and control group patient's evaluation of care received. More general items asking about subjects' understanding of successfully managing HF is likely to have been more valid for both groups. These items could be based on the major principles underlying the self-management program but not so specific that to invalidate control group responses. Therefore further research is necessary on the use of a generic questionnaire to measure the broad concepts of the evaluation of care received for patients with HF.

Psychological distress as *outcome variable*

There were some psychological symptoms that were likely to be increased slightly during the early phase of the intervention program (Flynn et al., 2005). For example, one patient was candid on this point, "I tried to follow the rule, do not eat too much salt food, but which let me feel stressful and nervous." Another woman said, "I am so tired to do something for improving my health. It just wastes time." Actually, when people encounter the necessity for a behaviour change, they may face anxiety, stress, arousal, fatigue, depression, and mood states (Bandura, 1977a, 1986). Moreover, in a study designed to evaluate the relationship of self-efficacy and depression among HF patients by Tsay and Chao (2002) in Taiwan found a significant inverse relationship between perceived self-efficacy and depressive symptoms. However, when patients have low perceived self-efficacy, it might cause patient to face psychological symptoms. Many factors may influence outcomes; not only the physiological changes, but also psychological factors. Thus, patients may have psychological distress when they try to improve self-efficacy for salt and fluid control. To understand the many aspects of outcomes, researchers must delve deeper into the psychological factors and physiological changes during the intervention. Further evaluation of psychological distress as an outcome variable would be required in future studies.

Strengths and Limitations of the Study

Strengths of the Study

The strengths of this study include the use of: a theory-based intervention program, a randomised controlled design, and the design of data collection for older people. Firstly, for the sake of effective interventions, the framework of this study was based on the self-efficacy model, used to develop self-management knowledge and skills including self-management advice, appraisal, goal setting, self-monitoring (e.g. body weight, fluid and salt content diet), social support, feedback, follow-up, home visit, phone call follow-up, and model of successful self-management. The results of the current study showed that the theoretically based self-management program did lead to significantly improved outcome variables such as self-efficacy, behaviour change and symptoms. This study with a theoretically underlined intervention was effective. Moreover, this self-management intervention was described in full so that it was clear what the intervention entailed, who received and provided the intervention, when the intervention was provided, where the intervention was provided, and how the intervention was implemented. The intervention was implemented in two ways, using both home visits and telephone call follow-up.

The second strength was the use of a randomised controlled study design. This study which recruited participants by random allocation of individual study participants to the intervention and control groups reduced selection bias, and thus posed less threat to external validity (Trochim, 2001). Furthermore there were no significant differences in the demographic data between the two groups. Homogeneity of the sample was further enhanced by all patients having the same serious disease process of heart failure. Also, the baseline data of outcome measures in this study were homogeneity which mean participants the degree of baseline data are similar.

Thirdly, the collection of the survey data used face-to-face interviews which were needed for the older people in this study. Such interviews represent a more personal form of research than questionnaire surveys, because the interviewer can work directly with the participants (Trochim, 2001). Moreover, there were approximately half of the participants were no schooling (n = 45, 41.6 %), which is the reason they may not have read the questionnaire. Also, the face-to-face and telephone interviews, used in the current study to collect survey data, provided the researcher and the RA with an opportunity to explain the meaning of any unclear item. Therefore, it is a more appropriate approach for research focused on older Taiwanese people who may be no schooling, are visually impaired, or both.

Limitations of the Study

Along with the above strengths, a number of limitations of this study will also be addressed. The limitations in this study include the effectiveness of four primary sources, outcome expectancies, the Hawthorne effect, the length of follow-up, and the generalisability of study findings.

Firstly, the researcher could not conclude which aspects of the new self-management intervention were more effective. There was no way that the relative effectiveness of the Bandura's four primary sources of information (mastery experience, social modelling, social persuasion and physical and emotional states) could be determined, although the tool for measuring the evaluation of care received did address each of these four sources. Determining which of the four primary sources were more effective could help future studies to develop more effective intervention programs.

In addition, another limitation is that outcome expectancies was not used or measured in our study. Bandura (1986) indicated that the efficacy expectations predict performance much better than outcome expectations. Some research also showed that increased efficacy expectation was a better predictor of performance of behaviour than expected outcomes (Stewart et al., 1999; Williams & Bond, 2002). Moreover, Dishman et al. (2004) showed that outcome expectations were not significantly related to physical activity. There was a lack of the consistent direct effect of outcome expectancy value on physical activity. In contrast, Williams, Anderson and Winett (2005) indicated that outcome expectancy was found to be a good predictor of intention for physical activity in older people. Also, some research has shown that efficacy expectations and outcome expectancies are both valid to predict self-management behaviours in patients with chronic disease (Bandura, 1997; Curry & Cole, 2001; Wallace, Buckworth, Kirby, & Sherman, 2000). As a consequence, the role outcome expectancies play in improving behaviour performance is still controversial. However, a greater understanding of efficacy expectations and outcome expectancy might guide researchers in the development of effective self-management programs. Thus, researchers should be aware of the role of outcome expectancy in determining the effectiveness of the intervention. The self-efficacy expectations and outcome expectations might both be considered in future interventions.

Thirdly, one disadvantage of any type of study is the possibility of the

Hawthorne effect influencing the outcome (Becker, Roberts, & Voelmeck, 2003; Polit & Back, 2004). The Hawthorne effect could be a concern in this experimental study. Each participant received all of the information about this study directly from the investigator. Thus, the intervention group may have been more conscious of participation in the study, which would pay special attention to perform better outcomes, because of the better outcomes were expected by the healthcare personnel. The effects of a self-management intervention might be influenced by their awareness of their participation in the study. For example, a member of one family said, "My father didn't tell the truth in your questions, because he felt embarrassed to tell you (researcher) what he actually did, he always says one thing and does another, for example, he told you that he weighs himself everyday, but he did not do it." As a consequence, the patients in the intervention group might not really have increased adoption of the behaviours as indicated by their responses, and this might have led to an improvement in all variables as well (Becker et al., 2003). One way to overcome this effect is to employ double-blind experiments (Polit & Back, 2004), however, blinding of ratings in the study examining this intervention program is difficult to achieve, because many of these interventions would not be blinded. Thus, intervention groups might have adopted such behaviour more often, which could result in better outcomes.

A fourth limitation is the length of follow-up for measuring the study outcomes (i.e., 4 weeks and 12 weeks). Other self-management intervention studies had collected data over 6 months (DeWalt et al., 2006; Elzen et al., 2007; Shively et al., 2005; Sisk et al., 2006; Taylor et al., 2005). It is possible that the period of 12 weeks in the current study was too short for the program to demonstrate effectiveness, and to observe improvements of health service utilization and body weight in this sample of older HF patients. It might be too short a period for maintaining the desired changes over time, which is the ultimate goal of any health-related intervention. The long-term effects could not be confirmed in the current study. Therefore, longer term assessment beyond the 12 week period may be able to indicate the long-term effects of the preferred self-management intervention on the outcome variables, such as body weight and health service utilisation. Future research should take this into consideration.

Finally, the researcher also recognised the limitations associated with the generalisability of the study. The findings of this study cannot be generalised to all older Taiwanese people with HF living in community dwellings. The sample of the study was randomly selected from 2 out of 9 medical centres in northern Taiwan. Thus, the participants may have had behavioural patterns that were different from those of other groups of older people with HF. It is not surprising that the older people living in northern Taiwan had more urbanised-oriented lifestyles. Certainly, these constraints limit the generalisability of the findings beyond this study. Any generalisation of the results from this study, therefore, should be limited to older persons living in the urban areas of Taiwan.

Implications

The findings of this study have several implications for practice, education, research, and policy. The implications for future research are given in the later section.

Implications for Practice

The findings in this study indicate that the self-management program for older people with HF in Taiwan was effective in improving three health-related outcomes. Although many new medications have been developed to treat HF, nursing interventions such as self-management programs also improve outcomes by improving patients' confidence and ability to self-manage their disease. This study showed that self-management attainment led to positive outcomes, and providing patients with such programs may lead to a decrease in serious complications. This approach of intervention program could be implemented within normal practice.

In designing the contents of the self-management program, nurses need to highlight an understanding of information for patients in particular areas. For example, all participants reported that they had received information about HF care. Alarmingly, only 13% of the participants knew that they needed to adopt certain behaviours in order to manage their disease. Nurses should address this problem when they develop intervention programs for this population. Therefore, making sure that the patients have a real understanding of HF is a first step in promoting the health of the older population in Taiwan. In fact, nurses play an essential role in assisting patients with HF to increase their understanding of the diagnosis, and to practice early recognition and management of this diagnosis. Nurses need to devote more time and attention to helping the patients adopt interventions to improve their understanding of HF and, therefore, self-management of this chronic disease.

Moreover, according to Chen (2007), older populations in Taiwan have the lowest confidence in their ability to sustain healthy eating habits, including knowledge about how to eat, how to cook, how to select and purchase healthy foods, and how to control and maintain their body weight. Therefore, intervention programs should include ways to strengthen the self-efficacy of elderly people, and thus improve their ability to acquire healthy-eating behaviours. Self-management might be viewed as an effective solution for HF management in Taiwan. The self-management intervention originated from transforming the self-efficacy theory into actual clinical health plans, demonstrating how it is possible to carry out and apply the self-efficacy enhancing program in individual cases with HF, and to strengthen confidence in self-care abilities and change health behaviours.

Besides the intervention programs described above, other issues need to be addressed. The family plays an import role in older people's food intake in our study. The responses of some participants indicated that daughters-in-law are the family members most frequently involved in diet preparation. Intervention programs should include the key family members, such as daughters-in-law, who are in a position to assist in promoting healthy outcomes.

Finally, the study provided the techniques of goal-setting and making plans that were easily applicable in their daily care by individual patients. In addition, this study involved the recruitment of study subjects in clinics, in communities in the Taipei region. Replication of this study would also be beneficial for various settings or other populations. It was possible to fit this programme into the routine of various hospital departments. The applicability of the overall design of the intervention program may be modified and extended with appropriate content to other chronic diseases; for example, hypertension or lung disease. Also, as self-management interventions in this study encouraged beneficial health practices, these interventions may have had the auxiliary effect of reducing symptoms of diseases other than HF.

A growing body of evidence indicated that using self-management would help people to become aware of the effects of the self-management program on healthy outcomes (Cline et al., 1998; DeWalt et al., 2006; Siu et al., 2007; Taylor et al., 2005). However, some research using different strategies of the self-management program did not have improvements in the health outcome, such as health status and quality of life (Barlow et al., 2005; Dunagan et al., 2005; Elzen et al., 2007; Jovicic et at., 2006). Thus, future research is still needed to assess whether improvements in different outcomes variables can be achieved with self-management and to determine what components of self-management are necessary to improve clinical outcomes. The dissemination of self-management information specific to the patients with chronic disease should be an important function of gerontology nursing in the future.

