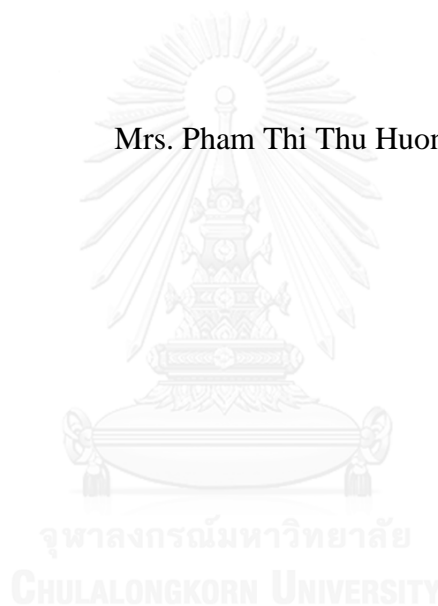


PREDICTING FACTORS OF SELF-CARE BEHAVIORS IN
VIETNAMESE ADULTS WITH HEART FAILURE

Mrs. Pham Thi Thu Huong



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ปัจจัยทำนายพฤติกรรมการดูแลตนเองในผู้ป่วยชาวเวียดนามที่มีภาวะหัวใจล้มเหลว



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การศึกษาเชิงสหสัมพันธ์แบบภาคตัดขวางนี้มีวัตถุประสงค์เพื่อบ่งชี้ปัจจัยทำนายของการดูแล
 เอง ของ ผู้ ที่ มี ภาวะ หัว ใจ ล้ม เหว ลว
 ผู้ป่วยที่มารับบริการแผนกผู้ป่วยนอกภายหลังจากจำหน่ายจากโรงพยาบาลภายในระยะเวลา 6 เดือน จำนวน
 200 ราย ได้รับการคัดเลือกจาก 10 โรงพยาบาลใน 10 จังหวัด เมืองสามเหลี่ยมปากแม่น้ำแดง
 ประเทศเวียดนาม โดยการสุ่มแบบหลายขั้นตอน
 โดยนำทฤษฎีการดูแลตนเองของโอเรียมร่วมกับการทบทวนวรรณกรรมมาเป็นกรอบแนวคิดของการวิจัย
 เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามข้อมูลส่วนบุคคล
 แบบประเมินพฤติกรรมการดูแลตนเองของผู้ป่วยภาวะหัวใจล้มเหลว (RHFSBS, $\alpha = 0.89$)
 แบบวัดความรู้เกี่ยวกับโรคหัวใจล้มเหลว (DHFKS, KR20 = 0.69)
 แบบประเมินความรุนแรงของภาวะหัวใจล้มเหลว (NYHA HF classification)
 แบบประเมินภาวะโรคร่วม (Charlson Comorbidity Index questionnaire)
 แบบสอบถามการสนับสนุนทางสังคม ($\alpha = 0.83-0.86$)
 แบบประเมินความเชื่อเกี่ยวกับการรับประทานอาหารและการรับรู้อุปสรรค ($\alpha =$
 0.81)วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและการถดถอยพหุคูณ

ผลการศึกษาพบว่า ภาวะโรคร่วม ความรู้ การสนับสนุนทางสังคม
 และอุปสรรคของการจำกัดปริมาณโซเดียมสามารถร่วมกันทำนายการดูแลตนเองของผู้ที่มีภาวะหัวใจล้ม
 เหลวได้ ร้อยละ 27.6% ($R^2 = .276$, $F_{4,195} = 18.59$, $p = .000$)
 โดยอุปสรรคของการจำกัดโซเดียมเป็นปัจจัยที่ทำนายการดูแลตนเองในผู้ที่มีภาวะหัวใจล้มเหลวได้มากที่สุด
 ($\beta = -.34$, $p < .05$) รองลงมา ได้แก่ ภาวะโรคร่วม ($\beta = -.19$) การสนับสนุนทางสังคม ($\beta = 0.23$)
 และ ความรู้ ($\beta = .15$) ในขณะที่ ความรุนแรงของอาการ
 เพศและระดับการศึกษาไม่มีความสัมพันธ์กับการดูแลตนเอง ($r = 0.02$, 0.11 และ 0.02 ตามลำดับ)

ผลศึกษานี้ชี้ให้เห็นว่าทฤษฎีการดูแลตนเองของโอเรียมมีความเหมาะสมที่จะใช้เป็นแนวทางใน
 การค้นหาปัจจัยทำนายการดูแลตนเองของผู้ที่มีภาวะหัวใจล้มเหลว นอกจากนี้ผลการศึกษาพบว่า
 สาขารัฐบาล มหาวิทยาลัยสุโขทัย มีความรู้ ปลายมือชื่อนิสิต ก.ร.ส.น.บ.ส.น.น.ท.ว.ง.ส.ง.ค.ม
 ปีการศึกษา ๒๕๖๖ การจำกัดโซเดียมและภาวะโรคร่วมเป็นปัจจัยทำนายพฤติกรรมการพยาบาลสำหรับผู้ป่วย
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This cross sectional, correlation study aimed to identify the predicting factors of self-care behaviors in Vietnamese adults with heart failure. Two hundred participants visiting the outpatient departments within 6 months after discharge were recruited from 10 hospitals of 10 provinces and cities of Red River delta in Vietnam using multistage sampling. The research theoretical framework was guided by the Orem's theory of self-care and literature review. Data collected by questionnaires including demographic data, the Revised Heart Failure Self-Care Behavior Scale (RHFSBS, $\alpha = 0.89$), the Dutch Heart Failure Knowledge Scale (DHFKS, KR20=0.69), NYHA HF classification, Charlson Comorbidity Index questionnaire, the social support questionnaire ($\alpha = 0.83-0.86$), the Beliefs about dietary compliance scale, barriers subscale ($\alpha = 0.81$). Data was analyzed using descriptive statistic and the stepwise multiple regression.

The results of multiple regression showed that Comorbidity, Knowledge, social support and Barrier of sodium restriction could predict 27.6% of self-care behaviors ($R^2 = .276$, $F_{4,195} = 18.59$, $p = .000$). The strongest predictor of self-care behaviors in patients with heart failure was barrier of sodium restriction ($\beta = -.34$, $p < .05$). Other factors related to self-care were comorbidity ($\beta = -.19$), social support ($\beta = 0.23$), and knowledge ($\beta = .15$). While symptom severity, gender and education level were not significant correlated to self-care behaviors.

In conclusion, the Orem's theory of self-care was appropriate guiding to find predicting factors of self-care behaviors in heart failure patients. The results of this research suggested useful information for the development of nursing intervention that can promote self-care behaviors in this population by improving knowledge, social support, less barrier of sodium restriction and comorbid diseases.

Field of Study: Nursing Science

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Student's Signature

Advisor's Signature

Co-Advisor's Signature

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CHAPTER I

INTRODUCTION

Background and significance of study

Since the last two decades, readmission among Heart Failure (HF) patients in Vietnam has got attention from health care researchers. At the beginning, HF was in the group of 20% of total admission patients in 5 year retrospective study, which was about 10,821 hospitalized patients with cardiovascular disease in Vietnam (Nguyen, Pham, Pham, Van, & Nguyen, 2010). However, the current number of hospitalized patients with HF among the group of Vietnamese adult has increased steeply compared with other age groups (Chu & Pham, 2005; Kieu & Nguyen, 2011; Le, 2001; Pham, 2008; Phan & Pham, 2002), which is from 50% to 80% of hospitalized patients aged 25 to 55 (Kieu & Nguyen, 2011; Le, 2001; Phan & Pham, 2002).

Interestingly, this phenomenon has also been a trend in the variety countries. Friedman and Basu found the increasing rate of rehospitalization among persons aged 18 to 64 in five states within 6 months after discharge, accounted for 81% of rate for group aged over 64 (2004), yet it is estimated that the rate of rehospitalization is continue to rise among young group aged under 65 (Aranda, Johnson, & Conti, 2009; Coffey et al., 2012). It is supported by recent studies that found the rates of rehospitalizations have increased, accounted for 10%-50% among young groups aged fewer than 65 within 6 months after discharge following index hospitalization (Aranda et al., 2009; Jessup et al., 2009).

Consequently, the increase in the prevalence of HF is associated with longer hospital stays, which represents an enormous burden to health care system. The cost

of treatment and care for this problem in Vietnam is counted for 1-2% of spending the national annual health care expenditure ("Heart failure and social financial problem,"). The accumulated losses in GDP due to chronic diseases in Vietnam between 2006 and 2015 could be as much as US\$270 million (Hoang, Dao, Kim & Byass, 2009). Moreover, the cost for one time hospitalization is relatively similar with the cost for full treatment of patient in one year. In brief, heart failure seems to be real health care problem in Vietnam. Thus, preventing hospital readmission is perhaps the most potent factor in reducing cost and resource consumption related to HF (Edwardson, 2007).

In this regard, some studies found the relationship between the period of care and outcome, which is related to readmission. For instance, in-hospital care results in short-term outcome, post-discharge care is related to intermediate-term outcome (Giamouzis et al., 2011), and long-term care as 6 months after discharge is more related to long-term outcome and readmission of patients with HF. This long-term care means to focus on components of self-care behavior of patients (Zaya, Phan, & Schwarz, 2012). It is similar with clinical experts and researchers in managing chronic HF disease who revealed that self-care behavior is seen as the most important reason of readmission (Betihavas et al., 2013; Giamouzis et al., 2011; Goodman, Firouzi, Banya, Lau-Walker, & Cowie, 2013). In addition, patients and family member also confirm the significance of self-care behavior is linked to readmission (Annema, Luttk, & Jaarsma, 2009). Therefore, self-care behavior is considered as cornerstone of therapy for adult patients in managing HF to prevent readmission. As literatures indicated patients who followed self-care after discharge reduced mortality and readmission (Brandon, Schuessler, Ellison, & Lazenby, 2009; DeWalt et al., 2006;

Koelling, Johnson, Cody, & Aaronson, 2005; Lee, Moser, Lennie, & Riegel, 2011; Seto et al., 2011).

In contrast, poor self-care behaviors such as less likely taking medication (Murray et al., 2009), non-following to a low-sodium diet (Tsuyuki, McKelvie, & Arnold, 2001; Zaya et al., 2012), fluid restriction (Lehnbom, Bergkvist, & Gransbo, 2009), high percentage of not regularly weigh, and delay in contacting health professional in the case of experiencing more symptoms (Lehnbom et al., 2009) lead to clinical exacerbation (Moser, Doering, & Chung, 2005) and readmission at 6 months after discharge (Annema et al., 2009; Siswanto et al., 2006; M. H. van der Wal, van Veldhuisen, Veeger, Rutten, & Jaarsma, 2010).

Given the explanation above, it can be concluded that self-care behaviors is one of the most important reason of readmission among adult patients with HF within 6 months after discharge. However, although self-care behaviors important and behaviors related to self-care have been emphasized for the patients during hospitalization (Yancy et al., 2013), almost of them unlikely follow these recommendation after discharge.

In Vietnam, a half of HF patients who experienced hospitalization have low self-care behaviors score (Kieu & Nguyen, 2011). It is 37% of patients having poor self-care is caused by not taking the prescribed medication (Hoang, 2010; Kieu & Nguyen, 2011), and this less follow to treatment behavior among HF patients has been the attention of many researchers in over half of patients (Chu & Pham, 2005; Le, 2001).

According to report of Hoang (2010), approximately 10% of patients did not get their symptoms monitoring regularly, and did not follow-up after discharge as recommended. It has been a habit of Vietnamese, especially for those with chronic

disease to have typical delays in making initial treatment contact to health care provider before finding alternative solution, such as following the previous medication's prescription until its symptoms getting worse.

Furthermore, dietary restriction seems to be a challenge for health care system in caring not only HF patients, but also other cardiovascular diseases due to “cultural preference for high sodium diets” (Duong, Bohannon, & Ross, 2001), and generally, extra salt is often seen on the dining tables of Vietnamese (Nguyen et al., 2012). Moreover, this kind of culture is not accompanied by physical activity, which is indicated that 20% to 40% of Vietnamese aged less than 65 do not engage in any moderate or vigorous activities such as walking, gardening and other activities that raise the heart rate (Nguyen et al., 2012; Nguyen et al., 2008).

Accordingly, despite having skill of self-care behaviors, HF patients should also “modify self-concept” to accept they really are as the ones who have HF (Artinian, Magnan, Sloan, & Lange, 2002). However, some of patients claim although they know their disease and follow the recommendation, they still return to the hospital. Some of them might fail to believe in their ability to follow what is being prescribed, and self-care behaviors does not exist as consequence (Frantz, 2004). During 6 months after discharge, patients believe that many causes of their illness are out of their control (Goodman et al., 2013), such as “a sense of failure in coping” (Orem, Taylor, & Renpenning, 2001, p. 381) although they have long-term condition that can develop understanding of their need for internal resources and external support, or become key decision maker (Department of Health, 2006). Therefore, the concept of self-care behaviors should be clearly understood.