Implications for Education

Nursing education should consider the addition of self-management to the curriculum in order to offer another approach for students to improve patient outcomes. Because of the increasing number of older Taiwanese with HF, such education is needed to provide more effective care and especially education for patient to deal with their disease. Nurses have responsibility for providing effective care to improve patients' health; therefore, education is needed to ensure competence for nurses (Strömberg, 2002). However, in Taiwan, there are short university courses in advanced HF care for nurses, but no higher degree or continuing education programs in advanced nursing practice in HF or cardiology. Strömberg (2002) indicated that there it is also necessary to continue providing training and education for the HF nurse. Thus, it is important for nursing faculties and students to gain new information in self-management, and to be sensitive to the behavioural influence of faith and family, as well as the special needs of older people. Nursing educators are challenged to teach students to be sensitive to older patient's needs in managing their disease. In this study, the outcomes provide new information for nursing faculties to use in guiding students or clinical nurses who have an interest in improving health outcomes through self-management programs based on the self-efficacy theory. Thus, nursing faculty members can provide this new information in nursing curricula and continuing education programs, so that students can become more practiced in the development of the self-management programs.

In addition, nurses may not be properly educated in HF self-management principles and must be provided with the appropriate information so they can improve the right information they offer to HF patients (Albert et al., 2002). This study has shown the concept of the self-management program, and indicated how the approach of such a program could be used in clinics. Although two results (weight and health service utilisation) did not support the hypotheses, older outpatients with HF who followed a self-management program did improve their self-efficacy for salt and fluid control, and carry out self-management behaviour. Therefore, the concept of self-management could be worthy of integrating into nursing education. In fact, the concept of a self-management curriculum in Taiwan is limited. Most education programs teach the treatment of disease in a general way by addressing, for example, how to nurse HF patients. Nursing faculties need to recognise that self-management has become a common term in the field of research, and it is apparent that self-management leads to improved compliance and the acceptance of healthier behaviours in HF patients.

Furthermore, the concepts of Bandura's self-efficacy theory provide the groundwork for this study in that nurses may be more willing to provide education if they have mastery of the information. Nursing faculties need to better understand that the change in an individual's self-efficacy affects the individual's performance (Bandura, 1986). Self-efficacy could bridge the gap between knowledge and action; therefore, nursing faculties should explore all of those concepts with students. Before developing interventions that improve personal mastery in HF patient education, the nurse must understand the HF education principles. It is difficult to promote behaviour if those concepts are not understood; for that reason, making self-management curriculum available to students is essential to the improvement of health-related outcomes in older people with HF in Taiwan.

Implications for Research

Further research on promoting self-management by elders with HF in Taiwan should be encouraged. A review of published articles in the National Central Library in Taiwan showed that fewer than 290 articles focused on self-efficacy, and, up to November 9, 2007, only five were clinical research articles related to self-management. There has been no research on the effectiveness of self-management program in older people with HF in Taiwan.

While a systematic review found that self-management programs may improve health outcomes for adults with chronic disease, the reviewers were unable to determine the effects of using self-management programs based on different theoretical models (Shaw et al., 2007). There was minimal mention of the theory underpinning interventions in the studies used in the systematic review (Shaw et al., 2007). Thus, information derived from this study should assist in preparing nurses for advanced knowledge, and should influence the research agenda for the HF self-management program which framework was modified from Bandura's self-efficacy model.

The current study identified at least five promising areas for research including research design, the sampling of representative populations, psychometric testing of the tool, long-term following up, and avoiding the Hawthorne effect on the self-management program needs of the elderly in Taiwan.

In regard to research design, as there had been only a limited number of studies that assessed the effect of a self-management program in Taiwan, further study using experimental research designs are needed. In addition, further research is necessary to gain a deeper understanding of the attitudes of elderly towards self-management practices. Thus, both quantitative and qualitative approaches are recommended for future study. Both numerical data and contextual data would further the understanding of the self-management behaviour in Taiwanese elders.

Future research would need to focus on other more representative populations when recruiting the sample. The inclusion of older HF patients from rural areas in Taiwan with an agricultural lifestyle would enable comparison of outcomes with findings from city populations in Taiwan. In our study, most participants lived in northern Taiwan and had more urbanised lifestyles. According to the literature review, older people living in rural areas had more chronic diseases, had less healthy lifestyles, and had less social and family support (Leung, Hsu, Chen, & Chen, 2002) in comparison with elders living in urban areas. Researchers might argue that both areas may have different levels of self-efficacy for self-management behaviour and it would be interesting to compare both the rural and urban population in effect of self-management in future studies.

Establishment of the psychometric properties of a tool for measuring self-efficacy for low salt and fluid control for HF patients in the current study provided a valuable reliability and validity to the methods for determining the effectiveness of self-management programs for older patients with HF. This tool may also be able to be used in the clinical setting. However, some items presented in the SeSFC scale were difficult for the older people in Taiwan to understand. Therefore, revisions to the SeSFC scale are required if it is to be administered to the Taiwanese elderly population. Moreover, both the Chinese versions of the HFSmB and HFSD scales are relatively short and easily administered, and provide a measure of HF related behaviour and symptoms in a Taiwanese elderly population with HF. Finally, the evidence of reliability and validity in the current study would strengthen confidence in using the SeSFC, HFSmB and HFSD scales in further HF research undertaken in Taiwan.

Additionally, the finding of ineffective of health service utilisation through self-management was different from other studies (DeWalt et al, 2006; Lorig et al., 2001b; Sisk et al., 2006; Taylor et al., 2005). Surprisingly, better self-care was unrelated to lower health service utilisation in the current study. One possible explanation is the short follow up assessments for determining health service utilisation; hence, measurement of the long-term effects of chronic disease is needed in further research.

Lastly, research is also needed for considering ways to reduce bias from the Hawthorne effect. Although the researcher did not tell participants which group they were in, participants are likely to have realised they had been allocated to the experimental group. Thus, inevitably, the participants may have paid greater attention to their care in this context and have performed better outcomes, because they had become more aware of self-management because of the questionnaires measuring the study outcomes. Also, as previously mentioned, there were three phone calls for the control group in order to control for the effect of attention within the new intervention for experimental group in the current study. However, when an intervention program is designed, future researchers need to consider the bias from Hawthorne effect.

In summary, there is room for research to improve self-management programs in the domain of chronic disease; and further research is recommended to develop and test similar theoretically based self-management programs in clinics. Moreover, when future researcher want to implement a self-management, they need to consider these issues including the area of the sampling of representative populations, psychometric testing of the tool, long-term following up, and avoiding Hawthorne effect that may help health professionals develop more effective self-management program.

Implications for Policy

HF in the past two decades has become an increasingly important public health problem around the world. In Taiwan, HF is a leading cause of morbidity in this society and causes a large economic burden. Therefore, effective care for older patients with HF is needed. The majority of HF care is done at home by the patient and family or caregiver, and if these individuals do not know how to live with HF, they will not participate effectively in care. There is good evidence that a self-management program led to statistically significant improvements in a variety of health outcomes compared with routine care for people with HF (Gary, 2006; Sisk et al., 2006; Siu et al., 2007; Wright et al., 2003b). However, in Taiwan, there are currently no recommendations made by the government health agencies about using non-pharmacological interventions such as self-management for patients with HF. Moreover, there is little previous research on non-pharmacological interventions such as self-management in older people with HF in Taiwan.

Our study provides an effective intervention for those populations with HF. However, it is too soon to determine whether our study has been successful in creating a sustainable care of HF self-management. Therefore, firstly, we recommend the government give research support to generate and evaluate innovative programs which would help patients live with their disease. Greater support and resources from the government which would encourage researchers to conduct more effective self-management program for patients. The administrators need to support the use of HF self-management programs for patients, knowing that it is an investment in health care which may represent benefits over time. It is necessary for government and policymakers at the Central and Provincial levels to assist developing and implement a clear policy for self-management programs, especially to promote the health status of older people living in Taiwan.

Secondly, government and policymakers need to be encouraged to support such self-management programs for older patients with HF. The care delivered only in a hospital or clinic is unlikely to be sufficient, and some kind of regular monitoring, either at home or remotely, is required. The current study demonstrated the self-management program as practical: therefore, a self-management program should be suggested in professional and government policy statements, as a part of the standard care in the clinical practice setting.

Finally, government can facilitate the incorporation of self-management programs into hospital and clinics policies. For example, self management programs could be incorporated as a major part of discharge planning. The reasons for this suggestion are that 77 % of regional and teaching hospitals already employ discharge planning in Taiwan (Department of Health, 2002). Discharge planning has been established for ten years by the Provincial Government of Taiwan and the Department of Health, the lead organisation for all policies relating to medical and healthcare practice (Department of Health, 2002). In addition, discharge planners have already worked in the community. Thus, if discharge planning could incorporate the concept of self-management, it would facilitate patients in Taiwan to execute a self-management program more easily in clinics and at home. Self-management programs are extended to all areas such as outpatient care and home health services, and nurses could help increase patients' awareness to manage their disease and prevention of HF symptoms, and the early detection of health problems through a self-management program. There are a wide variety of steps patients can take to delay or prevent many of the complications of HF which are the leading causes of death and disability. In addition, discharge planners are available seven days a week, including evenings, to answer questions about any self-management issue, and to consult with patients, to offer counselling, and to provide for the safe self-management of patient's disease at home. Self-management can motivate patients to adhere to the treatment plan and to participate effectively in self-management.

In sum, the self-management program is worth developing for patient care. Thus, we expect these efforts to generate the self-management program with clear results. This could motivate government sand policymakers to take steps to make policies for patients with HF. Thus, researchers could get more resources from governments to develop effective intervention programs. Also, governments and policymakers need to pay more attention to facilitate the self-management program so that it can become public policy and clinics such as self- management programs could be incorporated as a major part of discharge planning. Thereby these policies will bring an important, sustainable intervention program to the community for older patients with HF in Taiwan.

Recommendations

The findings in this study support the use of self-management in clinical practice and encourage further study on patients' self-management knowledge and skills. However, the current research had a number of limitations, and thus, several recommendations are proposed for future as follows:

1. The theory-based self-management program had a positive impact on the improvement of self-efficacy for diet and fluid control, HF related self-management behaviours, and symptoms. However, no previous research has been conducted on such an intervention program for older people with HF in Taiwan. Patients with HF and their family members or caregivers need to receive education and counselling that emphasises self-management of their disease. Teaching is insufficient without skill building and specification of critical target

behaviours, such as self-monitoring skills. Nurses need to provide appropriate skills in their interventions. Therefore, it is recommended that this self-management program based on self-efficacy theory is deserving of replication for future study in different populations and settings.

2. The "Self-management booklet" in the current study was instrumental in helping patients see connections between knowledge and action, which provide social modelling and self-monitoring skills for body weight, low-salt diet and fluid intake, and worsening symptoms. It is worthy of use in clinical practice. However, it is unclear whether more representative models of desired behaviour for older people executing the same behaviours need to be communicated using other systems, such as videos or CDs, for patients to observe others achieving success, thereby, enabling them to more clearly see and then model others' behaviours.
3. The self-management program is recommended as part of discharge planning to improve the management and transition of patients with HF between the health care setting and the community. Higher risk patients with more advanced HF may need to be followed permanently, and it is recommended that during the care process patients are asked to follow about activity of self-management such as follow a low sodium diet, and routinely monitor weight and early signs of worsening HF (e.g. fluid retention, shortness of breath and fatigue).
4. Future work is needed to investigate methods of maintaining behaviour changes that were implemented in the self-management study. Accordingly, there are some recommendations for future research to implement the self-management program:
   (1) As Ramsey (1996) indicated, behavioural problems are better suited to observational than self-report research, especially when people cannot

adequately and accurately describe their own behaviours. Observational methods may, therefore, be more able to capture behaviours and events in depth, and provide a variety of information. In order to understand exactly the change of self-management behaviour in older people, further development of reliable and sensitive observer-related specific measures for behavioural change would be useful in the future.