There are variety definitions of self-care in HF patients from empirical studies. Some studies apply Orem self-care theory, and some refer to behavior (Jaarsma, Abu-Saad, Dracup, & Halfens, 2000a), practice of activities (Artinian, Magnan, Sloan, et al., 2002), or decision and strategies (Jaarsma, Stromberg, Martensson, & Dracup, 2003), and almost components of self-care behaviors are related to behavior such as adherence or compliance with regimen. In sum, self-care behaviors are defined as practice of activities being performed by heart failure patients in daily living to prevent hospital readmission. The activities refer to taking prescribed medication, following dietary and fluid restriction, engaging exercise, weighing daily, monitoring and recognizing early symptom, and seeking appropriate medical assistance, and modifying the self-concept.

These activities however are considered important to deal with an existing problem of HF in Vietnam. Yet, there is limitation in nursing care to enhance self-care among adult HF patients to downward the readmission rate in Vietnam. The supportive routine care prepare for discharge emphasize on self-care behaviors, however, the score of self-care behaviors still low and rate of readmission is remain high.

To improve self-care behaviors among HF patients, some literatures mention that education is linked to self-care behaviors, especially young cardiac patients who are educated about self-care behaviors can assume some responsibilities for disease management after hospital discharge to care themselves and return to work. A variety of education studies have been implemented on HF patients during their hospitalization (Kent, Cull, & Phillips, 2011), even 6 months follow-up after discharge (Koelling et al., 2005), which found that, the improvement in self-care

behaviors at 6 months after discharge reduced the number of readmission. However, many studies had small sample size and less likely papers reported power analysis to determine the effect size (Barnason, Zimmerman, & Young, 2011). In addition, another study ascertained that education alone will not have a positive impact on self-care behaviors (Evangelista & Shinnick, 2008).

For that reason, another study provides a complete program for HF patients, including behavioral interventions to improve knowledge, promote self-care efficacy and enhancing self-care behaviors; psychosocial interventions enhance feeling of self efficacy and psychological wellbeing; even symptom management programs that are designed on variety groups of HF patients (DeWalt et al., 2006). But, these strategies still have less or moderate effect on all components of self-care behaviors following 6 months after discharge (Evangelista & Shinnick, 2008; Hershberger et al., 2001; Jaarsma et al., 2000a; Jaarsma et al., 1999; Stromberga et al., 2003). Therefore, the application of these existing interventions seems to be non-feasibility for this population.

Thus, understanding about predicting factors of self-care behaviors is needed. One significant step is to establish effective intervention to fill the gap of knowledge on HF management among Vietnamese adult patients with heart failure. There are numbers of qualitative and quantitative studies have been conducted to identify factors related to self-care behaviors among HF patients in different population, such as inpatient, outpatients; cover both developed and developing countries. Various predictors of self-care behaviors are also reported such as age, gender, socioeconomic status, education, symptom severity, self efficacy, depressive symptom, cognitive function (J. Cameron et al., 2009; Chriss, Sheposh, Carlson, & Riegel, 2004; Heo,

Moser, Lennie, Riegel, & Chung, 2008; Rockwell & Riegel, 2001). However, there is a difference among significant factors in each population, and a few paper focusing on group of adult patients aged fewer than 60, while the incident and prevalence of HF in this population is gradually increasing. In addition, the impact of HF on older and younger adult is different (Ledoux, 2010; Nordgren, Asp, & Fagerberg, 2007; Yu, Lee, Kwong, Thompson, & Woo, 2008).

Another factor also found from a study focusing on self-care behaviors of HF patients from 15 countries is culture, which is important to consider with regard to performance of self-care behaviors among patients with HF (Jaarsma et al., 2013). Orem emphasized that available means and procedures of self-care behaviors are culture elements that vary within families, culture groups and societies (2001, p. 143). Similar with study concerning about culturally competence of care for nurses who work with Vietnamese clients in North America by Labun (2001), discovered “Surely, the Vietnamese culture has its own way of looking at health and looking at appropriate treatment and the whole concept of Eastern (Vietnamese), and Western medicine is very much an issue and that can easily be misinterpreted”.

In addition, researcher also found that shy people do not share language or culture. Direct translation of health care promotion materials, which cite Western foods or activities are not helpful because such translated examples are not cultural relevant for Vietnamese (Labun, 2001). Moreover, in the developing country such as Vietnam, where chronic diseases go abreast with poor, people are easily to give up the treatment because of economic losses by their long term restrict treatment of chronic disease (Hoang et al., 2009). To sum up, based on the limitation of existing predicting

factors and differences in cultural context, it might not appropriate to apply the current factors in Vietnamese adults with HF.

Therefore, this study is to predict of self-care behaviors guided by Orem self-care theory, a significant starting point in developing knowledge and determining which variables can predict self-care behaviors among Vietnamese adults with heart failure. The further step is in order to develop valid prevention and intervention strategies focus this group of HF patients.

Conceptual framework

The concepts of self-care theory are therapeutic self-care demand, self-care agency, self-care, and basic conditioning factors.

Therapeutic self-care demands is a conceptual element that is composed of self-care requisites, and the method and operations to meet the required care. The concept of Therapeutic Self-care Demand has three dimensions, namely Universal Self-care Requisites, Developmental Self-care Requisites, and Health-Deviation Self-care Requisites. Self-care requisites are defined as formalized expressions of kinds of action (self-care). Universal self-care requisites include adequate air, food, water with purpose maintaining structure and functioning and promote general well being. Developmental self-care requisites are related to either particular periods in the life cycle or to conditions that could adversely affect human development. Health-deviation self-care requisites refer to needs related to illness, injury, or disability. These requisites arise from the disease state and the measurement used in diagnosis of treatment. It is also linked to prevention of hospital readmission among HF patients (p.250). There are six categories of health deviation self-care requisites (Orem et al., 2001, p. 235).

Self-care agency is the complex acquired capability to meet one's continuing requirements for *care of self* that regulates life processes, maintains or promotes integrity of human structure and functioning and human development, and promotes well-being (Orem, 2001, p. 254). This capability enables adults to control and manage the necessary factor to regulate own functioning and development, and finally to measure the care to meet self-care requisites. Self-care agency reveals itself through evidence as the developed and developing capability to engage the investigative and decision making phase of self-care behaviors, and the capability to engage in the production phase of self-care behaviors.

To meet these health-deviation self-care requisites (contents of self-care behaviors), person as a self-care agent needs to perform the designed care, which is called self-care behaviors. In Orem, self-care is action of mature and maturing persons who have the powers and who have developed or developing capabilities to use appropriate, reliable, and valid measures to regulate their own functioning and development in stable or changing environment (Orem, 2001, p43). Self-care is the deliberate use of valid means to control or regulate internal and external factors that affect the smooth activity of a person's own functional and development processes or contribute to a person's personal well being.

Self-care has form and content (p.64). It is envisioned by Orem to be represented by an action-system or a dynamic process (the form of self-care), which is activated in a series of deliberate action sequences required for meeting requisites (content) for self-care (p255).

To regulate own functioning to meet self-care requisites, an adult illness person need to improve self-care and control necessary factors (Orem et al., 2001, p.

254). Otherwise, self-care deficit occurs (Orem et al., 2001). Seemingly, managing discern factors always be a challenge for illness person. Therefore, person overlooks some of or total features of self-care. Further on, nursing care will be required to help in reorganizing and balancing self-care actions and self-care requisites.

Basic conditioning factors (BCFs) are internal and external factors that affect individuals' abilities to engage in self-care or affect the kind of amount of self-care required. These factors are: age, gender, developmental state, health state, sociocultural orientation, health care system factors, family system factors, pattern of living, environment factors, and resource availability and adequacy.

Among ten BCFs, seven factors were included in the conceptual framework of current study. Those factors were selected because they are supported by empirical evidences in HF patients, which include: Gender, Developmental state (represented by knowledge), Health state (represented by symptom severity and comorbidity), sociocultural orientation (represented by education level), Health care system factor and Family system factors (represented by social support), and Pattern of living (represented by barrier of sodium restriction).

In adult, developmental state can be seen stable in the growth, development and personality. However, learning how to take deliberate action to perform the tasks of daily living within specific environment still needs to enhance. Doing effective self-care, a comprehensive knowledge on meaning, value, purpose of self-care, condition relevant to health; self-care demand and measure of self-care are required. Empirical evidence demonstrated the effect of knowledge on self-care (Dickson, McCarthy, Howe, Schipper, & Katz, 2013; Siabani, Leeder, & Davidson, 2013). In

other words, knowledge can be seen as representative of developmental state in self-care of adults with HF.

In gender factor, Orem found the difference among men and women in internal structure, the constitution, the human functions and human viewing effects on formulate of action, and determining and choosing what to do for self-care actions. Empirical studies demonstrated the association among gender and self-care behaviors (Heo et al., 2008; Lee, Riegel, et al., 2009; Riegel, Dickson, Kuhn, Page, & Worrall-Carter, 2010). Thus, gender may predict self-care behaviors.

Health state is seen as a BCF that influences what persons need to do and what they can do with respect to self-care behaviors, including general and specific health disorder information and events which patients suffered. Conceptualization of health state includes having anatomic, physiologic, and psychologic features. On this point, the limitations of physical mobility interfere with human integrated functioning that changes values of their self-care requisites. While symptoms of HF challenge patients in daily self-care instructions (Riegel et al. 2009) and managing self-care behaviors effectively (Granger et al. 2009; Minget al. 2011). Therefore, symptom severity represents health state in HF patients in association with self-care behaviors.

In addition, seeking more about patients' experiences on effect of disease or disordered to understand new self-care requisites from disease and treatment is necessary for nursing. Comorbidity patient has to deal with many difficulties in following recommendation of self-care behaviors (Hedemalm, Schaufelberger, & Ekman, 2008; Riegel, Moser, Anker, Appel, Dunbar, Grady, Havranek, et al., 2009). Thus, comorbidity that is presented for health state should be concerned in related to self-care behaviors among adult HF patients.

According to Orem, sociocultural orientation consists of education, occupation, occupational experience and life experience (p 326). Empirical studies demonstrated that low education level is related to poor self-care behaviors and vice versa (Gary, 2006; Rockwell & Riegel, 2001; Van Der Wall et al., 2006). It can be assumed that education can predict self-care behaviors in adult HF patients.

On the other hand, health care providers should give feedback to patients, motivate them to direct their energies toward recovering state of health (Orem et al., 2001). Supporting in making close relationship with family member and friends, emotion, advice and material support to meet self-care requisites are necessary. Empirical studies demonstrated that social support affects health outcome (Sayers, Riegel, Pawlowski, Coyne, & Samaha, 2008) by improving self-care behaviors (Riegel & Carlson, 2002; Wu, Moser, Chung, & Lennie, 2008). Therefore, social support is selected to represent health care system factors and family system factors in related to self-care behaviors.

Pattern of living refers to usual repetitively performed daily activities. These include self-care measures performed daily, and responsibilities for other persons that may limit health deviation self-care requisites. In HF patients, to meet self-care requisite is to keep body in low level of sodium by low sodium diet. However, due to the habit of excessive sodium diet, food habit of family members with high sodium, and social service; it may not be able to concede the means of sodium restriction (Chung et al., 2006; Nguyen et al., 2012; Yancy et al., 2013). Pattern of living in HF patients is seen as barrier of sodium restriction that affects diet restriction action in self-care behaviors.

As a conclusion, from BCFs and support from literature review, the selected predictor of self-care behaviors for this study include gender, knowledge, symptom severity, comorbidity, education, social support, and barrier of sodium restriction.

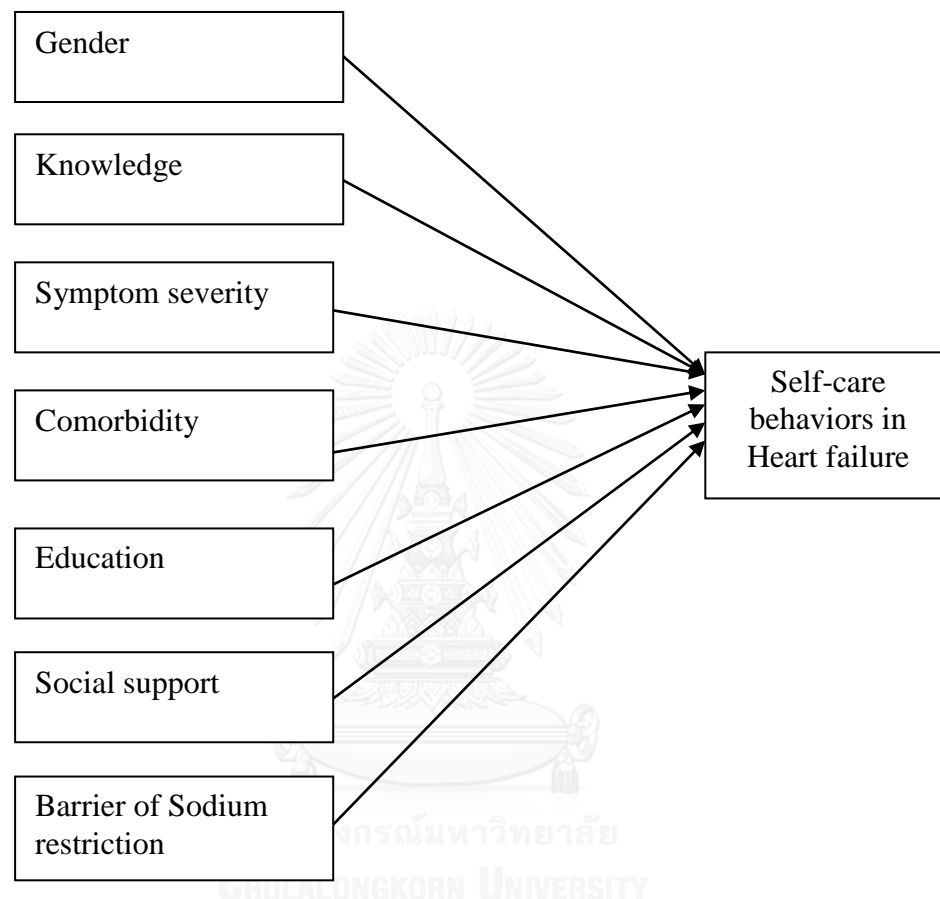


Figure 1 Conceptual framework of self-care in heart failure

Research question

How does gender, knowledge, symptom severity, comorbidity, education, social support, barrier of sodium restriction predict self-care behaviors in Vietnamese adults with HF?

Purpose of the study

To investigate the predicting factors of self-care behaviors in Vietnamese adults with HF during the six months after discharge.

Hypothesis and rationales

Gender

Gender is defined as the sex of individual with heart failure, consisting of male and female. The difference of male and female exhibits different features of physiologic, psychologic, spiritual functioning; and exhibits a religious habit of mind as they live within families and larger social units. On this point, the gender difference can be seen from behavior of self-care, factors related to better self-care behaviors (Chriss et al., 2004; Goldberg et al., 2008; Heo et al., 2008), and frequency in practicing of self-care behaviors (Lee, Riegel, et al., 2009). In which, women who are able to make dietary decisions (Chung et al., 2006), recognized signs of excess sodium intake, adherence low sodium diet, then have better HF outcomes than men (Ghali et al., 2003). Therefore, *female self-care better than male HF patients.*

Knowledge

Adults, in the process of development, they can calculate their own self-care demands due to knowledge and skills. However, acquired knowledge of appropriate courses of action to perform the tasks of daily living within specific environment for regulation, especially having chronic disease, is necessary. Empirical studies revealed significant relationship between patient knowledge and self-care behaviors in HF patients (Heo et al., 2008; Hsiao-Yun & Yann-Fen, 2011; Son, Kim, & Kim, 2011). Lack of knowledge about diet restriction (Bentley, De Jong, Moser, & Peden, 2005), fluid balance, weight (Jaarsma, Abu-Saad, Dracup, & Halfens, 2000b) and HF

symptom recognition (Quinn et al., 2011) are associated with poor self-care behaviors. Therefore, it can be assumed that knowledge has *positive relationship with self-care behaviors in adult HF patients.*

Symptom severity

Health state is conceptualized as having anatomic, physiologic, and psychologic features (Orem, 2001, p327). Specifically, the effects of a health disorder can adversely affect the performance of self-care behaviors operations (p.278). Suffering from atypical symptoms and functional limitation, HF patients frequently were unable to manage exacerbations of HF symptoms (Granger, Sandelowski, Tahshjain, Swedberg, & Ekman, 2009; Siabani et al., 2013). It can be hypothesized that *symptom severity class 2 has less self-care than class 1, symptom severity class 3 less self-care than class 1, and symptom severity class 4 less self-care than class 1, in adult HF patients.*

Comorbidity

Comorbid patients may experience new and more self-care requites, which is totally different of time distribution, and need more knowledge and effort to judge self-care behaviors significantly. With comorbidity, patients with HF must cope with taking multiple medications, different dietary requirements (Riegel, Moser, Anker, Appel, Dunbar, Grady, Havranek, et al., 2009), and meet challenges in distinguishing the symptom caused by HF or others (Hedemalm et al., 2008). It can be assumed that comorbidity have negative relationship with self-care behaviors in adult HF patients.

Education

According to Orem, sociocultural orientation consists of education, occupation, occupational experience and life experience. Persons with higher

education may be more likely to engage in self-care behaviors than those who are poorly educated (Rockwell & Riegel, 2001). Thus, education is assumed having positive relationship on self-care behaviors in adult HF patients.

Social support

Getting support from health care system in regard to lack of facilitation and utilization is very important for HF patient to follow the treatment (Clark et al., 2007; Farmer et al., 2006). On the other hand, the support from family, friends, and health care professionals in providing information and emotional support enable individuals with HF to maintain their medication and dietary treatment regimen (Riegel & Carlson, 2002; Wu et al., 2008), or recommended exercise (Tierney et al., 2011), monitoring weight gain, limiting fluid intake, getting an annual flu shot ($p = .002$) (Gallagher, Luttik, & Jaarsma, 2011). Therefore, it is assumed that social support has positive relationship with self-care behaviors in adult HF patients.

Barrier of sodium restriction

Regarding to Orem' therapeutic self-care demand, to meet self-care requisite, HF patients need to keep body in low level of sodium (action of self-care refers to treatment compliance). But the pattern of living of these patients is related to excessive sodium diet habit that might be a barrier of sodium restriction. Patients perceived barriers of following low sodium restriction because of spending time and money in preparing food when family members regarding high sodium foods (Bentley et al., 2005; Chung et al., 2006; Gary, 2006; Nguyen et al., 2012). A family-focused intervention may be useful in reducing dietary sodium intake in persons with HF (Dunbar et al., 2005). In addition, "cultural preference for high sodium diets" (Duong et al., 2001) also is barrier for HF patients in following diet recommendation.

Therefore, barrier of sodium restriction can be assumed *having negative relationship with self-care behaviors in adult HF patients.*

Scope of the study

This study is cross sectional, correlation study to develop and examine predicting factors of self-care behaviors in heart failure patients. These factors are gender, knowledge, symptom severity, comorbidity, education, social support, barrier of sodium restriction. The setting of this study is in outpatients' heart clinic of governmental and provincial hospitals in Red River delta in north of Vietnam.

Definition of terms

Self-care behaviors is defined as behaviors that heart failure patients perform in daily living during the past 6 months to prevent readmission. These behaviors refer to seeking appropriate medical assistance, being aware of and attending to the effects of HF, treatment compliance, modifying self-concept, and learning to live with effect of HF and HF treatment (Orem, 2001). Self-care is measured by Revised Heart failure self-care behavior scale (Artinian, Magnan, Sloan, et al., 2002).

Gender is defined as the sex of individual, consisting of male and female, which is measured by subjects self report of being male or female in the demographic questionnaire.

Knowledge is defined as patients' general heart failure (HF) understanding, HF treatment including diet, fluid restriction and medication, weight monitoring, physical activity, HF symptoms, and symptom recognition, which is measured by Dutch Heart Failure Knowledge Scale (DHFKS) (M. van der Wal, Jaarsma, Moser, & van Veldhuisen, 2005).

Symptom severity is defined as a degree of patient perceives cardiac function, physical functioning and symptoms related to HF during the past 6 months. Symptom severity is classified by the NYHA heart failure classification (Yancy et al., 2013).

Symptom severity class 2 defined as slight limitation of physical activity and ordinary physical activity results in symptom of HF.

Symptom severity class 3 defined as marked limitation of physical activity and less than ordinary physical activity causes symptoms of HF.

Symptom severity class 4 defined as unable to carry on any physical activity without symptoms of HF.

Comorbidity is defined as any distinct medical condition such as hypertension or diabetes that exists in addition to HF. Comorbidity is measured by self report measure of Charlson Comorbidity Index Questionnaire (Katz, Chang, Sangha, Fossel, & Bates, 1996)

Education is defined as secondary school or lower (primary and secondary school), and higher education (high education, undergraduate and graduate degree); which is measured by subjects self report in the demographic questionnaire.

Social support refers to perceived information of advice and feedback; perceived emotional of intimacy, attachment, reassurance, confidence and reliance; and perceived tangible of direct aid and giving of material supplies or services from family, friends and health care providers. which is measured by Social support questionnaire (Hanucharumkul, 1989).

Barrier of sodium restriction is defined as what HF patients perceive as obstacles to sodium retention, consisting of poor taste, lack of knowledge identifying and lack of availability of low salt items, difficulty in eating away from home,

increasing time and cost for food preparation, which is measured by Beliefs about dietary compliance scale, barriers subscale (Bennett, Milgrom, Champion, & Huster, 1997).

Expected benefits of the study

This study provided a basic knowledge to understand, explain and predict the phenomenon of self-care behaviors in Vietnam adult heart failure patients.

This research contributes to the body of knowledge that guided by Orem's theory of self-care. The findings provided and explained relationship of relevant aspects of the theory in the phenomenon.

Nurses are able to use the findings of this study to develop research and nursing interventions to help heart failure patients in improving self-care behaviors that directly improve health outcome, decrease readmission rate and mortality of heart failure patients.

CHAPTER II

LITERATURE REVIEW

Heart failure is a condition where the heart is unable to support body tissue and its metabolic demands. A result of insufficient forward pumping in general can be seen in most of heart diseases and the final common of pathway of many cardiac conditions. Since the last 2 decades, the prevalence of HF increases continuously in spite of the advances in medical, surgical and caring. Until now, the number of HF patients over the world is estimated near 6 million.

In this chapter, the phenomenon of HF self-care behaviors is presented from literature review. As important health issue, the evidence of HF with current prevalence, incident, pathophysiology, and burden is reported. Readmission is considered as the most common issue, followed by a series of other problems. Readmission occurs because of exacerbation of its symptoms, and the failure in self-care behaviors. This chapter also provides more detail about self-care behaviors in HF patients and identified factors related to self-care behaviors.

Heart failure - an important health issue

In a corporation book in cardiac nursing, Piano provided the history of heart failure definition. From the beginning, in 1930s, HF was defined by Thomas Lewis with “fails to discharge its contents adequately”. After this, emphasizing the failure of the heart as an organ and the accompanying circulatory consequence, HF was referred as “the state of any heart disease in which despite adequate ventricular filling, the heart’s output decrease or in which the heart is unable pump blood at a rate adequate for satisfying the requirement of the tissues with function parameters remaining with

normal limits”. In the same period, understanding the HF pathophysiology and ventricular remodeling, Poole-Wilson defined HF as “an abnormality of the HF and recognized by a characteristic pattern of hemodynamic, renal, neural and hormone responses” (Ledoux, 2010). This definition included some aspects of the genetic, molecular and cellular changes in the myocardium also reflected how HF could arise from abnormalities in systolic or diastolic function.

Cause of heart failure

Funk and Winkler (2008) categorized the cause of HF into four causes, consisting of myocardial, volume, pressure loading and restrictive. Firstly, hypertension and coronary artery disease (CAD) can be seen as the most common causes of HF currently. Coronary disease is known as etiology of heart failure in range of 36% to 50% in the reviewing of Roger (2010). Within 5 years after myocardial infarction for those between 40 and 69, about 7% of men and 12% of women will develop heart failure (Rosamond et al., 2007). Data from the National Health and Nutrition Examination Survey (NHANES) 2003–2006 indicated that 33.6% of US adults > 20 years of age have hypertension (Lloyd-Jones et al., 2010). In 2002, this proportion in Vietnamese is 16.8% (Hoang et al., 2009). In addition, hypertension, which precedes the development of heart failure in 75% of cases (Rosamond et al., 2007).

Secondly, there are changes in volume results of HF from disorder in aortic and mitral regurgitation and anemia. Thirdly, excessive after load from aortic stenosis or hypertension results in the inability of the ventricle to empty or pressure loading leads to heart failure.

Lastly, authors mention about more common causes of HF in third world nations, with restrictive conditions such as constrictive pericarditis. However, today, in less developed countries, another etiology of heart failure is known by the A streptococci in rheumatic fever. Rheumatic fever is an acute autoimmune disorder that results as a complication of streptococcal upper respiratory tract infections (Ledoux, 2010). The incidence of this rheumatic fever in developing countries is over 100/100,000. The prevalence of rheumatic heart disease is 30.8% (G. K. Pham, Nguyen, Pham, & Nguyen, 2010). This can be explained by insufficient of preventing streptococcal infections, environment hygiene and access to health care. This is also clarify the high rate of valvular disorder in Vietnam in young adult (*Recommendation for cardiovascular and metabolic diseases, period 2006-2010, 2006*).