(2) Although the self-management program had a positive impact on some health related outcomes, the effect of the program on the body weight and health service utilisation did not see significant improvement. This could be explained by several factors such as too little time for follow-up, and patients' disease progression and the resources available. Therefore, the recommendation for these considerations was that sustained follow-up over a longer period, and an expanding area (eg. the urban and rural areas of Taiwan) and criteria for sample selection (eg. including inpatients and documented NYHA functional class I to XI). These new types of information would help the study to be generalised to include all older Taiwanese people with HF living in community dwellings. Thus, new studies may demonstrate a greater difference with respect to outcomes.

(3) Patients should be offered a variety of options for adopting social modelling to assist them in living with HF, according to their individual preferences such as videotape, one-on-one discussion, reading materials, telephone calls, mailed information, and visits. Further study utilising different strategies might perhaps yield better results.

(4) As previously mentioned, older people often misinterpret the meaning of self-efficacy. In this study, face-to-face and telephone interviews were used to collect survey data, therefore, the researcher had a chance to set cues,

which were used to provide more explanation of the item when patients did not understand the item of the SeSFC scale. Thus, the recommendations for this consideration were set cues for collecting data or refine this application scale.

(5) Caring for a family member with HF can affect the well-being of those responsible for care, which may have consequences for the HF patient's health. Further studies are needed to clarify these issues and to examine the role of informal caregivers in the management of HF in the community.

(6) When people encounter the necessity for a behaviour change, they may face anxiety, stress, arousal, fatigue, depression, and mood states. Thus, further explorations into the affective states of older people with HF may yield meaningful results.

5. Government and policymakers need to develop and implement a clear policy for self-management programs, especially to promote the health status of older people living in Taiwan. The services need to not only focus on diseases, but also promote the health status and well-being of older people with chronic disease in the community.

Finally, it is necessary to determine whether a more effective intervention to further improve self-efficacy could mediate improvements in patient outcomes. Therefore, further study to explore the concept of self-management in Taiwanese culture as well as to replicate this study in other settings in Taiwan is needed.

Conclusion

The purpose of this experimental study was to develop, implement and examine the effectiveness of a self-management intervention in older people with HF in Taiwan. In accord with the literature review, this self-management program was based on the Bandura's self-efficacy theory, which enhances patients' self-efficacy through four primary sources of information: mastery experience, social modelling, social persuasion and physical and emotional states. Most researchers found that self-management programs tend to be effective in improving patients' self-efficacy and behaviour, but a few authors argue that the intervention program has no significant impact on health status of older individuals.

The results of this study indicated that with the self-management intervention members experienced improved self-efficacy, behaviour change, and reduced HF related symptoms. Thus, this research provides evidence supporting that the self-management program positively influenced self-efficacy expectations in the HF population by creating a supportive environment to perform physical activities (mastery experience), assisting with encouragement and support (social persuasion), providing a booklet guidance and sharing how others perform through real story (social modelling), and providing a realistic assessment of patient's abilities (physical and emotional states). By enhancing self-efficacy, the researcher can increase self-management behaviour in this population, leading to decreased symptoms. On the other hand, there was no significant improvements occurred in the outcome variables of body weight and health service utilisation in this current study. The differences of those results among this population may be related to multiple factors. For example, a following- up period and health status might effect on weight and health service utilisation outcomes. Overall, however, further study is needed to determine whether a more targeted intervention to further improve self-efficacy could mediate improvements in patient outcomes. Although several limitations were found, the knowledge gained from this study provides a beginning understanding of the effect of self-efficacy theory underpinning the intervention which enhances patients' self-efficacy to facilitate self-management of HF among outpatients diagnosed in Taiwan.

Our study has contributed to the literature by examining and determining whether the tailored self-management program which could enhance patients' self-efficacy and change in behaviour, in addition to measures of their level of confidence in implementing self-management behaviour. This study is the first to examine the impact of a self-management program in older patients with HF in Taiwan. The evidence from this study can prove future study to overcome the gap between theory and practice, and supports the view that self-management is important to older patients with HF in Taiwan.

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Appendix A

Ethical clearances

Appendix A- 1. Permission from QUT Human Research Committee

Appendix A- 2. Permission from Municipal Wan Fang Hospital

Appendix A- 3. Permission from Chang Gung Memorial Hospital

Appendix A-1

Permission from QUT Human Research Committee

Date: Thu 3 Aug 15:53:06 EST 2006
From: "Research Ethics" <ethicscontact@qut.edu.au> Add To Address Book | This is Spam
Subject: Ethics Application Approval: 0600000408
To: "Ms Jung-Hua Shao" <j.shao@student.qut.edu.au>
Cc: "Research Ethics" <ethicscontact@qut.edu.au>

Dear Ms Jung-Hua Shao ,

Re: Evaluation of health-related outcomes following a self-management program for elderly people with heart failure

This email is to advise that your application 0600000408 and subsequent response to queries raised, has been considered and approved. Consequently, you are authorised to immediately commence your project.

The decision is subject to ratification at the next available committee meeting. You will only be contacted again in relation to this matter if the Committee raises any additional questions or concerns in regard to the clearance.

Please do not hesitate to contact me further if you have any queries regarding this matter.

Regards

David Wiseman
Research Ethics Officer

Appendix A-2

Permission from Municipal Wan Fang Hospital

grse

臺北醫學大學・市立萬芳醫院
Taipei Medical University・Municipal Wan Fang Hospital

臺北市立萬芳醫院

敬啓者：

研究人員：邵榮華 研究生

指導老師：徐亞瑛 教 授

台 端

所申請於本院 護理部單位內進行之研究計劃，

計劃名稱：自我管理計劃對心臟衰竭老人成效之探討

已於 95 年 4 月 13 日 完成護理部內審查，核定通過。

研究結果請惠贈本部乙份，以嘉惠受研究單位改進業務之參考。敬請寄回以下同意書後，與 秦麗美 護理長聯繫收案事宜(02-29307930 分機 8653)。並頌 時祺！

臺北醫學大學・市立萬芳醫院

護理部 教學研究委員會 敬上

2006 年 4 月 13 日

13 April, 2006

Taipei Medical University. Municipal Wan Fang Hospital agrees that

The researcher Jung-Hua Shao, who is a PhD student of Queensland University of Technology (QUT), has authority to implement her research at the cardiology clinics of the medical centre during the period from 1st September, 2006 to 30th September, 2007. The title of research conducted by Jung-Hua Shao is ***"Evaluation of health-related outcomes following a self-management program for elderly people with heart failure"***.

The Nursing Department– Research and Education Committee

Taipei Medical University- Municipal Wan Fang Hospital, Taiwan

95. 5.12

Appendix A-3

Permission from Chang Gung Memorial Hospital

邵榮華 君，您好：

台端申請至本院之研究計劃申請案，經本院護理委員會及林口院區院長審議通過後，同意台端於申請研究收案期間至申請單位進行研究收案。研究進行時，請遵守相關注意事項，並祝研究順利！

研究計劃名稱	自我管理計劃對心臟衰竭老人成效之探討
計劃主持人	邵榮華(3095010US)
研究收案員	1人，姓名：邵榮華
收案單位	心臟內科二科醫師門診
收案期間	95・07・12—96・09・30
配合注意事項	1・門診區收案，以不影響門診看診作業為原則。 2・病房區收案，以不影響臨床照護作業為原則。 3・研究生需取得收案對象同意參與研究同意書。 4・收案前需先與單位護理長聯繫。 5・收案時研究人員需著制服及配戴識別證。 6・收案結束時需將所有研究人員識別證繳回護理部教研組。

長庚紀念醫院護理部　謹上

12, July, 2006

Research Consent Form

Chang-Gung Memorial Hospital agrees that

The researcher Jung-Hua Shao, who is the PhD student of Queensland University of Technology (QUT), has authority to implement her research at the cardiology clinics (CV2) of the medical centre during the period from 12th July, 2006 to 30th September, 2007. The title of research conducted by Jung-Hua Shao is "***Evaluation of health-related outcomes following a self-management program for elderly people with heart failure***".

The Nursing Department Committee & Director of Administration Center,
Chang- Gung Memorial Hospital, Linkou Branch, Taiwan

Appendix B

Information Sheets and Consent Forms

Appendix B-1.1

Informed Consent Sheet

QUEENSLAND UNIVERSITY OF TECHNOLOGY

CENTRE FOR HEALTH RESEARCH

INFORMATION SHEET

Title: Evaluation of health-related outcomes following a self-management program for elderly people with heart failure

Chief Researcher: Jung-Hua Shao

Contact Phone No.: -61-7-38658211 (QUT), **Mobile:** -0910305521 (Taiwan),

Email: j.shao@student.qut.edu.au

Principle Supervisor: Professor Anne Chang

Contact Phone No.: -61-7- 38643842(QUT) **Email:** am.chang@qut.edu.au

Associate Supervisor: Professor Helen Edwards

Contact Phone No.: -61-7- 38643844(QUT) **Email:** h.edwards@qut.edu.au

This Doctoral Research Project is being undertaken by Jung-Hua Shao under the supervision of Professor Anne Chang and Professor Helen Edwards, Queensland University of Technology, Australia. The aim of the project is to test a self-management intervention for elderly Taiwanese with heart failure. The specific benefits of the intervention are to improve dietary self-efficacy, heart functionality, and also to decrease symptoms, hospital readmission and body weight. There are no health and safety risks associated with this project.

This is an experimental study with two groups. One group will receive a program helping them manage their heart failure at home which involves a home visit (approximately two hours) and follow-up phone calls (approximately 30 minutes). The other group will continue on with the usual management of their heart failure and follow-up phone calls (approximately 10 minutes).

Once you agree to participate in this study and sign a consent form, the researcher will interview you about your condition by questionnaire (approximately 50 minutes) and measure your body weight. Then you will be randomly assigned to one of these two groups. One group will accept a self-management program which teaches you about how to look after yourself.

Both groups will already have received the routine care provided by the clinical nurse at your medical centre where the "Understanding of Heart Failure" handbook teaches patients how to deal with heart failure. Finally, all patients will be followed-up for 12 weeks. If you choose not to participate, it will not influence your medical treatment in any way.

Information and any material you provide will be used by Jung-Hua Shao for educational or research purposes as part of her Doctor of Philosophy studies. However, your identity, and the identity of those you speak about, will be not disclosed and will be protected at all times. In addition, your participation will be entirely voluntary and you are free to withdraw your participation in this study before or during the research process without affecting your medical treatment.

In the event that you have any other queries or matters in relation to any aspect of this project, or should you wish to speak to someone during the conduct of the project, the person to contact is either the researcher or her supervisors listed on the front of this package. If you have any concerns in relation to the ethical conduct of this project you may contact the officer of the Queensland University of Technology's Research Ethics Committee, by email at ethicscontact@qut.edu.au

Thank you for considering participating. Your participation will be greatly valued. If you decide to participate please sign the attached consent form. It would also be greatly appreciated if you can inform me of your decision on 0932099490 (Taiwan) or email at j.shao@student.qut.edu.au.