Incident and prevalence of heart failure

Heart failure is major public health issue with current prevalence over 23 million people worldwide (Anh, Tamara, & Gregg, 2011). Although specific statistics are not available for every country, HF is believed to have reached epidemic proportions in both developed and developing countries (Riegel, Driscoll, et al., 2009). In the USA, almost 6 million people had heart failure in 2008, and the prevalence continues to rise (Anh et al., 2011). In Europe, for the period of 1987–2003, approximately 2% of the population had heart failure (Shafazand, Schaufelberger, Lappas, Swedberg, & Rosengren, 2009). The prevalence of HF in India is estimated range from 1.3–4.6 million, with an annual incidence of up to 1.8 million cases (Huffman & Prabhakaran, 2010). In a South African study of patients with a confirmed diagnosis of cardiovascular disease, 85% of whom were black, HF was the most frequent diagnosis (in 44% of patients) (Sliwa et al., 2008).

Noteworthy, HF is not only a condition of advancing age typically, while the lifetime risk of developing of HF in both genders at the middle age is one in five (National Heart & Lung Institute, 2007). In the report of Centers for disease control and prevention (CDC) (2005) 1.4 million adults of American suffer from HF.

Admission and readmission among HF patients

Admission and readmission are the most common consequence of failure self-care behaviors (Annema et al., 2009; Siswanto et al., 2006; M. H. van der Wal et al., 2010). The prevalence of readmission among younger HF patients initially attention (Aranda et al., 2009). Interestingly, Friedman and Basu found that among persons 18 to 64 years of age in five states, the rate of rehospitalization for any reasons within 6 months after discharge was 81% of the rate among those older than 64 years of age (2004). Even, this rate is expected higher for HF patients who are younger than 65 years of age compared with older patients (Aranda et al., 2009; Coffey et al., 2012). More recently, numbers of studies were conducted confirming the trend of readmitted hospitalization in heart failure population. It ascertained that heart failure of group aged less than 65 year accounted for 10–50% readmission in the 6 months following index hospitalization (Aranda et al., 2009; Jessup et al., 2009).

In Vietnam, findings from one 5 year retrospective study showed that, the number of cardiovascular disease hospitalization patients were increased from 7,046 to 10,821 cases (increased 53.5%). In which, HF was in the group of 20% of total admission patients in this study (Nguyen et al., 2010). In addition, according to report of Hanoi Cardiovascular institute in 1991, HF patients admitted account for 59% in total of 1,291 inpatients (Pham, 2008). The current number of hospitalized patients with HF among the group of Vietnamese adult has increased steeply compared with

other age groups (Chu & Pham, 2005; Kieu & Nguyen, 2011; Le, 2001; V. T. Pham, 2008; Phan & Pham, 2002). In 2001, studies on 400 heart failure patients, Le found that 80% of participants with age from 25 to 55 (Le, 2001). The prevalence is approximately 50% could be seen in group of HF patients under 60 (Kieu & Nguyen, 2011; Phan & Pham, 2002). Beside, one report paper indicated that readmission among HF patients should be attended with the rate of 30% in total cardiovascular readmission number (Do, 1997).

The increase in the prevalence of HF parallel is coupled with extended and frequent hospital stays, which represents an enormous burden to health care system. The cost of treatment and care for this problem in Vietnam is counted for 1-2% of spending the national annual health care expenditure ("Heart failure and social financial problem,"). The accumulated losses in GDP due to chronic diseases in Vietnam between 2006 and 2015 could be as much as US\$270 million (Hoang et al., 2009). Moreover, the cost for one time hospitalization is relatively similar with the cost for full treatment of patient in one year. In brief, heart failure seems to be real health care problem in Vietnam. Thus, preventing hospital readmission is perhaps the most potent factor in reducing cost and resource consumption related to HF (Edwardson, 2007).

Reason for readmission in HF patients

Some studies found the relationship between the period of care and outcome, which is related to readmission. For instance, in-hospital care results in short-term outcome, post-discharge care is related to intermediate-term outcome (Giamouzis et al., 2011), and long-term care as 6 months after discharge is more related to long-term outcome and readmission of patients with HF. This long-term care means to focus on

components of self-care behaviors of patients (Zaya et al., 2012). It is similar with clinical experts and researchers in managing chronic HF disease who revealed that self-care behaviors is seen as the most important reason of readmission (Betihavas et al., 2013; Giamouzis et al., 2011; Goodman et al., 2013). In addition, patients and family member also confirm the significance of self-care behavior is linked to readmission (Annema et al., 2009). Therefore, self-care behaviors are considered as cornerstone of therapy for adult patients in managing HF to prevent readmission. As literatures indicated that patients who followed self-care behaviors after discharge reduced mortality and readmission (Brandon et al., 2009; DeWalt et al., 2006; Koelling et al., 2005; Lee et al., 2011; Seto et al., 2011).

In contrast, poor self-care behaviors are such as less likely taking medication (Murray et al., 2009), non-following to a low-sodium diet (Tsuyuki et al., 2001; Zaya et al., 2012), fluid restriction (Lehnbom et al., 2009), high percentage of not regularly weigh, and delay in contacting health professional in the case of experiencing more symptoms (Lehnbom et al., 2009) lead to clinical exacerbation (Moser et al., 2005) and readmission at 6 months after discharge (Annema et al., 2009; Siswanto et al., 2006; M. H. van der Wal et al., 2010).

In Orem (2001), modifying self-concept is mentioned as accepting oneself as being in a particular state of health and in need of specific forms of health care. However, in spite of expectation that HF patients with long term condition involve the development of understanding of their need for internal resources and external support (Department of Health, 2006), patients believe that many of the causes of their illness are outside their control (Goodman et al., 2013; Jaarsma et al., 2000a). They believe that HF is unlikely to be cured or completely controlled by treatment.

However, when patients fail to believe in their ability to follow what is being prescribed, and self-care behaviors does not exist as consequence (Frantz, 2004).

Heart failure in adults and elderly

For the younger heart failure patients, especially for those who are still working, they might feel depressed “why is this happening to me and not to somebody else”. Give up and meaningless existences (Nordgren et al., 2007) are common in the experience of the middle age heart failure patients. In this study, it is also found the strain in the relationship among HF patients in the middle age group with their life. Rapid emotional swings and turns between hope and hopelessness, faith and despair, feeling well and feeling ill, and satisfaction and discontentment. It seems that this group meets challenging in dealing with their health care problem than the older group, which are often ‘feeling imprisoned in illness’, ‘feeling free despite illness’ represented “ready for death, and viewing it as natural after a long life”. Older people, instead of depression and hopeless, tried to modify their usual lifestyles adjusting the amount of physical activities and reducing stress (Yu et al., 2008). In addition, finding purpose and meaning of the illness experience also emerged as a way for them to reconcile their living with CHF.

Self-care

Self-care definition

Concept of Self-care is more and more attractive with scientist nowadays. Initially, the World Health Organization (WHO, 1983) refers self-care as “Activities of individuals, families, and communities to undertake with the intention of enhancing health, preventing disease, limiting illness, and restoring health”.

The definition of WHO was revised in 2009 emphasized on the “ability” of individuals, families or communities to promote health, prevent disease, and maintain health, and cope with illness and disability with or without the support of a health-care provider.

In the original theory of Orem, self-care is defined as “the practice of activities that maturing and mature persons initiate and perform, within time frames, on their own behalf in the interests of maintaining life, healthful functioning, continuing personal development, and well-being, through meeting known requisites for functional and developmental regulations” (Orem et al., 2001).

In the UK, the Department of Health (DH) defines self-care as “the actions of individuals to take care of themselves, their children, their families and others to stay fit and maintain good physical and mental health; meet social and psychological needs; prevent illness or accidents; care for minor ailments and long-term conditions; and maintain health and wellbeing after acute illness or discharge from hospital.” (Department of Health, 2005)

To sum up, self-care can be defined as the activities of individuals, families, and communities to undertake with the intention of enhancing health, continuing personal development, preventing disease, limiting illness, and restoring health.

Definition of self-care behaviors in HF patients

Self-care activities are dependent on an individual’s needs at a given point in time and may vary over time and with the disease course. It is true to say that most conditions have specific self-care activities. However, for the chronic heart failure, researchers in this study focus on the concept of self-care behaviors, which has various definitions.

Rockwell and Riegel (2001) defines self-care is an active, cognitive process in which persons engage for the purpose of maintaining their health or managing disease and illness. While Gary (2006) defines self-care as naturalistic decision making process involving the choice of behaviors that maintain physiologic stability (self-care maintenance) and the response to symptoms when they occur (self-care management).

From literature review, there is numerous papers applied Orem theory to define concept of self-care in HF patients as followings:

Heart failure self-care behavior is the behavior that a patient undertakes to care for himself to promote health and well-being (Jaarsma et al., 2000a; Jaarsma et al., 2003).

Self-care refers to the practice of activities that individuals initiate and perform on their own behalf in the interest of maintaining life, health, continuing personal development, and well-being (Artinian, Magnan, Sloan, et al., 2002).

However, although self-care in HF in these studies referred to behavior (Jaarsma et al., 2000a), practice of activities (Artinian, Magnan, Sloan, et al., 2002) or cognitive process (Rockwell & Riegel, 2001), but most of components of self-care in HF is related to behavior, such as adherence or compliance with regimen. The most common behaviors are related to maintaining physical functioning, controlling HF condition and preventing exacerbation after discharge are taking prescribed medication, following dietary and fluid restriction, engaging exercise, weighing daily, monitoring and recognizing early symptom and seeking appropriate medical assistance.

On the other hand, as widely use as theoretical definition in HF patients, Orem guides the way to define self-care. She said that study of the actual self-care practices

of individuals with well-defined requirements for self-care is the best method to achieve a sound understanding of self-care. Based on this, Denyes, Orem, and Bekel (2001) explained, “Self-care requisites are formalized expressions of kinds of action (named self-care) to achieve conditions that have some established or presumed effectiveness in individuals’ regulation of their own functioning, development, and well-being on a day-to-day basis as they live with other human beings in stable or changing environments” (p. 51). In particular, self-care requisites are “the reasons for doing actions that constitute self-care” (Orem, 1995, p. 108).

To meet the increased demand for self-care effectively, the specifics of HF self-care must be learned and deliberately performed continuously and in conformity with the regulatory requirements, especially in 6 months after discharge, modifying self-concept to become more important in HF patients (Artinian, Magnan, Sloan, et al., 2002; Frantz, 2004).

In conclusion, self-care behaviors are defined as behaviors performed by heart failure patients in daily living to prevent hospital readmission. From empirical studies, adapting activities contain items related to adapting one’s activities to the condition (Jaarsma et al., 2003) or being aware of and attending to the effects of HF (Orem, 2001). Moreover, regarding to Orem, adapt activities also refer to learning to live with effect of HF and HF treatment. Therefore, these behaviors refer to treatment compliance, seeking appropriate medical assistance, being aware of and attending to the effects of HF, learning to live with effect of HF and HF treatment, and modifying self-concept (Orem, 2001).

The following is guideline of self-care behaviors for heart failure patients (Riegel, Moser, Anker, Appel, Dunbar, Grady, Gurvitz, et al., 2009; White, Kirschner, & Hamilton, 2014).

Self-care in HF patient

In Vietnam, a half of HF patients who experienced hospitalization have low self-care behaviors score (Kieu & Nguyen, 2011). It is 37% of patients having poor self-care behaviors is caused by not taking the prescribed medication (Q. H. Hoang, 2010; Kieu & Nguyen, 2011), and this less follow to treatment behavior among HF patients has been the attention of many researchers in over half of participants (Chu & Pham, 2005; Le, 2001).

Among patients who did not follow medication prescription (Q. H. Hoang, 2010), one worthy note is the rate of “forget taking medication” among patients younger 60 year of age higher than this rate among higher age group. In this report, approximately 10% of participants did not get their symptom monitoring regularly and a similar rate of them did not follow up after discharge as recommended. However, the percentage of the real situation is higher than the percentage in this report. For example, as the result of Kieu & Nguyen (2011) indicated that, almost of HF patients admit hospital because of exacerbation of symptoms combination. It is in regard to the popular habit of Vietnamese, especially for those with chronic disease to have typical delays in making initial treatment contact to health care provider before finding alternative solution such as following the previous medication’s prescription, and its symptoms getting worse.

Furthermore, dietary restriction seems to be a challenge for health care system in caring not only HF patients, but also other cardiovascular diseases due to “cultural

preference for high sodium diets” (Duong et al., 2001), and generally, extra salt is often seen on the dining tables of Vietnamese (Nguyen et al., 2012). The proportion of almost one third of 191 patients are still continuous a normal salty dietary after discharge (Hoang, 2010), even up to 52.5% (Kieu & Nguyen, 2011). This study also indicated that reducing salt intake combined with tobacco control would reduce 40-80 deaths per 100,000 populations older than 30 years (cited by Hoang et al., 2009).

Moreover, this kind of culture is also not accompanied by physical activity, which is indicated that 20% to 40% of Vietnamese aged under 65 do not engage in any moderate or vigorous activities such as walking, gardening and other activities that raise the heart rate (Nguyen et al., 2012; Nguyen et al., 2008).

The scientific evidence demonstrated that there was a significant relationship among influenza and heart failure (Madjid, 2004; Naghavi et al., 2000). As recommendation of Ministry of health from 2011, everyone, especially cardiovascular patient including HF patients should have annual influenza vaccination because the epidemiology of influenza among Vietnamese is 20% (report WHO, cited by Dang (2012)). Nevertheless, this requirement seems new and unfamiliar among cardiovascular, particularly HF patients.

Self-care is concerned among adult HF patients within 6 months after discharge. HF patients admit hospital and having nursing care only 5 to 7 days (Aranda et al., 2009). Further on, they have to spend their remaining recovery at home with the stress that HF is a progressive, chronic, and incurable disease without knowing whether short or long time hospital discharge. However, patients with heart failure are at high risk of re-admission because of worsened symptom. Moreover, in spite of expectation that HF patients with long term condition involve the

development of understanding of their need for internal resources and external support or become key decision maker (Department of Health, 2006), at 6 months after discharge, patients continue to believe that many of the causes of their illness were outside their control (Goodman et al., 2013), a sense of failure in coping with events (Orem et al., 2001, p. 381) although they satisfied with treatment regimen. They believed that HF is unlikely to be cured or completely controlled by treatment. When patients fail to believe in their ability to follow prescribed care regimens, they are less likely change their health behavior such as self-care behaviors (Frantz, 2004; Petrie & Weinman, 1997).

Health care service and cultural context in Vietnam

Health system in Vietnam is a mixed public-private health system. The public system plays a key role in health care, especially in policy, prevention, research and training. While the private sector has grown steadily since the 'reform' of the health sector in 1989, but is mainly active in outpatient care; inpatient care is provided essentially through the public sector.

The health care network is organized under the state of administrative units: central, provincial, district, commune and village levels, with the Ministry of Health at the central level. In the public sector, there are 774 general hospitals, 136 specialized hospitals and 11,576 primary health centers. The establishment of the grassroots health care network (including commune and district levels) as the foundation for health care has yielded many achievements, especially for the contribution towards attainment of national health care goals for the entire population.

The health stations in commune and village levels provide primary health care services, including consultation, outbreak prevention and surveillance, treatment of

common diseases, maternal and child health care, family planning, hygiene and health promotion.

There are so many problems regarding health care system in Vietnam such as The quality of health services that does not meet the diversifies needs of people; Slow renew, Poor health care condition for those in remote and ethic group; Unaffordable health care cost, Low capacity of pharmaceutical supply, and Insufficient preventive medicine.

To restrain the limitation of health care system in supporting service for citizen, in 2013 (Vietnam Ministry of Health, 2013), the Government and the Ministry of Health achieved proposal hospital satellite network and family doctor; the number of bed has been added to 14269 beds in whole country. In all district hospitals, 15% of health care providers have graduate level, around 74% health station get national standard of commune health care system. National financial support to communes and rural areas is higher as urban, which is 1.7-2.4 times, and the education level and professional level of health care providers in all units have increased.

Non-communicable diseases have shown a tendency to increase in the last two decades (Nguyen et al., 2010), with total morbidity rising from 39.0% in 1986 to 63.14% in 2008, and mortality from 41.1% to 60.02%. In this group of non-communicable disease, heart failure is one of the most common diseases. Heart disease with 16% is in the 3rd place of 5 most common health problems that require outpatient care.

In dealing with health problem, Vietnamese have a habit in typical delays in making initial treatment contact to health care provider. They tend to have self-treatment at the beginning to find alternative solution such as following the previous

medication's prescription, using traditional medicines, until its symptoms getting worse. Therefore, it is a challenge for health care system in managing citizen' health.

For the group of chronic disease, including cardiovascular patients, they may less likely get health education after discharge. In spite of expectation on the role of nurse with sufficiency competence in educating and recommending patients taking care at home, the patients still need the cooperation of physician. The nurses may not recognize the significance of preparation for discharge. Therefore, patients with chronic disease have kind of challenges in dealing with their health problem that needs long term care after discharge.

In line with that, although the patients get the recommendation to check-up after discharge, but the majority of them do not implement. It tells that, patients with HF come to clinic when their symptoms get worse (rationally it may be nearly 40% of population use health care system without health care insurance—the report on the results of monitoring the implementation of policies and laws on health insurance, 2012). As consequence, the rate of readmission after discharge is almost 30% in this population (Do, 1997). In the entire proportion, some of which to be outpatients, following health checking or appointment, and others may be good in self-care when they can keep long time staying at home. Moreover, in the developing country such as Vietnam, where chronic diseases go abreast with poor, people are easily to give up the treatment because of economic losses by their long term restrict treatment of chronic disease (Hoang et al., 2009) . Therefore, they need more support from family member or assistant from friends or neighbor in case of acute care emergency, especially for remote persons. However, the implementation of new policies on health care

insurance from the beginning of 2016 opens the expectation in meeting health care requirements for Vietnam health care system.

On the other hand, concerning about culturally competence of care for nurses who work with Vietnamese clients in North America, Labun (2001) discovered “Surely, the Vietnamese culture has its own way of looking at health and looking at appropriate treatment and the whole concept of Eastern (Vietnamese), and Western medicine is very much an issue and that can easily be misinterpreted”.

In addition, researcher also found that shy people do not share language or culture. Direct translation of health care promotion materials, which cite Western foods or activities are not helpful because such translated examples are not cultural relevant for Vietnamese (Labun, 2001).

Existing self-care theories

Several theories explained self-care in HF patients have been proposed. These are the Situation-specific theory of heart failure, The Connelly’s Model of Self-Care in Chronic Illness (MSCCI) and Orem’ theory of self-care.

The Self-care of HF model is originally developed to describe the situation-specific theory, which is codified for the purpose of instrument development (Riegel & Dickson, 2008). In this theory, self-care in heart failure patients is defined as behaviors to maintain physiologic stability (self-care maintenance) and response to symptoms when they occur (self-care management). In detail, self-care maintenance consists of symptoms monitoring (recognizing and interpreting symptoms), and treatment adherence that involves the advice of providers to follow the treatment and live a healthy lifestyle. Self-care management describes how patients recognize and respond to their symptoms, involving symptom recognition, symptom evaluation,

treatment implementation, and treatment evaluation (Riegel & Dickson, 2008). However, the model does not provide the factors that related to self-care or implement these behaviors.

The Connelly's Model of Self-Care in Chronic Illness is developed to illustrate and describe the variables influencing self-care among patients with chronic illnesses and among HF patients (Rockwell & Riegel, 2001). The MSCCI is based on the motivational theory and structured around a value-expectancy concept. This is the concept that in a given situation, human beings can be expected to respond in a manner that they believe will lead to the most subjectively valuable outcome for that particular situation. The MSCCI is described as a holistic approach for identifying variables influencing self-care in chronic illness. In this model, Connelly suggests that predisposing and enabling factors influence general and therapeutic self-care behaviors. However, the construct of concept self-care is related to self-care maintenance and self-care management; without self-concept dimension (Rockwell & Riegel, 2001), which emerges in long term care of HF patients.

In Orem theory, health-deviation self-care requisites refer to needs related to illness, injury, or disability. These requisites arise from the disease or injury state and the measurement used in diagnosis of treatment. Its purpose is to prevent, control, or manage health problems. In six categories of health deviation self-care requisites (Orem, 2001, p 235), Orem emphasizes the significance of treatment compliance, seeking appropriate medical assistance, being aware of and attending to the effects of HF, learning to live with effect of HF and HF treatment. Moreover, Orem recommends that self-concept should be modified to accept oneself as being in particular state of health and in need of specific forms of health care. Moreover, the

theory model provides variables influencing self-care as basic conditioning factors. Therefore, Orem model is used to guide this study.

Orem' s Self-care theory



Figure 2 Orem' s Self-care Theory-Conceptual framework

The concepts of theory of Self-care include therapeutic self-care demand, self-care agency, self-care, and basic conditioning factors.

Self-care therapeutic demands

Therapeutic self-care demands is a conceptual element composed of self-care requisites and the method and operations to meet the required care. The concept of Therapeutic Self-Care Demand has three dimensions, namely Universal Self-Care Requisites, Developmental Self-Care Requisites, and Health-Deviation Self-Care Requisites.

Denyes, Orem, and Bekel (2001) explained, “Self-care requisites are formalized expressions of kinds of action (named self-care) to achieve conditions that have some established or presumed effectiveness in individuals’ regulation of their own functioning, development, and well-being on a day-to-day basis, as they live with other human beings in stable or changing environments” (p.51).

Universal requisites are common to all human beings. They are concerned with life processes, and its purpose is to maintain human structure and functioning and to promote general wellbeing. The universal requisites include adequate air, food, and water,... and human desire to be normal (Orem, 2001, p225)

Developmental self-care requisites are related to either particular periods in the life cycle or to conditions that could adversely affect human development (Orem, 2001, p230).

Health deviation self-care requisites refer to needs related to illness, injury, or disability. These requisites arise from the disease or injury state and the measure used in diagnosis of treatment, with its purpose to prevent, control, or manage health problems. There are six categories of health deviation self-care requisites (Orem, 2001, p 235).

1. Seeking and securing appropriate medical assistance when there is exposure to specific physical or biologic agents or environmental conditions associated with human pathologic events and states, or when there is evidence of genetic, physiologic, or psychologic conditions known to produce or to be associated with human pathology.

2. Being aware of and attending to the effects and results of pathologic conditions and states, including effects on development.

3. Effectively carrying out medically prescribed diagnostic, therapeutic, and rehabilitative measures directed to preventing specific types of pathology, to the pathology itself, to the regulation of human integrated functioning, to the correction of deformities or abnormalities, or to compensation for disabilities.

4. Being aware of and attending to or regulating the discomforting or deleterious effects of medical care measures performed or prescribed by the physician, including effects on development.

5. Modifying the self-concept (and self-image) in accepting oneself as being in a particular state of health and in need of specific forms of health care.

6. Learning to live with the effects of pathologic conditions and states and the effects of medical diagnostic and treatment measures in a life-style that promotes continued personal development (Orem, 2001, p. 235).

When self-care requisites are viewed as formulated and expressed purposes of self-care, the ways and means through which these purposes can be attained are an important consideration in understanding self-care as human action (p49). A single self-care practice or a whole system of self-care is therapeutic to the degree that is actually contributes to the achievement of: support of life processes; maintenance of normal growth; prevention, control or cure of disease processes; prevention of or compensate for disability; and promotion of wellbeing (p52).

In summary, for people who have chronic heart failure, practicing of self-care activities is a therapeutic to prevent exacerbation of symptom and prevent hospitalization. These activities are formulated by health deviation self-care requisites.

Self-care agency

Self-care agency is the complex acquired capability to meet one's continuing requirements for *care of self* that regulates life processes, maintains or promotes integrity of human structure and functioning and human development, and promotes well-being (Orem, 2001, p. 254). The complexity of developed capability enables

adults and adolescents to discern factors that must be controlled or managed in order to regulate their own functioning and development, to decide what can and should be done with respect to regulation, to lay out the components of their therapeutic self-care demands (self-care requisites, technologies, care measures), and finally to perform the care measurement designed to meet their self-care requisites over time (Orem, 2001, p. 492).

Self-care agency, according to Orem (2001), “varies over a range with respect to its development from childhood through old age. It varies with health state, with factors that influence educability, and with life experiences as they are enabling for learning, for exposure to cultural influences, and for use of resources in daily living” (p. 254). Self-care agency of individuals at this time or that time is conditioned by factors that affect its development and its operability. Its adequacy is measured against the component parts of the therapeutic demand, that is, the demand on the individuals to engage in self-care.

Self-care agency reveals itself through evidence as the developed and developing capability to engage to the investigative and decision making phase of self-care (phase one) and the capability to engage in the production phase of self-care (phase two).

The concept of Self-Care Agency has three dimensions, namely Development, Operability, and Adequacy. Development and operability are identified in terms of the kind of self-care operations individual that can consistently and effectively perform. The adequacy of self-care agency is measured in terms of the relationship of the number and kinds of operations that persons can engage in and the operation, which is required to calculate and meet an existing or projected therapeutic self-care demand.

Self-care

In Orem, self-care is action of mature and maturing persons who have the powers and who have developed or developing capabilities to use appropriate, reliable, and valid measures to regulate their own functioning and development in stable or changing environment (Orem, 2001, p43). Self-care is the deliberate use of valid means to control or regulate internal and external factors that affect the smooth activity of a person's own functional and development processes or contribute to a person's personal well being.

Self-care has form and content (p.64). It is envisioned by Orem to be represented by an action-system or a dynamic process (the form of self-care). This action-system is activated in a series of deliberate action sequences required for meeting requisites (content) for self-care (p255).

To regulate own functioning and development and perform the care measure results into, an adult illness person need improve self-care to meet self-care requisites and control necessary factors (Orem et al., 2001, p. 254). Otherwise, self-care deficit occurs (Orem et al., 2001). Seemingly, managing discern factors always be a challenge for illness person. Therefore, person overlooks some of or total features of self-care. Further on, nursing care will be required to help in reorganizing and balancing self-care actions and self-care requisites.

Basic conditioning factors – selected and non-selected factors

Basic conditioning factors are defined as personal conditions or environmental circumstances in a time-place matrix that affect the values or ways of meeting person's existence self-care requisites; bring about new self-care requisites; or affect the development, operability or adequacy of persons' capabilities to care for

themselves or their dependents; condition or events in a time-place matrix that affect the values of nurses' powers of nursing agency.