Once again, thank you in anticipation.
Jung-Hua Shao

Appendix B-1.2

Study Consent Form

QUEENSLAND UNIVERSITY OF TECHNOLOGY

CENTRE FOR HEALTH RESEARCH

Consent Form

Title: Evaluation of health-related outcomes following a self-management program for elderly people with heart failure

Chief Researcher: Jung-Hua Shao

Contact Phone No.: -61-7-38658211 (QUT)

Mobile: -0910305521 (Taiwan)

Email: j.shao@student.qut.edu.au

I have read and understand the information sheet and consent form and hereby consent to participate in this study.

I consent to provide any information and to the use of any materials I have written as a participant in the study. My medical history will be provided by the hospital. All information is being used for educational or research purposes.

My consent has been given with the understanding that my identity, and the identity of those I have written or spoken about, will be protected at all times; and that I will first read and approve of any transcriptions.

I am aware that I can withdraw from the research project at any time without comment or penalty and if I have any concerns I can contact Jung-Hua Shao (Mobile: 0932099490) or the Research Ethics Officer at QUT by email at ethicscontact@qut.edu.au

Name: ………………………………

Signature: ………………………………

Date: ………/………/………

Appendix B-2.1

昆士蘭科技大學

參與研究說明書

案號:

題目:自我管理計劃對心臟衰竭老人成效之探討

研究生: 邵榮華 j.shao@student.qut.edu.au
連絡電話: 0910305521 (台灣) 或 -61-431402305(澳洲)

指導教授: Professor Anne Chang	**指導教授: Professor Helen Edwards**
連絡電話: -61-7- 38643842 (澳洲)	連絡電話: -61-7- 38643844 (澳洲)
郵件信箱: am.chang@qut.edu.au	郵件信箱: h.edwards@qut.edu.au
指導教授: 徐亞瑛	
連絡電話: 03-2118800 -5275 (台灣)	
郵件信箱: yeaing@mail.cgu.edu.tw	

各位先生、女士：

您好!我是昆士蘭科技大學護理研究所學生，很關心目前心臟衰竭老年病人在家自我照顧結果狀況，所以正從事相關研究。我們藉由訪視來了解您的實際情況，以便提供臨床醫護人員進行相關護理衛教改善，進而採取有效之措施，來協助您自我照顧。

此次的研究是經過醫療專業人員以及參考國內外情況和相關研究，審慎仔細評估，針對心臟衰竭老人需求而設計的，期望透過完善的自我管理計劃，能協助您實行自我管理疾病的行為，改善您在家中的健康狀況。此研究的進行，將從您在門診就診開始，至三個月的追蹤為止。所有參與的個案將會完成三次的問卷填寫，是經研究者詢問後代為填寫，而這三份問卷分別會在三次不同的時間-門診、門診後一個月、以門診後 3 個月經由電話的訪談。另外，所有參與的個案將隨機分成措施組及對照組，措施組的個案在您門診就診後三天後，研究人員將到府上評估進行諮詢衛教及指導，進行之前將以電話連絡; 另外在家庭訪視後第一週、第三週、第七週及第十一週，研究人員將電訪追蹤出院後照顧情形，必要時再予以指導衛教。而對照組也會在第三週、第七週及第十一週作電話追蹤。

本研究中所有相關您個人資料將全部保密，除了研究者以之外，不會有第三者知道，故請您放心的回答每一個問題，您的回答將對於我們服務未來的病患，是相當有價值且有很大的幫助，感謝您的支持與協助!

敬祝您　平安、快樂

昆士蘭科技大學護理研究所 研究生
邵榮華 敬上

Appendix B-2.2

昆士蘭科技大學

參與研究同意書

案號:

題目:自我管理計劃對心臟衰竭老人成效之探討

主要研究者: **邵榮華** j.shao@student.qut.edu.au
連絡電話: 0910305521 (台灣) 或 -61-431402305(澳洲)

指導教授: Professor Anne Chang	**指導教授: Professor Helen Edwards**
連絡電話: -61-7- 38643842 (澳洲)	連絡電話: -61-7- 38643844 (澳洲)
郵件信箱: am.chang@qut.edu.au	郵件信箱: h.edwards@qut.edu.au
指導教授: 徐亞瑛	
連絡電話: 03-2118800 -5275 (台灣)	
郵件信箱: yeaing@mail.cgu.edu.tw	

本人同意參與昆士蘭科技大學護理研究所研究生 邵榮華 所進行之「自我管理計劃對心臟衰竭老人成效之探討」研究，我在此同意書上簽名，表示瞭解以下的項目:

1. 已閱讀並瞭解本研究之內容、目的與所有的過程;
2. 研究對病人本身不會造成不良影響;
3. 知道研究者會將個人及病況資料保密，僅提供研究分析參考不做他用;
4. 過程中並有權利隨時終止或退出研究，且不影響個人及家庭所接受之照顧服務;
5. 知道若有其他相關問題，我可以直接與邵榮華聯絡 (行動電話: 0910305521) 或與澳洲昆士蘭科技大學之研究倫理委員會的人員連絡， 電子郵件地址: ethicscontact@qut.edu.au.

簽　　名: ________________同意參與研究，並回答研究中的問題。
簽署日期: ________________

Appendix C

Questionnaires

Appendix C- 1.1 Demographic information sheet (English version)

1.2 Self-Efficacy for Dietary Control Scale (English version)

1.3 Heart Failure Self-management Behaviour Scale (English version)

1.4 Heart Failure Symptom Distress Scale (English version)

1.5 Evaluation of Care Received Scale (English version)

Appendix C- 2.1 Demographic information sheet (Chinese version)

2.2 Self-Efficacy for Dietary Control Scale (Chinese version)

2.3 Heart Failure Self-management Behaviour Scale (Chinese version)

2.4 Heart Failure Symptom Distress Scale (Chinese version)

2.5 Evaluation of Care Received Scale (Chinese version)

Appendix C- 3. Permission to adapting and using questionnaires

Appendix C-1.1

Demographics information sheet　　　Date:

Site ID: ______________________________

Patient ID: ______________________________

1	Date of Birth:_____________________	( ) age.	
_______ 2	Sex:	❶.Male ❷.Female	
_______ 3	Marital status:	❶.Single ❷.Married ❸.Widowed ❹.Divorced ❺.Separated ❻.Others:_______________	
_______ 4	Education:	❶.Illiteracy ❷.Private tutor fail ❸.Elementary school ❹.Junior high school ❺.Senior high school ❻.Vocational school ❼. Bachelor ❽. Masters ❾. PhD	
_______ 5	Working status:	❶.Employed ❷.Unemployed ❸. Retired status	
_______ 6	Annual Income:	❶.Less than $9999. ❷.$10000-19999. ❸.$20000-29999. ❹.$30000-39999. ❺.More than $40000.	
_______ 7	Religious faith:	❶.None ❷.Buddhism ❸.Taoism ❹.Christianity ❺.Catholicism ❻.Others:__________________	
_______ 8	Living arrangements:	❶.Alone ❷. With spouse or significant other ❸.With children or grandchildren ❹.Others:_________	
_______ 9	Exercise:	❶. Non ❷. Yes (Type/duration/frequency:________ ______________________________________)	

Medical History

Patient ID:_____________ Body weight:_____________ Height:_____________

Diagnosis:____

When diagnose heart failure: ____

Type of medicine you take: ____

_______ 1	Etiology: ❶.CAD ❷.Valvular ❸.Hypertension ❹.Diastolic ❺.Idiopathic	
_______ 2	Ejection Fraction (%): ❶.<10 ❷.11-20 ❸.21-30 ❹.31-40 ❺.>40	
_______ 3	NYHA classification: ❶.I ❷.II ❸.III ❹.IV	
_______ 4	The frequency of hospitalization in this year: ❶.1 ❷.2 ❸.3 ❹.4 ❺. >5	
_______ 5	Length of stay at hospital in this year: ❶.Less than10 ❷.10-20 ❸.21-30 ❹.31-40 ❺. More than 40	

Patient ID: ______________

Items / Time	Hospitalization	Clinical visit	ER visit	Weight	NYHA class
T_2: In the last one month	**Related to HF** Total: __________ ( ) days	Routine: __________ Unplanned: ________	______	____kg	_____
	Related to others Total: __________ ( ) days	Routine: __________ Unplanned: ________	_______		

Patient ID: ______________

Items / Time	Hospitalization	Clinical visit	ER visit	Weight	NYHA class
T_3: In the last three months	**Related to HF** Total: __________ ( ) days	Routine: __________ Unplanned: ________	______	____kg	_____
	Related to others Total: __________ ( ) days	Routine: __________ Unplanned: ________	_______		

Appendix C-1.2

Self-Efficacy for Dietary Control Instrument

Beside each item below, please **Circle** how much confidence you have about performing it. 1="I am not sure I can do it", to 5= "I am very sure that I can do it"	**1** Very Little	**2**	**3** Confidence	**4**	**5** Very Much
Resisting relapse on reducing salt intake					
1. Stick to low-salt foods when I feel depressed, bored or tense.	1	2	3	4	5
2. Stick to low-salt foods when I feel too lazy to prepare food or I am in a hurry.	1	2	3	4	5
3. Stick to low-salt foods when dining with friends or family away from home.	1	2	3	4	5
4. Stick to low-salt foods when I have guests at home.	1	2	3	4	5
5. Stick to low-salt foods when someone eats high-salt in front of me.	1	2	3	4	5
6. Follow your low salt diet when you want to eat a favourite salty food.	1	2	3	4	5
7. Follow low salt diet around holidays/occasions.	1	2	3	4	5
8. Do not buy any snacks with salt from nearby store.	1	2	3	4	5
9. Use salt –free condiments (e.g. pepper, lemon juice) instead of salty condiments (e.g. soy sauce, pepper/ salt mixture, ketchup).	1	2	3	4	5
Resisting relapse on reducing fluid intake					
10. Stick to fluid restriction when I feel thirsty.	1	2	3	4	5
11. Stick to fluid restriction when dining with friends or family away from home.	1	2	3	4	5
12. Stick to fluid restriction when I have guests at home.	1	2	3	4	5
13. Stick to fluid restriction when someone drinks water in front of me.	1	2	3	4	5
14. Keep the fluid in my drink lower than 1500 cc every day.	1	2	3	4	5
15. Stick to record my fluid intake every day.	1	2	3	4	5

Appendix C-1.3

Heart Failure Self-Management Behavior Scale

This scale contains statements about heart failure self-care. Respond to each statement by circling the number you think best applies to you.

Note that the different answer alternatives constitute a scale ranging between the extremes of “I completely agree” (1) to “I don’t agree at all” (5). Even if you feel uncertain about a particular statement, circle the number you feel is most true for you.

	I completely agree				**I don’t agree at all**
1. I weigh myself every day	1	2	3	4	5
2. If I get short of breath I take it easy	1	2	3	4	5
3. If my shortness of breath increases I contact my doctor or nurse	1	2	3	4	5
4. If my feet/legs become more swollen than usual I contact my doctor or nurse	1	2	3	4	5
5. If I gain 1.5 kilo in a 24-hour I contact my doctor or nurse	1	2	3	4	5
6. I limit the amount of fluids I drink (not more than 1500c.c./day)	1	2	3	4	5
7. I take a rest during the day	1	2	3	4	5
8. If I experience increased fatigue I contact my doctor or nurse	1	2	3	4	5
9. I eat a low salt diet	1	2	3	4	5
10. I take my medication as prescribed	1	2	3	4	5

Appendix C-1.4

Heart Failure Symptom Distress Scale

This set of questions concerns a variety of problem. For the items below, **Circle** one number using the scale with the choices of 0= not at all, 1= a little, 2= moderately, 3= quite a bit, 4= extremely.