Basic conditioning factors (BCFs) are internal and external factors that affect individuals' abilities to engage in self-care or affect the kind of amount of self-care required. These factors are: age, gender, developmental state, health state, sociocultural orientation, health care system factors, family system factors, pattern of living, environment factors and resource availability and adequacy. The relationships among each factor and self-care is described in detail below:

Age is most frequently thought of in term of chronologic age, the period of time between birth and succeeding time periods (p.373). In this study, the researcher concerns about self-care in adult patients. Therefore, age is seen as specific factor in nursing adult. According to Orem, adult patients who are aware of their experiences and of the events that occur in the health care situation, they serve as information and communication centers in the health care situation. The contacts and content of communications, interpretation of and reactions to his or her experiences are influencing factor on health care and nursing. So, increasing age of adult HF patients, increasing life experiences, having social responsibilities to exposure cultural influences, and the use of resources in daily living (p254) can make them easier to accept themselves in being ill and change self-concept. However, this concept overlaps with the increased knowledge by experience, and accept oneself in development state. Therefore, concept of age is not included in this study.

Developmental state (adult oriented) is in relation to the existence of developmental self-care requisites (p327). Human development is investigated in terms of its various dimensions such as organic dimension, the psychic dimension,

and personal dimension (p230). In adult population, the growth, development and personality are assumed stable. However, learning how to take deliberate action to perform the tasks of daily living within specific environment is still necessary (p273). Having some understanding of the meaning and value of self-care is fundamental to engaging in it (p.276). Knowledge of the purposes and meaning of self-care provides the basis for appraising and attaching value to engaging in particular courses of self-care action (p.274). Knowledge of self-care measures is useful in meeting self-care requisites varies with life experiences. Therefore, knowledge is representative of developmental state as basic conditioning factor associated with self-care behaviors.

However, knowledge of patients can be divided to be 2 kinds, which are formal and experiential. However, it seems overlap between knowledge of patients that is related to increasing age (experience knowledge was ascertained from their own experiences), and knowledge that patient can learn in the developmental stage. In addition, it is similar with developmental states of accepting oneself (p271), and changing self-concept along with increasing age that confirms the overlap among two factors. It means age is not selected in this study as a predicting factor of self-care behaviors.

Gender: Orem views men and women as a unitary, embodies being, bringing into focus the internal structure, the constitution, and the human functions that are the objects of study of the life sciences (p.130). Unitary being view includes the views that human being are living; who exhibit features of physiologic, psychologic, spiritual functioning, exhibit a religious habit of mind as they live within families and larger social units. Moreover, a person may formulate results in terms of what he or

she hopes to experience (p.272). According to Orem, gender may also influence the methods that are used to meet the various self-care requisites.

Health state: Health state is basic conditioning factors influencing what persons need to do and what they can do with respect to self-care (p81), including general and specific health disorder information and events which patients suffered. Health state is conceptualized as having anatomic, physiologic, and psychologic features (Orem, 2001, p327). The information regarding the disciplines of physiology and pathology helps to the judgment about self-care need and capability of patients (p185). Absence of stability in structure and functional feature of health state changes values of their self-care requisites and their therapeutic demands. These changes focus a person's attention on himself leads to demands for determining of self-care action to restore normalcy (233). The limitation of physical mobility may lead to emotional and mental problem, interfere with human integrated functioning and influences what person may choose to do (234). Orem emphasis that heart failure as one of leading causes of death with its degree of illness, affect the outlook and behavior of patients (p380). In another word, the symptom severity of HF affects self-care behaviors in patients.

Beside the symptom severity, nurses should seek information about the effects of disease or disordered function experienced by the patient (p379). The comorbidity patients may experience new and more self-care requites in a totally different time distribution, and more knowledge and effort may be needed for valid judgments about self-care measure (p.274), which is not only arise from the disease, but also self-care requisites that arise from the measures used in diagnosis and treatment (p234).

Sociocultural orientation

According to Orem, sociocultural orientation consists of education, occupation, occupational experience and life experience (p 326). Self-care is a process that can be taught. It takes time to learn the process, and poor education may simply need more time to learn self-care than those who are better educated.

Health care system factors and family system factors

Because of complicated demands for managing self-care behaviors that produced by medical technology; patients who are ready to engage in health deviation self-care may require assistance in the form of support and guidance (p.276). To select valid and reliable methods of helping and designing nursing systems to support, nurses need to diagnose self-care agency accurately. Helping patients to view themselves, recognizing needs for change, and becoming knowledgeable are important for maintaining self-care agency. However, the medical or nursing assistance may be needed for a valid judgment of self-care measures (p.274) when decision making is affected by adverse self-care requisites.

To diagnose patients, nurses must make close relationship by accepting individuals, families and groups as being in particular states of health and wellbeing; understanding the limitation of the biologic features of human being and limits of human capacities for self-care behaviors (p256). As a result, nurses can assist patients to accept their self-concept as they really are, and motivate them to direct their energies toward recovering state of health (p.194). Giving feedback to patients who need to perform new and additional self-care measures, adjust or change currently performed measures or resume self-care behaviors after a period of being take care of, is an essential aspect of nursing practice by assessing patients' foundation capabilities and dispositions (p.264). While as a part of nursing focus, patients have capability in

aware of need for observation, able to recognize the need for emergency medical assistance (p.194). However, lack of social support system to sustain individual when self-care is complex, time consuming and stressful are the limitations in achieving courses of action (p281).

Besides contacting with health workers and persons who provide services, the frequency and duration of contact with family member and friends, the variety of social contacts, the content of communications are influencing factors on health care and nursing. By contacting family member or friends, with emotional support and advice, patients are given insight into the importance of understanding any illness as a continuum and of the need to look for change and evaluate over time to adapt and accept existing condition (p.268).

However, it is not only emotional support, but also material especially financial support is important in taking care of HF patients. On the other hand, the material support from family is seen as *resource availability and adequacy* that affects primarily the selection of means to meet self-care requisites and the associated care measures (p246, 409).

Environmental factor, according to Orem, includes physical, chemical and biologic features, which in addition with socioeconomic cultural features, the other side of environmental factor, and focus on family and community (Orem et al., 2001). By this definition, environmental factor and resources availability and adequacy are not included as predicting factors of self-care behaviors because of the relapse to social support.

Patterns of personal or family living restrict engagement of self-care operations. Self-care actions engaged in over time are performed by person in stable

or changing environmental setting and within the context of their pattern of living (p.255). *Pattern of living* is information sought included usual repetitively performed daily activities, including self-care measures performed daily; and responsibilities for other persons (p.327). Pattern of living limits health deviation self-care requisites and means for meeting them (p.246).

As a conclusion, from BCFs and support from literature review, the selected predictor of self-care behaviors for this study include gender, knowledge, symptom severity, comorbidity, education, social support, and barrier of sodium restriction.

How to measure self-care behaviors in heart failure

The selection of instrument for self-care behaviors in this study based on the review on clinical instrument of self-care behaviors in heart failure (Cameron, Worrall-Carter, Driscoll, & Stewart, 2009). Based on psychometric properties, two instruments are common used to measure self-care in HF patients.

The European Heart Failure Self-care Behavior Scale (EHFScBS) by Jaarsma et al. (2003) was developed using Orem' definition of self-care. The development of this scale took place in three phases: phase 1) concept analysis and first construction, phase 2) revision of items and response and scoring format, and phase 3) testing of the new scale of reliability and validity on 442 patients from centers in Sweden, Netherlands and Italy. The final scale using a principal components extraction came up with 12 items-self-administered questionnaire, taking 5-10 minutes to complete. The answers range from 1 to 5, meaning 1 = completely agree and 5 = don't agree at all. These items cover three dimensions that are complying with regimen, seeking help and adapting activities. Cronbach's alpha's ranged from 0.69 to 0.93 in the separate HF samples, and validity using compared patients with extra HF education

and patients without such education. This scale commonly used to measure self-care behaviors among HF patients in Asia countries such as Japan (Kato, Ito, Kinugawa, & Kazuma, 2008; Kato et al., 2009) and China (Yu et al., 2011). A version of EHFS_{cB} 9 item scale was defined and tested psychometric properties in different samples from six countries (Yu et al., 2011).

The Self-Care of HF Index (SCHFI; Riegel, Carlson et al., 2004) was developed using naturalistic decision making theoretical framework. This scale revised from Self management of HF scale which used to assess self management decision making. The 15-item SCHFI is measured on a 4-point Likert scale and grouped to form three subscales: self-care maintenance, management, and confidence. Coefficient alpha of subscales were .56, .70 and .82, respectively. Confirmatory factor analysis and exploratory factor analysis indicated model adequately fit for three models. The update version was conducted in 2009 (Riegel, Lee, Dickson, & Carlson, 2009). The scale has good psychometric properties.

Besides above two scales, the Revised Heart Failure Self-Care Behavior Scale (RHFS_{cBS}) by Artinian et al (2002) is taken in the selection because of its association with the theoretical guide of this study (the Orem theory of self-care). This is a 29-item 6-point scale measurement of HF self-care derived from Orem's self-care model related to health deviation self-care requisites. This scale covers 5 of 6 health deviation self-care requisites include seeking appropriate medical assistance, being aware of and attending to the effects of HF, treatment compliance, modifying self-concept, and learning to live with effect of HF and HF treatment, except "being aware of and attending to or regulating the deleterious effects of medical care measures". The scale is ranging from "none of the time" (zero [0]) to "all of the time" (5). The

psychometric properties of this scale were tested on 110 HF inpatient and outpatients. The content validity of this scale was evaluated by 2 nurse practitioners and 2 self-care experts. Cronbach's alpha was .84.

The comparing among instruments for self-care behaviors gives a favor to the RHFSBS. The construct of this scale is relevant to the operational definition of self-care behaviors, developed based on Orem's self-care requisites and used for HF patients. Therefore, RHFSBS is used in this study by testing psychometric properties in Vietnamese population.

Nursing interventions for self-care behaviors

Heart failure is a chronic condition, and patients with HF have to follow the health care professional recommendation for the rest of their lives. They require understanding their illness, guideline for medical treatment, changing life style, or how to self-care to maintain physical functional, control condition and prevent frequent hospitalization. Nurses are in a position to increase self-care behaviors because they have more opportunities communicating with patients at hospital and following after discharge to teach, guide and understand factors related to self-care behaviors among HF patients.

Number of educational interventions were conducted to provide information related to disease management and maximize patients' ability to comprehend and implement self-care behaviors (Kent et al., 2011), especially young cardiac patients who are educated about self-care behaviors can assume some responsibilities for disease management after hospital discharge to care themselves and return to work. A variety of education studies have been implemented on HF patients during their hospitalization (Kent et al., 2011), even 6 months follow-up after discharge (Koelling

et al., 2005), which found that, the improvement in self-care behaviors at 6 months after discharge reduce the number of readmission. However, many studies had small sample size and less likely papers reported power analysis to determine the effect size (Barnason et al., 2011). In addition, another study ascertained that education alone will not have a positive impact on self-care behaviors (Evangelista & Shinnick, 2008).

Besides improving knowledge, behavior interventions also promote self-care efficacy and enhance self-care skills. Electronic medical monitoring, web-based monitoring, diary users, telephone-delivered build the skills to perform self-care behaviors (Evangelista & Shinnick, 2008). Psychosocial interventions explore the way to help patients the enhance feeling of self-care efficacy and psychological well being when patients' beliefs about treatment regimens revealed an important factor. Noteworthy, symptoms management program and a comprehensive and maximize support system educate the rationale behind sodium and other dietary restrictions, the beneficial and potential adverse effects of all medications, and the value of a regular exercise program (Evangelista & Shinnick, 2008). These strategies promote patients in following self-care behaviors and diminishing readmission. But, these strategies still have less or moderate effect on all components of self-care behaviors following 6 months after discharge (L. S. Evangelista & Shinnick, 2008; Hershberger et al., 2001; Jaarsma et al., 2000a; Jaarsma et al., 1999; Stromberga et al., 2003). Therefore, the application of these existing interventions seems to be non-feasibility for this population.

Thus, understanding about predicting factors of self-care behaviors is needed. One significant step is to establish effective intervention to fill the gap of knowledge on HF management among Vietnamese adult patients with heart failure. However,

based on the particular in health care system and cultural context, it is not appropriate to apply the current predicting factors in Vietnamese adult with HF.

Correlates of self-care behaviors in HF patients

There are many studies about self-care behaviors in patients with heart failure as following:

Jeon, Kraus, Jowsey, and Glasgow (2010) conducted qualitative study, focusing on the experience of patients living with heart failure. Patients with HF reported negative emotion such as guilty and anxiety over being a burden on others. Besides it is ascertained that many factors impacted on patients' self-care behaviors including knowledge, understanding, and health service encounters. In which, co-morbidity and depression were common factors. Depression was found decreasing patients hope, self worth and frequency of socialization; and increasing feelings of helplessness and isolation.