Please mark how much the problem listed below has bothered distressed you during the past month including today.

	not at all	a little	moderately	quite a lot	extremely
1. Fatigue	0	1	2	3	4
2. Weight gain	0	1	2	3	4
3. Dizziness	0	1	2	3	4
4. Shortness of breath when talking or dressing	0	1	2	3	4
5. Shortness of breath when sitting in a chair	0	1	2	3	4
6. Chest pain	0	1	2	3	4
7. Feeling like your heart is pounding or racing	0	1	2	3	4
8. Swelling in your hands or feet	0	1	2	3	4
9. Swelling around your stomach area	0	1	2	3	4
10. Difficulty breathing when you lie flat	0	1	2	3	4
11. Waking up from you sleep feeling like you can’t catch your breath	0	1	2	3	4
12. Poor appetite	0	1	2	3	4
13. Weakness	0	1	2	3	4
14. Headache	0	1	2	3	4
15. Constipation	0	1	2	3	4
16. Nausea (feeling sick to your stomach)	0	1	2	3	4
17. Cough	0	1	2	3	4

Appendix C-1.5

Evaluation of Care Received

We would like know how much level with your receive health care. For each of the following questions, Please **tick** the relevant box from **question 1-5.**

	Strongly disagree 1	2	3	4	Strongly agree 5
❶. I have a clear knowledge of how to self-monitoring my condition.	☐	☐	☐	☐	☐
❷. I feel I have enough information regarding the model of successful live with HF.	☐	☐	☐	☐	☐
❸. I can learn from other people live with heart failure.	☐	☐	☐	☐	☐
❹. I feel I get enough social support from healthcare personnel.	☐	☐	☐	☐	☐
❺. I am content with feedback and follow-up from healthcare personnel.	☐	☐	☐	☐	☐

Please check you have answered each question.

Thank you for completing this questionnaire.

Appendix C-2.1

QUT

個案基本資料問卷(一)

醫院代號:__________________　　　個案代號:________________________

1. 出生年月日：民國______年______月______日(__________足歲)。

________2. 性別：　(1)男　，　(2)女。
________3. 婚姻狀況：(1)已婚，(2)未婚，(3) 鰥或寡，(4) 離婚且未再婚，
(5) 離婚且再婚，(6) 其他(______________________)。
________4. 教育程度：(1)不識字(沒讀書),(2)小學,(3)國中,(4)高中、職,(5)大專(學),
(6)研究所(含)以上,(7)其他 (___________________________)。
________5. 職業：　(1)全職工作，(2)兼職工作，(3)沒有工作，(4)退休，
(5)家庭主婦，(6) 其他(__________________________)。
________6. 月收入：　(1) 9999 元或以下，(2) 10000-19999 元，(3) 20000-29999 元，
(4) 30000-39999 元，(5) 40000 元 或以上。
________ *您覺的您的收入夠支付您的支出嗎？(1) 夠，(2) 不夠。
________7. 宗教信仰：(1) 無，(2) 佛教，(3)道教，(4) 基督教，(5) 天主教，
(6) 其他(____________________ 教)。
________8. 居住情形：(1) 與家人同住，(2) 獨自一人居住，(3) 住在安養院，
(4) 其他(_____________________________________)。
________9. 運動情形:　(1)無，(2) 有(種類:_______________時間:________________)

個案醫療病史

病歷號碼：___________________ 身高：___________ cm　體重：__________ kg
罹病史：____
何時被診斷為心臟衰竭：____
藥物使用：____

________1. 病因學：　(1)心血管疾病，(2)瓣膜形，(3)高血壓，(4)舒張形，
(5)原發性。
________2. 心室射出率(%)：　(1)<10，(2)11-20，(3)21-30，(4)31-40，(5)>40。
________3. NYHA 心臟功能分級：(1) Ⅰ，(2) Ⅱ，(3) Ⅲ，(4) Ⅳ。
________4. 近一年內的住院次數：(1) 1，(2) 2，(3) 3，(4) 4，(5) 5 次，或以上。
________5. 住院累積天數：　(1) 10 天，或 10 天以內，(2) 10-20 天，(3) 21-30 天，
(4) 31-40 天，　(5) 40 天以上。

個案代號:__________________

項目 / 時間	住院次數	門診就醫次數	急診就醫次數	體重	心臟功能
T$_2$: 近一個月內	**HF 的因素** 總共: ________次 (　　) 天	規則就醫: ________ 無計劃的: ________	______	____kg	_____
	其他的因素 總共: ________次 (　　) 天	規則就醫: ________ 無計劃的: ________	_______		

個案代號:__________________

項目 / 時間	住院次數	門診就醫次數	急診就醫次數	體重	心臟功能
T$_3$: 近三個月內	**HF 的因素** 總共: ________次 (　　) 天	規則就醫: ________ 無計劃的: ________	______	____kg	_____
	其他的因素 總共: ________次 (　　) 天	規則就醫: ________ 無計劃的: ________	_______		

Appendix C-2.2

飲食控制自我效能量表

下列有關飲食日常生活的題目是想了解若您處在該種情況，您有多少的把握可以做到。請圈選出適當的答案。

	絕無把握	一至三成的把握	四至六成的把握	七至九成的把握	絕對有把握
減少鹽份的堅持:					
1 即使覺得憂愁、厭煩或緊張，我仍會維持吃低鹽食品的習慣。	**1**	**2**	**3**	**4**	**5**
2 即使懶得準備食物或趕時間，我仍會選擇吃低鹽食品的習慣。	**1**	**2**	**3**	**4**	**5**
3 與同事或朋友一起用餐時，我仍會維持吃低鹽食品的習慣。	**1**	**2**	**3**	**4**	**5**
4 即使家裏有客人，我仍會維持吃低鹽食品的習慣。	**1**	**2**	**3**	**4**	**5**
5 如果有人在我的面前吃較鹹的食物時，我會不為所動。	**1**	**2**	**3**	**4**	**5**
6 當我想要吃喜愛的鹹份食物也能遵從低鹽飲食。	**1**	**2**	**3**	**4**	**5**
7 在特殊的場合或節日也能遵從低鹽飲食。	**1**	**2**	**3**	**4**	**5**
8 如果我想買餅乾或零食時我會選擇買低鹽的食品。	**1**	**2**	**3**	**4**	**5**
9 用餐時不沾含鹽份的調味品 (如醬油、椒鹽、蕃茄醬)改以其他調味品(如胡椒、檸檬汁)代替。	**1**	**2**	**3**	**4**	**5**
減少水份的堅持:					
10 即使覺得很渴，我仍會維持喝水量的限制。	**1**	**2**	**3**	**4**	**5**
11 與同事或朋友一起用餐時，我仍會維持喝水量的限制。	**1**	**2**	**3**	**4**	**5**
12 即使家裏有客人，我仍會維持喝水量的限制。	**1**	**2**	**3**	**4**	**5**
13 在特殊的場合或節日也能維持喝水量的限制.	**1**	**2**	**3**	**4**	**5**
14 每一天在我的喝水量能少於 1500 cc。	**1**	**2**	**3**	**4**	**5**
15 每一天維持記錄我的喝水量。	**1**	**2**	**3**	**4**	**5**

Appendix C-2.3

心臟衰竭的自我管理行爲量表

這個量表 是針對心臟衰竭的自我照顧，請您依據自己目前的情況回答，在所附每一個選項中勾選最能表達您意見的分數。

1=我完全同意; 2=我同意; 3= 我既非同意亦非不同意; 4=我不同意; 5=我完全不同意

即使您在回答時並不是很確定，您仍要勾選較合宜您的分數。

	我完全同意	我同意	我既非同意亦非不同意	我不同意	我完全不同意
1. 我每天測量我自己的體重	1	2	3	4	5
2. 如果我有呼吸短促的現象，我可以從容面對	1	2	3	4	5
3. 如果我呼吸短促的現象增加，我會聯絡我的醫師或護理人員	1	2	3	4	5
4. 如果我的手或腳比平常變的較腫脹，我會聯絡我的醫師或護理人員	1	2	3	4	5
5. 如果我的體重在 24 小時內增加 1.5 公斤，我會聯絡我的醫師或護理人員	1	2	3	4	5
6. 我限制我的喝水量，每天不超過 1500c.c.	1	2	3	4	5
7. 我在白天時會找時間休息一下	1	2	3	4	5
8. 如果我的疲倦感增加，我會聯絡我的醫師或護理人員	1	2	3	4	5
9. 我吃低鹽飲食	1	2	3	4	5
10. 我照醫師處方服用我的葯物	1	2	3	4	5

Appendix C-2.4

心臟衰竭症狀量表

這份問卷是關於多種的心臟衰竭症狀，而以下的問題是為了了解您在過去一個月內(包括今天)，感受到身體症狀困擾您的情況，請依據下列選項圈出最能符合您的狀況的分數，0=一點也不困擾；1=一點點困擾；2=中等困擾；3=很多困擾；4=非常多困擾。

	一點也不	一點點	中等	很多	非常多
1. 疲勞	0	1	2	3	4
2. 體重增加	0	1	2	3	4
3. 頭暈	0	1	2	3	4
4. 當說話或穿衣時會感到呼吸短促	0	1	2	3	4
5. 當坐在椅子上時會感到呼吸短促	0	1	2	3	4
6. 胸痛	0	1	2	3	4
7. 感到好像你的心臟劇烈跳動	0	1	2	3	4
8. 在你的手或腳會腫脹	0	1	2	3	4
9. 你的胃周圍會膨脹感	0	1	2	3	4
10. 當你平躺感到呼吸困難	0	1	2	3	4
11. 從你的睡覺醒來感到好像不能喘氣	0	1	2	3	4
12. 缺乏食慾	0	1	2	3	4
13. 虛弱感	0	1	2	3	4
14. 頭痛	0	1	2	3	4
15. 便秘	0	1	2	3	4
16. 噁心	0	1	2	3	4
17. 咳嗽	0	1	2	3	4

Appendix C-2.5

照護接受的評值量表

此份問卷是為了解您個人在接受照護認知程度。請您依據自己目前的情況回答，在所附選項中勾選最能表達您意見的分數。

1= 極為不同意; 2= 不同意; 3= 既非同意亦非不同意; 4=同意; 5= 極為同意。

	極為不同意 1	2	3	4	極為同意 5
❶. 我清楚的知道自我監測的技巧。	☐	☐	☐	☐	☐
❷. 我感到我有足夠的訊息關於個案與心臟衰竭和平共處成功的例子。	☐	☐	☐	☐	☐
❸. 我可以從其他的個案身上學習如何與心臟衰竭和平共處。	☐	☐	☐	☐	☐
❹. 我感到從醫護人員身上我得到足夠的社會支持。	☐	☐	☐	☐	☐
❺. 我是滿足於醫護人員對我的疾病的追蹤及迴遺。	☐	☐	☐	☐	☐

*請您再次確認您已完全回答**每一個問題**!*

謝謝您完成整份的問卷!!

Appendix C-3

Permission to adapting and using questionnaires

Permission to adapting and using for "Self-efficacy for Health-related and Exercise Behaviours Scale"

Self-efficacy scales for health-related diet and exercise behaviors

(健康相關的飲食與運動行為自我效能量表)

Copyright User's Agreement

I agree Jung-hua Shao who study at School of Nursing, Queensland University of Technology using and modifying the items/ instrument of "Self-efficacy scales for health-related diet and exercise behaviors" that I published in 2000 in Nursing Research (Taiwan).