Riegel & Carlson (2012) in their qualitative study explored how patients perform self-care by involving 26 patients (Riegel & Carlson, 2002). Self-care in this study involved the recognition of classic symptoms, such as weight gain, edema and interpretation of atypical symptoms as signs of trouble. It was difficult for subjects to recognize symptoms although they used several methods for caring themselves. The study ascertained that number of patients were unable to judge the important of their symptoms, and misinterpreted them. These problems may be based on some challenges they have to deal with physical limitations, difficulty coping with treatment, lack of knowledge/misconceptions, distressed emotions, and multiple co-morbidities or personal struggles.

The quantitative heart failure research reported a variety of predictors of self-care, such as age, gender, socioeconomic status, education, symptom severity, self efficacy, depressive symptom, cognitive function (J. Cameron et al., 2009; Chriss et al., 2004; Heo et al., 2008; Rockwell & Riegel, 2001).

Rockwell and Riegel (2001) conducted a study on 209 inpatients to determine if there were specific predictors such as gender, age, socioeconomic status, level of education, social support, co-morbidity, and severity of symptoms among patients with heart failure that would influence self-care practices of taking medications as prescribed, following a low-salt diet, observing fluid restrictions, weighing themselves daily, and being in turn with their early signs and symptoms of worsening heart failure. In this study, education and symptom severity were significant as the predictor variables of self-care. Better-educated persons may be more likely to engage in self-care than those who are poorly educated. The patients with more severe symptoms had higher self-care scores (Rockwell & Riegel, 2001).

One replication study from Chriss and her associates (2004) determined seven variables as predictors of self-care in HF. This study used secondary analysis of data obtained from a prospective investigation of an HF program. Result from measurement at three months after hospitalization showed that being older male was a significant predictor of relatively better HF self-care maintenance at baseline (Chriss et al., 2004).

One study find out the factors related to self-care in elderly HF patients in one province of Vietnam. The finding of this study showed the low level of HF self-care behaviors. There were significant, moderate and positive correlations between knowledge of HF, social support and self-care behaviors. While gender, educational

level, income, and comorbidity had no significant correlations with self-care behaviors (Nguyen, 2011).

Another study in community-dwelling patients who suffered from heart failure, investigated patients' self-care behaviors of taking prescribed medication, following sodium restriction, and seeking health information. Findings showed that high scores of these behaviors were significantly correlated with fewer hospital admissions, and influenced by psychological status, ethnicity, and comorbidity (Schnell-Hoehn, Naimark, & Tate, 2009).

Artinian, Mangan, Sloan, et al. (2002) tested the relationship among basic conditioning factors (BCFs) and self-care among 110 patients with heart failure. The descriptive correlation study was guided by Orem's theory of self-care. The BCFs included age, sex, race, marital status, health state, income, education and living arrangement. The result revealed that there were no significant relationships among total self-care behavior score and any BCFs. However, a number of significant relationships between BCFs and individual self-care behaviors were observed. For example, health state with severity of short of breath influenced the performance of almost half of the self-care behaviors.

Several systematic reviews conducted to find determinants of self-care in HF patients. It was indicated that longer duration of HF diagnosis associated to self-care maintenance. Type D personality had relationship with consulting medical professionals. However, this review also revealed that determinants were inconsistent in relationship with self-care (Oosterom-Calo et al., 2012).

In conclusion, variety of qualitative and quantitative studies with or without using Orem self-care theory have been conducted to find out the factors related to

self-care in HF patients. These studies concerned about divergent population, such as inpatients, outpatients; cover both developed and developing countries. Various predictors of self-care were reported inconsistency among these studies.

Factors related to self-care in HF patients

In this study, based on Orem's self-care theory and empirical studies, there are some factors related to self-care in HF patients as following:

Gender

Gender is defined as the sex of individual, consisting of male and female, with heart failure. There is a difference in behavior of self-care and factors related to better self-care behaviors among men and women (Heo et al., 2008), or difference of male and female on frequency in practicing of self-care behaviors (Lee, Riegel, et al., 2009). A multinational study also indicated gender different in self-care behaviors among developed countries such as US, Australia and developing countries as Thailand (Lee, Riegel, et al., 2009).

According to Orem, gender may also influence the methods that are used to meet the various self-care requisites. Empirically, it is common belief that the women take care of themselves better than man (Senay, Waters, & Newberger, 2004) with their self-care confidence (Heo et al., 2008). As a result, women have better HF outcomes than men (Ghali et al., 2003). In example of following low sodium diet in patients with heart failure, they found that the adherence was higher in women. Women were also more able to make dietary decisions (Chung et al., 2006). Women recognized signs of excess sodium intake more often than men and had better understanding of appropriate ways to manage a low sodium diet. Riegel et al (2010) and Goldberg et al. (2008) also revealed the difference in the mood reaction of the

young men who were angry delayed acting on their symptoms, which related to poor self-care.

Conversely, there are some evidences indicated that self-care behaviors in women is not better than self-care in men. Women are more likely having psychosocial distress and need more social support, which is related to poor self-care behaviors (Chriss et al., 2004; L.S. Evangelista, Berg, & Dracup, 2001). Chriss and colleague also indicated that poorer physical function in women related to poor self-care behaviors (2004). In contrast, Riegel et al. (2010) and Heo et al. (2008) found perceived control and HF management knowledge of men were better than women in interpreting their symptoms related to HF. Male is significantly related to better self-care behaviors among HF patients.

However, Rockwell and Riegel (2001), Jurgens (2006) and Lee, Riegel, et al. (2009) ascertained that gender did not significantly relate to self-care behaviors. Single-site retrospective studies found a null association between gender and delay in seeking help (Evangelista, Dracup, & Doering, 2000).

Knowledge

Definition of knowledge

According to Strömberg, knowledge is defined as the relevant information that one is able to recall from memory: ability to remember and recall previous learning material (Strömberg, 2005)

Artinian and colleague (2002) defined knowledge as patient understanding of the following: HF and the reason for symptoms; symptoms of worsening HF; low-sodium food selection; medications and actions to take if there are side effects; and

self-management relative to weight monitoring, physical activity, and worsening symptoms (Artinian, Magnan, Sloan, et al., 2002).

Knowledge is also defined as the extent to which a person comprehends information regarding heart failure self-care behaviors including symptom recognition, diet, fluid restriction, medication regimen, and exercise (van der Wal et al., 2006).

Kato et al. (2008) define heart failure knowledge as knowledge in general, including symptoms, signs, and HF related to treatment and self-care.

According to Artinian, Magnan, Christian, and Lange (2002), knowledge is defined as general information about HF, prognosis (advance directives), physical activity, diet, medications, and the importance of compliance with care.

In sum, knowledge is defined as patients' understanding about general heart failure (HF), and HF treatment including diet, fluid restriction and medication, weight monitoring, physical activity, HF symptoms, and symptom recognition.

How knowledge related to self-care behaviors

National and international guidelines indicated that general knowledge on HF condition, including knowledge on medications and self-care management are important. Guidelines can give an overview of educational topics, but the individual needs and skills vary widely between individuals with heart failure (Strömberg, 2005). Yet, knowledge among individual might be different.

One qualitative study (Ton et al., 2011) is conducted to find out knowledge of cardiovascular health and its comparison among Chinese, Korean and Vietnamese in US. Beside limitation in knowledge of sign and symptom, some particular culture care issue is also seen as a challenge for people in health care management. In regard to

mental and emotional, Vietnamese participants believe that ‘think too much can lead to heart disease and high blood pressure’. Misconception in preventing participants showed “sweating was the primary mechanism of preventing high cholesterol, namely by causing fat to come out in sweat”. They acknowledged herbal or home remedies to control hypertension or hypercholesterolemia, and to prevent heart disease and strokes.

Another qualitative study explored the factors influencing adherence to a low-sodium diet. Lack of knowledge about diet restrictions was found as one reason for non-adherence (Bentley et al., 2005). With the limitation in knowledge, patients negatively following fluid balance (Van Der Wal et al., 2006). While others said that “they did not find it useful”, and “they did not know what to do with the information” (Jaarsma et al., 2000b). Thirty eight percent of group patients had poor HF symptom recognition (Quinn et al., 2011) although almost of them having experience of hospitalization in the past 6 months.

Empirical studies indicated significant relationship between patient knowledge and self-care behaviors in HF patients (Heo et al., 2008; Hsiao-Yun & Yann-Fen, 2011; Son et al., 2011). It could be said that behaviors of self-care are dependent on adequate knowledge (Artinian, Magnan, Christian, et al., 2002). It is also indicated that insufficient knowledge is associated with all aspects of self-care behaviors, consisting of medical, dietary restriction, weighing, symptom recognition and treatment performance and help seeking (Siabani et al., 2013). For instance, consumption of salty foods is recognized by some investigators as a behavior associated with cultural beliefs and/or social norms that might simply be a manifestation of ignorance due to insufficient knowledge about the pathophysiology

of CHF (Siabani et al., 2013). Lack of knowledge on the reasons for weighing can explain why HF patients do unregularly weigh themselves (Van Der Wal et al., 2006). Knowledge is seen as a factor affecting the performance of self-care behaviors in patients with HF (Heo et al., 2008). Hsiao-Yun and Yann-Fen also provided a positive correlation between self-care and disease knowledge with $r = .54$ and significant $p < .01$.

How to measure knowledge

The literatures showed the extent of the relationship between knowledge and self-care behaviors that vary depending on the country of study conducted, and the way of knowledge and self-care behaviors were measured (Artinian et al., 2002; Ni et al., 1999; van der Wal et al., 2006). Therefore, the measurement of knowledge and self-care is very important.

The Dutch Heart Failure Knowledge Scale developed by van der Wal et al. is a 15-items, multiple-choice instrument derived from earlier tools measuring heart failure knowledge in general, treatment and symptoms, and symptom recognition. The items of this instrument are also derived from important self-care concepts covered by the European Heart Failure Self-care Behavior Scale (M. van der Wal et al., 2005). It was tested for content and face validity, construct validity; Cronbach alpha was .62.

Japanese heart failure knowledge scale (Kato et al., 2008) was a new instrument that developed using HF guidelines and empirical studies. This scale includes 15 items with Yes/ No/ I don't know answer, which concerning HF in general, HF symptom and signs HF related treatment and self-care. Content validity and construct validity were tested, and Cronbach's alpha was 0.79. However, this instrument requires clinical knowledge, and too advanced for most HF patients.

The 30 multiple-choice items of Atlanta Heart Failure Knowledge Test (Reilly et al., 2009), was initially developed measuring patient and family knowledge about HF, treatment, and self-care HF disease process, diet and nutrition (including sodium and fluid restriction), medications, symptoms, and behaviors (such as daily weighing and physical activity). Content validity of 9 nationally known nurse experts in HF patient education and self-management were ranged from 0.55 to 1.0, with 81% of the items rated from 0.88 to 1.0, but lack of factor analysis.

The Questionnaire About Heart Failure patients' Knowledge of Their Disease (Bonin et al., 2014) was composed of three steps theoretical (adaptation of the construct), empirical (properties testing) and analytical (measurement validation). This scale consists of 19 items four multiple-choice alternatives, covering HF pathophysiology; HF concept; risk factors; signs and symptoms; lifestyle; diagnosis; drugs; treatment; self-care; and physical exercise. Psychometric properties were testing using content validity (cardiac rehabilitation experts) and factor analysis for construct validation. The Cronbach's alpha was 0.6. However, almost questions focus on treatment.

In conclusion, based on the comparison among existing instruments, the Dutch Heart Failure Knowledge Scale was used as instrument measure knowledge in this study because the appropriateness number of items, relevant to construct of knowledge concept in current study, providing psychometric properties, and easy for heart failure patients to understand and answer the questions.

Symptom severity

The severity of HF symptom has been widely used to operationally define HF health state. Orem said that energy and sense of wellbeing insufficient to initiate a

sustain self-care effort affect the ability to perform self-care behaviors (p.276). There are so many symptoms are reported in HF patients (Patel, Shafazand, Schaufelberger, & Ekman, 2007), for instance, exhaustion and shortness of breath limit individual's ability to engage daily physical activity, which is recommended in self-care instructions (Riegel et al. 2009). HF patients are also difficult to recognize atypical symptoms, such as dizziness, fatigue, sleepiness, cognitive decline, and loss of consciousness; difficult to interpret or response to complex symptoms. HF patients frequently are unable to manage exacerbations of HF symptoms. It could be said that by suffering from such symptoms, the ability of HF patients to engage in efficacious self-care behaviors is also decreased (Siabani et al., 2013). It is also reported that functional limitation and dependency are linked to CHF as serious barriers to self-care behaviors in patients with advanced HF (classes III and IV) by Granger et al. (2009); Riegel and Carlson (2002). In contrast, the improvement in health care state may increase patient's self-care activities (p194).

Definition of symptom severity

Severity of symptoms is defined as the person's ability to perform normal daily activities in spite of symptoms (Rockwell & Riegel, 2001).

Symptom severity is defined as self-reported limitations in physical activity (Chriss et al., 2004).