Chii-Jun Chiou
(authorized signature)

Chii-Jun Chiou, RN, MS
(print name and title)

Date: 11/30/05

Permission to adapting and using for "The European Heart Failure Self-Care Behaviour Scale"

Date: Tue 25 Jul 17:05:34 EST 2006
From: "Tiny T. Jaarsma" <t.jaarsma@thorax.umcg.nl> **Add To Address Book** | **This is Spam**
Subject: RE: Asking permission from Australia
To: <j.shao@student.qut.edu.au>

Dear Jung-hua Shao

Thank you for your interest in my work.
I mail you the English version of the scale. I do not know if you need another language. The development of the official Chineses version has just started, but will be ready soon.
Please let me know if you need that. Otherwise you can modify the instrument as you want. Please refer in publications of a modified versioin as modified from the EHFScBS as published in.
Jaarsma T, Stromberg A, Martensson J, Dracup K. Development and testing of the European Heart Failure Self-Care Behaviour Scale. Eur J Heart Fail. 2003; 5:363-70

Dr. Tiny Jaarsma
Department of Cardiology
University Medical Center Groningen
PO Box 30.001
9700 RB Groningen
The Netherlands
31 50 3613429 (tel)
31 50 3614391 (fax)

Permission to adapting and using for "Heart Failure Symptom Distress Scale"

Date: Tue 9 May 23:01:34 EST 2006
From: mary.bondmass@unlv.edu **Add To Address Book** | **This is Spam**
Subject: Re: response to your request
To: <j.shao@student.qut.edu.au>

Dear Joy,

You have my permission to use my symptom distress scale. If you do any psychometric testing, I would be interested in your results. Thank you again for your interest in the symptom distress scale and best of luck with your research.

Mary D. Bondmass, RN, PhD
Assistant Professor - School of Nursing
4505 Maryland Parkway - 453018
Las Vegas, NV 89154-3018
Office; 702-895-3418
Fax: 702-895-4807

<j.shao@student.qut.edu.au>05/09/2006 09:33 ZE10
To: mary.bondmass@unlv.edu Subject: Re: response to your request
Dear professor Bondmass,
How are you!I am so happy to hear you!
I am a postgraduate student of Queensland University of Technology in Australia. My name is Joy Shao. My research is regarding testing Self-management intervention to improve health-related outcome in elder people with heart failure in Taiwan in order to enhance patients' ability in self-management their disease. Therefore, I am interesting in your instrument that was showed in your thesis in 2002, entitled "Outcomes of home management methods for chronic heart failure". The instrument "Heart Failure Symptom Distress Scale" which you modified version of "the Cohen-Hoberman Inventory of Physical Symptoms" used to measure patients' symptoms. It is relevance to my study. Thus, I intend to use the instruments. I wonder whether I could seek you permission for its use and any modification I make to suit my study and culture differences. Finally, I appreciate your kindness and reply and I look forward your response.
Sincerely yours,
Joy (Jung-hua Shao)

Appendix D

Questionnaires Guide

Appendix D

Questionnaires Guide

Instructions for Data Collection and Scoring

Here are some common ideas for researcher to notice before you go to collect data:

(1). Patients should not respond to the questionnaire prior to other assessments and interactions that may bias their responses.

(2). Enough time (about 60 minutes) should be provided for the patient to complete the questionnaire.

(3). To notice that the patient answer the questions without being influenced by other people such as their spouse or family members.

(4). Read the introductory paragraph at the top of the questionnaire before use the first question to patient.

(5). Ask the patient respond to all questions. The entire questionnaire may be read directly to the patient if one is careful not to influence responses by verbal or physical cues.

(6). Check to make sure the patient has responded to each question. Make sure there is only one answer clearly marked for each question.

(7). Partially complete questionnaires do occur despite best efforts to minimize missing data. However, missing data can greatly bias the data and complicate analysis. The researchers need to make sure the respondents understand to mark zero for any items that do not apply to them, rather than leave a blank. Whenever possible review the questionnaire before the respondent leaves to make sure there are no unanswered questions or questions with more than one answer.

Finally, the guide of three questionnaires include Self-Efficacy for Dietary Control Scale (SeDC), HF Self-management Behaviour Scale (HFSmB), HF Symptom Distress Scale (HFSD) and Treatment satisfaction survey (TSS) more detailed instructions as follows:

<u>1. Self-Efficacy for Dietary Control Scale (SEDC) Guide</u>

1). Check to make sure the patient has understood using a 5-point scale from 1= I am not sure I can do it, 2= I am a little sure I can do it, 3= I am moderate sure I can do it, 4= I am much sure I can do it, to 5= I am very much sure that I can do it.

2). Read the question with the respondent –"How much confidence you have about performing it"?

Items	**For example**
1. Stick to low-salt foods when I feel **<u>depressed, bored or tense</u>**.	e.g. Some people will eat food without any limitation when their mood is unusual

Items	For example
2. Stick to low-salt foods when I feel too **lazy** to prepare food or I am in a **hurry**.	e.g. Some people will eat food without any limitation when they are busy such as canned food, fast food, soy source pickle.
3. Stick to low-salt foods when dining with friends or family **away from home**.	e.g. You with friend go to BBQ restaurant or picnic.
4. Stick to low-salt foods when I **have guests at home**.	e.g. You will accompany with you guests to eat food without any limitation.
5. Stick to low-salt foods when someone eats high-salt **in front of me**.	e.g. People will invite or lure you eat high-salt food.
6. Follow your low salt diet when you want to **eat a favourite salty food**.	e.g. You can control yourself don't eat your favourite salty food such as cake, soy source pickle or cured meat.
7. Follow low salt diet around **holidays/occasions**.	e.g. There are a lot of special salty food in Chinese new year such as cured meat, sausage or Chinese pickled vegetables.
8. Do not buy any **snacks** with salt from nearby store.	e.g. Chips, cane, fast food or to eat out.
9. Use salt –**free condiments** (e.g. pepper, lemon juice) instead of salty condiments (e.g. soy sauce, pepper/ salt mixture, ketchup).	e.g. Aniseed or Chinese medicine perfume.
10. Stick to fluid restriction when I feel **thirsty**.	e.g. People will drink a lot water such as after eating in hot weather.
11. Stick to fluid restriction when dining with friends or family **away from home**.	e.g. You with friend go to BBQ restaurant or have a party in your friend's home.
12. Stick to fluid restriction when I **have guests at home**.	e.g. You will accompany with you guests to drink without any limitation.
13. Stick to fluid restriction when someone **drinks water in front of me**.	e.g. People invite you drink a lot of beverages.
14. Keep the fluid in my drink lower than **1500 cc every day**.	e.g. It means all of fluid in one day including water, soup and beverages. Use bottle or cup to evaluate your water every time when you drink.
15. Stick to **record** my fluid intake every day.	e.g. Use record sheet every day.

2. Heart Failure Self-Management Behaviour Scale

1). Check to make sure the patient has understood using a 5-point scale from extremes of "I completely agree" (1) to "I don't agree at all" (5).

2). Read the question with the respondent –"Respond to each statement by circling the number you think best applies to you".

3). Note that the different answer alternatives constitute a scale ranging between the Even if you feel uncertain about a particular statement, circle the number you feel is most true for you.

Items	For example
1. I **weigh** myself every day	e.g. Use same scale and same time to weigh themselves
2. If I get short of breath **I take it easy**.	e.g. You don't feel nervous about it and could sit down to rest your head on your forearms or on some pillows that will deal with it.
3. If my shortness of breath increases I **contact my doctor or nurse**.	e.g. You will go to hospital with your family immediately when symptom worsen.
4. If my feet/legs become more swollen than usual I **contact my doctor or nurse**.	e.g. You will go to hospital immediately when symptom worsen.
5. If I gain 2 kilo in one week I **contact my doctor or nurse**.	e.g. You will go to hospital immediately when symptom worsen.
6. I limit the amount of fluids I drink (not more than **1500c.c**./day)	e.g. 6 cups for every 250cc. cup.
7. I **take a rest** during the day	e.g. take a nap for 30 minutes after lunch or in afternoon.
8. If I experience increased **fatigue** I **contact my doctor or nurse**.	e.g. People do ordinary physical activity results in fatigue. They will go to hospital immediately when symptom worsens.
9. I **eat a low salt diet**.	e.g. I decrease to eat low salt diet.
10. I take my medication **as prescribed**.	e.g. You do not add or increase medicine by yourself and take medication on time.

3. Heart Failure Symptom Distress Scale (HFSD) Guide

a. Check to make sure the patient has understood using a 0-4 point scale with the choices of 0= not at all, 1= a little, 2= moderately, 3= quite a bit, 4= very much. If a question does not apply to the patient they should choose the zero (0).

b. Read the question with the respondent –"Did you have the symptom of fatigue during the past month (4 weeks) including today"? Then tell the respondent ……… --If you did not have any the symptom of fatigue during the past month (4 weeks)

including today you should circle the zero (0) after this question.

--If you did have the symptom of fatigue that was caused by some other cause that you are sure was not related to heart failure, you should circle the zero (0) after this question.

--If you had the symptom of fatigue that might be related to your heart condition, then rate how much the symptom of fatigue you would like to feel. In other words, how much did the symptom of fatigue affect you? Circle either the 0, 1, 2, 3 or 4 to indicate how much the symptom of fatigue affected you during the past month including today – zero (0) means not at all, one (1) means a little and four (4) very much.

4. Evaluation of Care Received Scale (ECR) Guide

1. Check to make sure the patient has understood using a 5-point scale from 1-5 rating "1= Strongly disagree" to "5= Strongly agree".

2. If patent have question, researcher could give them for example as below:

Items	For example
❶. I have a clear knowledge of how to **self-monitoring** my condition.	e.g. How to self-monitoring weight, fluid and salt food every day.
❷. I feel I have enough information regarding **the model of successful live with HF**.	e.g. Including how to care the heart failure, how to control and record the salt, water and weight. Finally, patient felt well then before.
❸. I can **learn from other people live with heart failure**.	e.g. You can do it including how to care the heart failure, how to control and record the salt, water and weight.
❹. I feel I get enough **social support** from healthcare personnel.	e.g. You will give all of sources from verbal support via home visit and telephone following up.
❺. I am content with **feedback and follow-up** from healthcare personnel.	e.g. acquiring encourage and providing verbal feedback about reviewed weight change and what it meant and assist the patient.

Appendix E

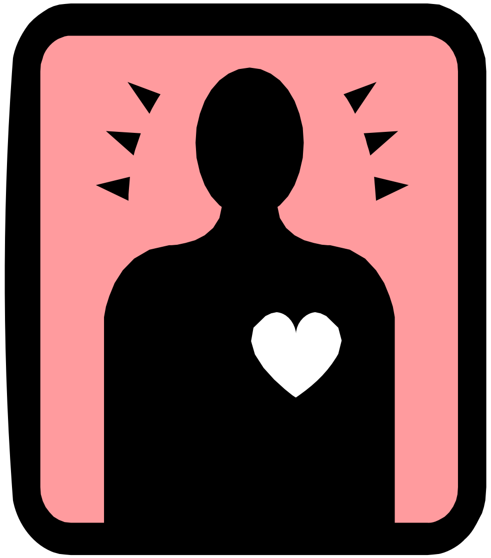
Self-management Booklet

Appendix E

Looking after yourself—
Self-management booklet

Table of Contents:

1. Introduction



Many heart failure people could successfully reduce the burden on their heart. This will reduce their chance of being in the hospital, and living longer because they are more aware and wanting to learn how to self-manage their heart failure.

Right now, you also could self-manage your heart condition so that you can deal with your symptoms of heart failure before they become a problem. Awareness, prevention, and early detection can keep you healthy! Let us work out a plan for managing your condition that includes active self-care. It can make you feel better, prevent your heart failure from getting worse, and help you live longer. Next, I will tell you about a real story.

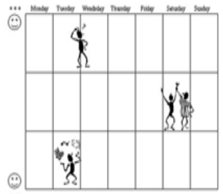
Change Your Behaviour to Improve Your Daily Life

2 Description of Grandmother a-yun….

Grandmother a-yun, a 72-year-old married woman, her symptoms were indicative of NYHA class III heart failure. Grandmother a-yun and her husband are living with her granddaughter. Grandmother a-yun was taught to recognize the early warning signs of heart failure and instructed to weight and record daily by her. A dietician met with Grandmother a-yun and her granddaughter to provide sodium and fluid restricted education to decrease episodes of dyspnea. She agreed to do behaviours change for improve her health. Within the first few weeks after discharge from the hospital, Grandmother a-yun's weight decreased precipitously. After thorough assessment of medication and dietary adherence, the medicine was decreased of level.

Then, after several weeks she seemed to forget her experience with heart failure. Thus, she did not pay much attention to keep her behaviours such as weigh herself and stick to low-salt foods and fluid restricted. Actually, she loves salty foods at the table. Finally, she was sudden weight gain and appeared shortness of breath. Her heart failure exacerbated at home.

She readmitted via ambulance to the emergency department again after two months from hospital discharge. There was minimal peripheral edema. She readily admitted to drinking 1 to 2 gallons of water per day because "it is good for me" and did not following low salt foods. The doctor suggested that he must self-manage her disease such as weight herself sodium and fluid restricted. Grandmother a-yun was shocked about her disease and she resolved to change his lifestyle. She used to an extreme salt user at the table, but she was willing to avoid that habit in the future.



Grandmother a-yun found her weight down from 66 kg on Friday to 65kg on Monday after one week. She denied dizziness or other symptoms. She was physically stable, had obtained a scale to record her weight everyday.

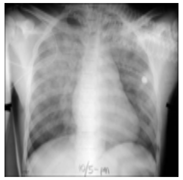
Question 1: When Grandmother a-yun changed her diet, what happened to her weight?

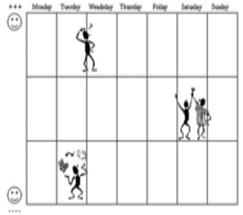
Question 2: What have you learned from Grandmother a-yun's story?

Question 3: If Grandmother a-yun can do it, so can I?

2. Description of Uncle a-Tu…….

He is a 66-year, has 6 children and living in rural villager, his living arrangement is take turns every month in staying with his three sons. He got tuberculosis when he was 40-years old. This disease affected his lung function. Moreover, his heart function was affected when he was 60-years old. His doctor told him that he had cardiomegaly and needed to decrease the load of his heart. However, Uncle a-Tu feel that doctor’s opinion is ridiculous since he feel his physical condition is every good. He negated doctor’s suggestion until 66-year. Couple month ago, he visited his doctor because he felt coughing, fatigue, and dyspnea. His doctor told him that his got heart failure. For solving his problem, he needs to take medication and to decrease the load of his heart. He denied the condition that his physician said. Therefore, he tried to search the tradition strategies to reduce the symptom that he had from his friend. Finally, he drank a lot of the medicated soup with alcohol everyday to treat his disease. No later, he felt uncomfortable, including more severe of dyspnea and fatigue, furthermore, he found that he can not put on the shoes. Hence, Uncle a-Tu visited his physician again and got the suggestion that he can not take too much liquid again because that will worsen his heart function. Moreover, his physician referred Uncle a-Tu to the home care unit. The home care unit start the program that helped the patient to learn self management for their heart failure. They evaluated the home care need of Uncle a-Tu, and the self management of HF. The self management included how to care the heart failure, how to control and record the salt and water, how to control and record the body weight. After one month, Uncle a-Tu felt well then before, he felt more energized, the shoes was fit to his foot. The important thing is Uncle a-Tu know how to care heart failure finally.





Question 1: When Uncle a-Tu controlled and recorded his salt and water intake, what happened to his heart?

Question 2: What have you learned from Uncle a-Tu’s story?

Question 3: If Uncle a-Tu can do it, so can I?

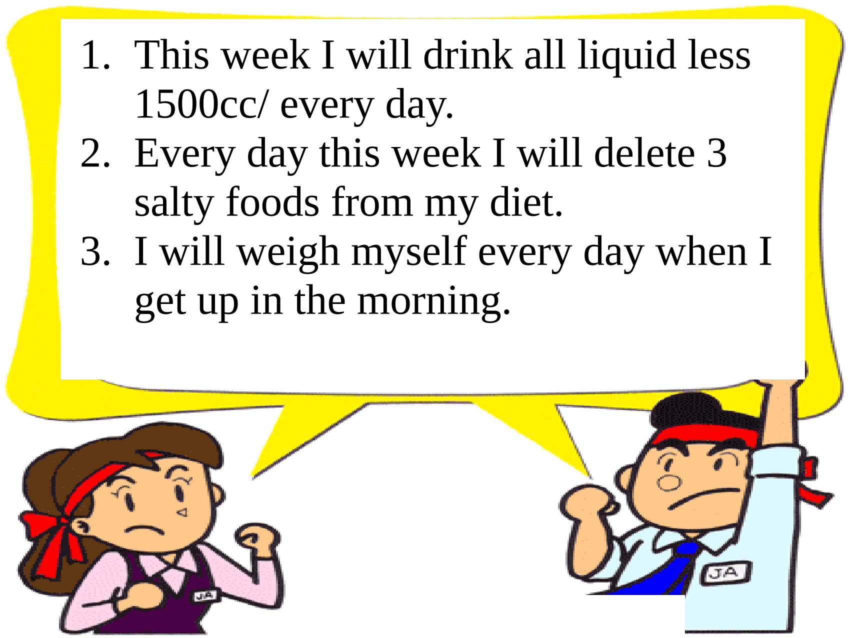
3. Heart failure Self-Management

Goal Setting

Set up your self-management goal:

How do I plan for my dietary control?

1. Short term goal: <u>this week I will:</u> ……..
2. Long term goal: <u>three months from now, I will:</u> ……...



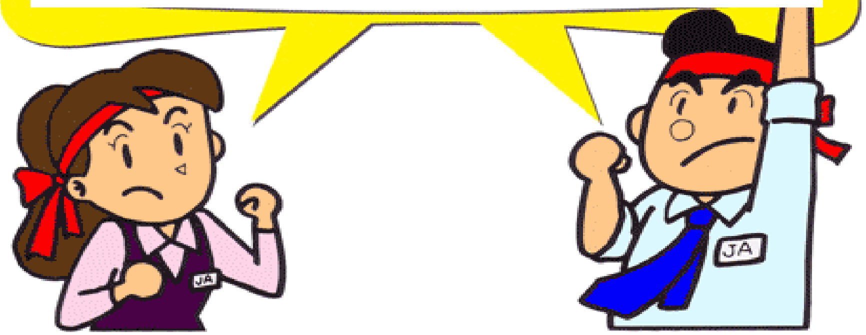
Question 1: What factors (within my control) are the main problems for me to reach this goal?

Question 2: What or who can help me reach this goal?

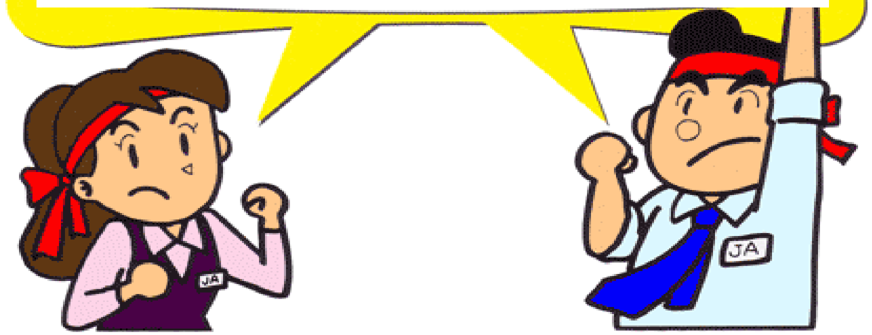
♥ **Plan goal for next week --fluid, low-salt and body weight control.**

Write down your goal…………

Low-salt:
Fluid:
Body weight:



Low-salt:
Fluid:
Body weight:



Self-Monitoring:

Low-salt diet:

- Eat less than 20 milligrams of sodium per day. This is equivalent to about 1 teaspoon of table salt.
- Break the habit of adding extra salt to food during cooking or at table.
- Use salt –free condiments (e.g. pepper, lemon juice) instead of salty condiments (e.g. soy sauce, pepper/ salt mixture, ketchup).

1.

2.

3.

4.

5.

6.

7.

8.

9.

Which one you can eat?

____

- Read the nutrition label on all food packages to select foods lower in sodium. Limit excessively salty foods.

Nutrition Facts	
Serving Size 1 tsp	
Calories	5
Total Fat	0g
Saturated Fat	
Cholesterol	0mg
Sodium	20mg
Protein	0g

Fluid restriction:

- Weight gain: body 1kg weight =to 1 litre body fluid
- Water + all liquids less 1500 cc / day
- Filling a **pitcher** or **thermos** with water at the beginning of the day and drinking from it all day helps keep track of the amount.

Body Weight:

- If weight gain is more than 1.5 kg in a 24-hour, you need to contact your doctor.
- You need be careful and slow when you stand up to weight yourself.
- **Three steps……**Wake up in the morning:
  First step go to the toilet,
  Second step weigh yourself,
  Final step write down your weight in log.

Weight, fluid and high-salt food log---fill in yourself

Date		Weight (kg)	Fluid (cc/day)
For example: 10/9/2006		60	1000
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

Date	High-salt food			
	Breakfast	Lunch	Dinner	Snack
For example:	0	1	1	0
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Please remember to <u>post return-prepaid envelope</u> in twice a week!

Evaluation

You can assess yourself every week. Please **tick** to indicate the extent to which you reached your goal during the past week with the choices of +1 (slightly better outcome), +2 (much better outcome), -1 (slightly poorer outcome), and -2 (much poorer outcome).

Fluid restriction goal:

Please **tick**	1w	2w	3w	4w	5w	6w	7w	8w
+2								
+1								
0								
-1								
-2								

How can I reach this goal?

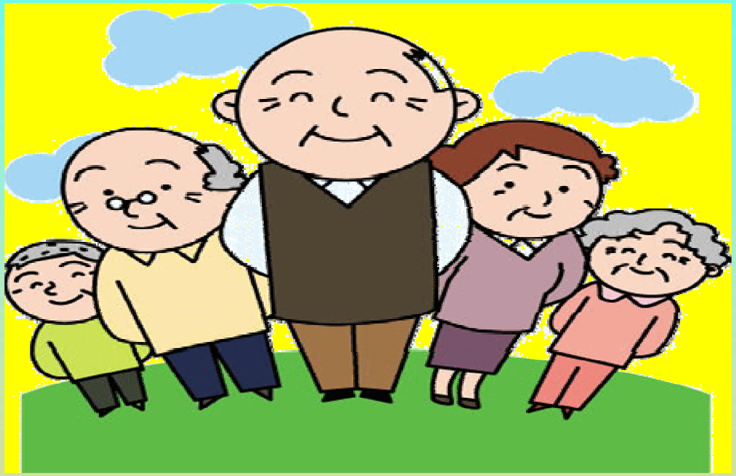
Body Weight goal:

Please **tick**	1w	2w	3w	4w	5w	6w	7w	8w
+2								
+1								
0								
-1								
-2								

Low-salt diet goal:

Please **tick**	1w	2w	3w	4w	5w	6w	7w	8w
+2								
+1								
0								
-1								
-2								

Re plan for next week…………



Become part of life

Appendix F

Self-management Program Content

Appendix F

Self-management program content

<u>Home visit</u>

Objectives:

At the completion of this visit, it is expected that patients will be able to:

1. Understand the signs of HF related symptoms.
2. Set up attainable goals about fluid, low-salt and body weight control.
3. Follow the techniques of self-morning for diet and weight.

Topic	Activities
1. Introduction	The researcher will: 1. Introduce herself and the self-management program. 2. Outline the objectives of home visits to the patient and family. 3. Explain the procedure of this program. 4. Give patients the package of self-management program which includes: ♦ "Looking after yourself- Self-management booklet". ♦ A measuring pitcher.
2. Brief assessment	1. Assess patients' personal behaviours related to HF by asking questions about daily self-weighing, fluid and salt restriction. For example, "Do you weigh yourself daily?" ♦ If yes, "Tell me more about what you did?" ♦ If no, "What were the reasons you were unable to weigh yourself?" 2. Finally, tell patients about their result of assessment.
3. Discuss specific symptoms	1. Discuss warning signs of HF related symptoms in their actual daily life by asking the questions. For example, "Have you had a change in your weight?" and "Do you have swelling?" ♦ If yes, "What kinds of reason cause that condition?" ♦ If no, "Do you know what the signs of HF related symptoms are?" 2. Finally, explain to patient what signs need to be looked for, such as shortness of breath (SOB), fatigue, ankle swelling, and sudden weight gain. 3. Explain the cause of symptoms to patients. Eor example, most of the symptoms are greatly influenced by fluid retention.

Topic	Activities
4. Discuss how to reduce symptoms	1. Discuss how to reduce symptoms through daily self-monitoring of weight, fluid and salt restriction by asking the questions that could help patients to consider past efforts that does not matter successes or failures. For example, "Do you weigh yourself daily?" ♦ If yes, "How do you feel about weighing yourself daily?" ♦ If no, "What are the possible benefits of weighing yourself?" "How much water do you drink everyday?" ♦ If they do not know → "Do you know how much water you can drink daily?" ♦ If less 1500 cc / day, "What do you feel about that?" ♦ If more than 1500 cc / day, "What do you feel about that?" "What are the salty foods?"(see booklet page7) "What kind of salty food do you eat everyday?" (For example, Soy sauce pickles and fermented soybean curb) ♦ If less than3 kinds/day, "Do you think you can eat less than 3 kinds/two days?" ♦ If more than 3 kinds/ day, "Tell me more about what kind of salty food do you like?" 2. Emphasize to patients the importance of daily self-weighing, fluid and salt restriction. 3. Answer patient's questions.
5. Give a model	1. Give a model regarding successful looking after himself/ herself. 2. Describe in detail how other people look after themselves: ♦ If male, talk about "story of Uncle a-Tu" ♦ If female, talk about "story of Grandmother a-yun" 3. Answer patients' questions regarding story.

Topic	Activities
♦ Persuade the patient that they have ability to engage in self-management.	1. Discuss the success in the story by asking a question. For example, ♦ When Grandmother a-yun changed her diet, what happened to her weight? ♦ Yes Grandmother a-yun lost 1kg within three days. What did these physical changes mean to Grandmother a-yun? ♦ What have you learned from Grandmother a-yun's story? ♦ If Grandmother a-yun can do it, so can I? 2. Answer patients' questions about any self-management.
♦ Encourage to set attainable objectives	1. Give examples of how to set a goal such as: Decreasing a cup of tea or water a day. ♦ Decrease one kind of favourite salty diet during a week. ♦ Weighing themselves everyday. 2. Help patient to set their attainable goals. 3. Help patient to take a step-by-step approach of goal. 4. Answer patients' questions regarding setting goal.
6. Make an action plan	1. The researcher will follow "booklet" teaching participants how to restrict, monitor and record fluid, low-salt food and weight every day (see booklet page6-11). ***Fluid……..*** ♦ Fluid intake should generally be limited to1.5 litres per day. ♦ Weight gain in the body with 1kg of weight equalling 1 litre of body fluid. ♦ Fill a pitcher or thermos with all the water the person needs in a day, with a so-called sip-and-go cup nearby. This makes it is easy to count how much they drink. ♦ Provide a fluid intake sheet to help them assess their daily water intake outcomes (see booklet page10)

Topic	Activities
	Low-salt food…… Teach patient to: ♦ Check the labels of foods and choose products low in salt (containing less than 120mg of sodium per 100grams serve, see booklet page 9) when they go shopping. This will help them to avoid highly salted seasonings, processed foods such as smoked or cured fish, snack foods: Potato chips, pretzels, pickles, processed meats: bologna, cured ham, frankfurters, etc. ♦ Use garlic, herbs and spices and eating fresh food such as fruit and vegetables instead of salty food. ♦ Limit dietary sodium to below 2000 mg per day in order to help reduce fluid retention. The researcher will: ♦ Provide a high-salt diet checklist which indicates foods to be avoided: smoked foods, cured meat or fish, canned food, salty snack food (potato chips, salted nuts, popcorn, prepare condiment (salt, soy sauce…), soy sauce pickles, pre-packaged frozen food, and any fast food. ♦ Help patients to write down 5-10 species of favourite salty foods, and then to count and record on a salt intake sheet, how many kinds of these foods they eat every day.
	Weight……. ♦ Patients will be advised that if their weight increases By more than 1.5 kg in a 24-hour period, they need to consult their doctor. ♦ Teach participants how to weigh themselves in the morning by three steps (see booklet page10). ♦ Answer patients' questions about following the techniques of self-morning for diet and weight.

Topic	Activities
7. Inform the family regarding the benefits of self-management and their role in helping the patient in self-management activity.	1. Give them the benefits of the model and explain the model's behaviours through successful example. For instance: ♦ If patient is male, talk about "story of Uncle a-Tu" ♦ If female, talk about "story of Grandmother a-yun" 2. Ask question. For example, ♦ How do you think you can do this for your family? 3. Help them to get decision making and make an action. For example, ♦ Let us think about what we can do for your family. 4. Explain how they can help patients to develop more useful attitudes/behaviours toward their self-management. For example, if patients do well, they can give patient verbal encouragement. If not, they can ignore it. 5. Answer family' questions.
8. Encourage the patient to discuss any questions or feelings about self-management with the researcher and/or family.	1. The researcher understanding that the patient might have some problems or stress about performing self-monitoring at home, is more able to discuss and help them to solve these problems. 2. The researcher will encourage patients to talk about themselves with the researcher and/or family. 3. The researcher will provide a clear time schedule of phone call consultations that could help patient to discuss any questions or feelings with the researcher.

<u>Phone call</u>

Objectives:

At the completion of this phone call, it is expected that patients will be able to:

1. Understand signs of HF related symptoms.
2. Continue to present the techniques of the self-morning for diet and weight every day.
3. Get enough social support and solve their questions.

Topic	Activities
1. Assessment	1. Warm up relationship-- say hello to the patients 2. Lead patient to describe the activities of self-management after intervention. 3. Encourage patient to express their concerns, thoughts and/or feelings they have related to self-management of their condition after the intervention. 4. Observe their performance about how much they can do and how well they are from their record and talking. 5. Provide positive reinforcement if pt is doing well.
2. Identification and solving of the problem.	1. Identify patient's problems such as those related to self-management or to physical condition. 2. If the problem is related to self-management: help patient aiming at problem to solve. 3. If the problem is related to physical condition: help patient to visit him/her physician.
3. Discussion of self-monitoring of the success or failure.	1. Provide encouragement and praise for positive behaviour changes made. 2. Set new attainable goals for next week if they have not achieved goal/s.
4. Remind the stories of models.	1. Remind them about the model regarding successful looking after himself/ herself. If male, talk about "story of Uncle a-Tu" If female, talk about "story of Grandmother a-yun" 2. Give other patient's condition regarding successful looking after himself/ herself. 3. Answer patients' questions.
5. Remind behaviours of self-monitoring.	1. Provide positive reinforcement of benefits of self-management. 2. Set up next telephone interview.

Appendix G

Telephone Guide

Appendix G- 1. Telephone guide-intervention group

Appendix G- 2. Telephone guide-control group

Appendix G-1

Telephone Guide-Intervention group

Experimental group: week 1, 3, 7 and 11.

1. Greeting:

First time phone call………….

- Dear sir/madam_______, I am a PhD student of QUT. My name is ……….
- Do you remember me? I had been visited your home last week.
- How are you today?
- I would like to discuss your physical condition, it will need 30 minutes. It's that fine?

Second time phone call………….

- Dear sir/madam_______, I am a PhD student of QUT. My name is ….
- Do you remember me? I had been visited your home before and call you two weeks ago.
- How are you today?
- I would like to discuss your physical condition, it will need 30 minutes. It's that fine?

Third, Fourth time phone call………….

-Dear sir/madam_______, I am a PhD student of QUT.
-Do you remember me, my name is ….
-We have talked on the telephone last month.
-How are you today?
-I would like to discuss your physical condition, it will need 30 minutes. It's that fine?

2. The content of conversation:

All phone call following up the phone call of "Self-management program content"

3. Ending:

Dear sir/madam:_______, I will finish our conversation if you have no more questions. Furthermore, I will call you after two weeks (one month later) in order to follow your physical condition. I want to thank you again for being in my study. If you have any questions, I will be happy to answer them when I call you back.

Appendix G-2

Telephone Guide -Control group

<u>Control group: week 3, 7 and 11.</u>

1. Greeting:

First time phone call………….

- Dear sir/madam_______, I am a PhD student of QUT.
- Do you remember me, my name is ….
- We had been met at the outpatient service of Dr._______ .
- How are you today?
- I would like to discuss your physical condition, it will need 10 minutes. It's that fine?

Second time phone call………….

- Dear sir/madam_______, I am a PhD student of QUT.
- Do you remember me, my name is …. We have talked on the telephone last month.
- How are you today?
- I would like to discuss your physical condition, it will need 10 minutes. It's that fine?

Third time phone call………….

- Do you remember me, my name is …… We have talked on the telephone last month.
- How are you today?
- I would like to discuss your physical condition, it will need 10 minutes. It's that fine?

2. The content of conversation:

How about your physical feeling recently?

The situation 1:

If patients feel uncomfortable physically--------------------listening

The situation 2:

If patients do not feel any uncomfortable physically-------finish the conversation.

3. Ending:

Dear sir/madam:_______, I will finish our conversation if you have no more questions. Furthermore, I will call you next month in order to follow your physical condition. I want to thank you again for being in my study.