The severity of HF is conceptually defined as cardiac function, physical functioning, and symptoms related to HF (Hou, 2007).

In this study, symptom severity is defined as a degree of individual in perceiving cardiac function, physical function, and symptoms related to HF during the past 6 months.

How to measure symptom severity

Specific Activity Scale (SAS) (Goldman, Hashimoto, Cook, & Loscalzo, 1981) development consists of 2 phases: performing specific activities and interviewing. The estimation of functional class using Canadian Cardiovascular society functional class and New York Heart Association functional class and then these criteria were compared to SAS based on metabolic cost. This measurement is a series of 5 questions to ask the respondent's ability to complete specific activities ranked by metabolic expenditure. Subjects are classified from Class I (fully functional) to Class IV (severely compromised). The SAS has 73% of reproducibility (reliability).

Functional classification of heart failure of American heart Association (AHA) emphasizes the development and progression of disease. In which, progression in HF stages is associated with reduced 5-year survival and increased plasma natriuretic peptide concentrations. In addition, risk factors and abnormalities of cardiac structure are also used to define stages of HF. The level of HF stages is devised into 4 levels from A to D. For example, stage B "Structural heart disease but without signs or symptoms of HF" (Yancy et al., 2013).

The New York Heart Association (NYHA) (AHA Science Advisory, 2000) was initially using assess functional capacity, as guideline for exercise testing. This focuses on physical activities capacity and the symptomatic status of HF. It is based on the main symptoms of heart failure (breathlessness, fatigue, and palpitations) as experienced by patients and the limitation in their physical activity resulting from their condition. The stages of NYHA are devised into 4 levels from I to IV. Although the assessment in physical activity by clinician is sometimes not objective and may be easy to change, this measurement is widely used in clinical practice (Yancy et al,

2013). In addition, in this study, nurses should assess the ability of patients in performing self-care activities that associate to the symptoms of HF before supporting them. Therefore, the NYHA was appropriate measurement to measure symptom severity of HF patients.

Comorbidity

According to Orem et al (2001), nurses should seek the information to describe health state of patients including effects of disordered function, which are experienced by the patients. Comorbid patients may experience new and more self-care requites, which is totally different time distribution, and need more knowledge and effort to judge self-care measure significantly (p.274).

It is demonstrated that all individuals with HF virtually have other illnesses (Riegel, Moser, Anker, Appel, Dunbar, Grady, Havranek, et al., 2009). Population-based study in rural Vietnam found that 39% of people aged 25-74 reported having at least one chronic disease. It was more than 10% of them reported having two or more chronic conditions (Hoang, Dao, & Kim, 2008). Some common comorbid conditions were hypertension, coronary artery disease, diabetes mellitus and renal insufficiency (Chen, Normand, Wang, & Krumholz, 2011). As a result, in regard to medication, patients with HF must cope with taking multiple medications. Lack of understanding about the purpose or effects of medications leads to lower adherence to prescribed medications, which is common in patients with HF who have multiple comorbidities (Riegel, Moser, Anker, Appel, Dunbar, Grady, Havranek, et al., 2009). In addition, it seems challenging for HF patients to adhere to a low-sodium diet when comorbid conditions exist because of each patient has different dietary requirements (Riegel, Moser, Anker, Appel, Dunbar, Grady, Havranek, et al., 2009). Additionally, empirical

studies demonstrated that symptoms monitoring in heart failure patients have comorbidities challenges in distinguishing the symptom caused by HF or others (Hedemalm et al., 2008). Patients with serious comorbidities may be preoccupied with other aspects of their illnesses, such as depression and fear, which decrease their abilities to concentrate on maintaining their overall health status. There was a significant relationship between self-care behaviors and the number of comorbidities ($r = -.25$; $p = .03$) (Dickson et al., 2013).

Definition of comorbidity

According to Kaplan and Feinstein (1974), comorbidity is defined as “any distinct additional clinical entity that has existed or that may occur during the clinical course of a patient who has the index disease under study”.

Elixhauser, Steiner, Harris, and Coffey (1998) defined comorbidity as “clinical condition that exists before a patient’s admission to the hospital, which is not related to the principal reason for the hospitalization, and is likely to be a significant factor influencing mortality and resource use in the hospital”.

Comorbid conditions are conceptually defined as any distinct medical conditions, such as hypertension and diabetes, that increase the rate of mortality and morbidity and exist in addition to HF (Diller, Smucker, David, & Graham, 1999).

In the population with HF, the failure in distinguishing symptom of HF or other disease lead to HF exacerbation, and is the reason of hospital readmission. Therefore, it seems inability to separate and define comorbidity as unassociated principle reason for admission as Elixhauser et al. Thus, the definition of comorbidity in this study is defined as any distinct medical conditions, such as hypertension and diabetes that increase the rate of mortality and morbidity and exist in addition to HF.

How to measure comorbidity

Measurements of comorbidity are presented in one systematic review (Buck, Akbar, Zhang, & Bettger, 2013).

The first measurement of comorbidity was developed by Kaplan and Feinstein (1974) with the purpose to classify patients for therapeutic and statistical reasons. This measurement was conducted to develop criteria for classifying individuals, which could be used by other researchers. However, there is a limitation of this method, which is Kaplan and Feinstein system ranks patients as having grades from 0 to 3 according to the single worst condition.

Continue to early work, Charlson and colleagues in the 1980s developed the Charlson Comorbidity Index (CCI), rather than a list of criteria to measure comorbidity. This measurement weighted index assigns weights of 1, 2, 3 and 6 for each of the existing comorbid diseases to derive a total score. In 1990s, there were several instruments were developed these adapted the CCI for use with administrative datasets by using ICD-9-CM or ICD-9 codes equivalent to diseases in the CCI (D'Hoore, Bouckaert, & Tilquin, 1996; Deyo, Cherkin, & Ciol, 1992). In addition, to predict resource use or clinical outcomes, Elixhauser et al. (1998) developed a comprehensive set of 30 comorbidity measures for use with large administrative inpatient datasets.

In comparing the number of items in each instrument (30 comorbidity measures compare to 10 ones), and definition of comorbidity, the CCI is suitable to measure comorbidity.

Besides that, Katz and colleagues developed questionnaire on the Charlson comorbidity index, which represented as a reliable and valid measure (Katz et al.,

1996). In addition, there was high item specific prevalence and agreement level between questionnaire and Charlson Index. It was concluded that the instrument has substantial promise as an inexpensive, practical alternative to chart review. Therefore, Charlson comorbidity questionnaire was used in this study.

Education

Low educational levels have been found to be important factors related to poor self-care (Gary, 2006; Van der Wal et al., 2006). A higher level of education is also found to be a significant predictor of adherence in the studies by Evangelista and Dracup (2000) and Rockwell and Riegel (2001). Persons with higher education may be more likely to engage in self-care behaviors those who are poorly educated (Rockwell & Riegel, 2001). In this study, the variable education contributed 4.6% of the variance for self-care. Interestingly, education level was interpreted non significant in group of community dwelling heart failure patients (Schnell-Hoehn, Naimark, & Tate, 2009). Therefore, the relationship among education level and self-care behaviors should be further explored. Education is defined as secondary school and lower (primary and secondary school), and higher education (high education, undergraduate and graduate degree). Education is measured by subjects self-report in the demographic questionnaire.

Social support

Social support definitions

Social support is defined as perceived adequacy of support from the three sources: family, friends and significant others (Zimet, Dahlem, Zimet, & Farley, 1988).

Social support is an interpersonal transaction involving one or more of the following: emotional concern, instrumental aid, information or appraisal (Vaglio et al., 2004).

House (1981) social support is an interpersonal transaction involving one or more of the following (1) emotional concern (liking, love, empathy), (2) instrumental aid (goods or services), (3) information (about the environment), or (4) appraisal (information relevant to self evaluation) (Williams et al., 2004)

Social support is defined as a diversity of natural helping behaviors of which individuals are recipients in social interaction: tangible aid (material aid and behavioral assistance), intimate interaction, guidance, feedback, and positive social interaction (Hilbert-McAllister, 2003).

According to Gjesfjeld, Greeno, and Kim (2008), social support includes four factors, namely Emotional information support characterized by both emotional support and guidance or advice, Tangible support characterized by material aid or assistance, Affectionate support characterized by the expression of love and affection, and Positive social interaction characterized by the availability of individual with whom to do fun things.

From many definitions above, emotional and information support seems very common in describing social support. However, tangible support in Gjesfjeld, Greeno, and Kim (2008) or Hilbert-McAllister (2003) definitions is characterized by material aid or assistance that covers both instrumental support and behavior assistance. Therefore, social support can be defined as perceived adequacy of support that includes information, emotion, and tangible. In addition, the distinct resources of

support in Orem theory suggest that family, friends and health care providers will be considered.

Social support related to self-care behaviors

The availability of support through one's social circumstances or social network has been associated with more positive health behavior (DiMatteo, 2004) and health outcomes in cardiovascular populations (MacMahon & Lip, 2002). Moreover, social support has been widely used to refer the mechanisms by which interpersonal relationship in an individual's social network buffer against a stressful environment and explanation of how social support influences HF outcomes (Sayers et al., 2008). On the other hand, the support from family, friends, and health care professionals in providing information, and emotional support are enable individuals with HF to maintain their medication and dietary treatment regimen (Riegel & Carlson, 2002; Wu et al., 2008), or recommended exercise (Tierney et al., 2011). Moreover, this perceived supports have significant relationships with both dose-count and dose time (Wu et al., 2008). High levels of social support are significantly related to specific self-care behaviors, such as monitoring weight gain, limiting fluid intake, following the medication regimen, getting an annual flu shot, and exercising regularly by Gallagher et al. (2011). In addition, patients who have an opportunity to share their problems and those who participate in social activities manifest better self-care behaviors (Falk et al. 2007; Rucker-Whitaker et al. 2006).

Additionally, material especially financial support is also important in taking care of HF patients. Inadequate financial support will affect to follow-up the treatment. HF patients might have difficulty in meeting adequacy nutrition and medication therapeutic requisite in regard to low income, while extra medical care

expenditure due to chronic illness is high. It is a challenge for Vietnamese households in holding their food and non-food consumption constantly (Wagstaff, 2007). It also seems difficult for women in rural area in taking care of themselves (Hoang et al., 2008) .

In line with that, in the context of Vietnam health care system, it is also a challenge for HF patients to access the health care service because of long distance to consult with health care providers, and the utilization of facilitates might differ from the representing a model for urban services (Clark et al., 2007; Farmer et al., 2006). Thus, getting support from health care system is so important for HF patient following treatment.

How to measure social support

The Multidimensional scale of perceived social support (MSPSS) revised from the original version of 24 items to evaluate three perceived sources of support (Zimet et al., 1988). This is a brief self report of measurement, which subjectively assesses social support by rating 12 items with a 7 point Likert scale ranging from very strongly disagree (1) to very strongly agree (7). The MSPSS is designed to measure the perceived adequacy of support from the following three sources family (items 3,4,8,11); friends (items 6,7,9,12) and significant other (items 1,2,5,10). (Osman, Lamis, Freedenthal, Gutierrez, & McNaughton-Cassill, 2014)

The Social Support Questionnaire (SSQ) was developed by Hanucharumkul (1989) modified from Social Support Questionnaire of Schaefer, Coyne, and Lazarus (1981) and Norbeck, Lindsey, and Carrieri (1981). This instrument includes 7 items covering information, emotion and tangible support, and rating 5 point Likert scale (0: not at all and 4: a great deal). The instrument is used to ask families, health care

providers, friends, neighbors, and supervisors. The internal consistency correlations were .91, .92 and .95 between the four emotional support items; and .61 between the two items of tangible support. The coefficient alpha for the total SSQ was .97.

The ENRICHD Social Support Instrument (Vaglio et al., 2004) using from the Medical Outcomes Survey and earlier work examining the influences of social support as guideline to develop. This assesses the four defined attributes of social support: emotional, instrumental, informational and appraisal. It is 7-item self-report survey with 5 Likert scale (1: none of the time, 5: all of the time). Cronbach's α was 0.88, and intra-class correlation coefficient was 0.94.

Medical outcomes study social support survey (MOS-SSS) is developed based on the responses of nearly 3000 patients with chronic health conditions from the Medical Outcome study, an observational study that examined variations in patient's outcomes and physician practice styles in different systems of care. Four factors of social support: emotional-informational support, tangible support, affectionate support and positive social interaction (Gjesfjeld et al., 2008). It covers 12 items (1: none of the time, 5: all of the time).

According to Hilbert-McAllister (2003), social support includes social interaction tangible aid (material aid and behavioral assistance), intimate interaction, guidance, feedback, and positive social interaction. The social support in chronic illness Inventory (Hilbert-McAllister, 2003) includes 38 of 6 point Likert scale items (scale ranging from dissatisfied to very satisfied) and coefficients for the subscales ranged from .84 to .94. These components of social support cover all aspect of family system factor and health care system.

Based on the comparison of the existing social support instruments above, SSCII is used for the support in relation to chronic illness, such as cardiac disease and for long-term life style adjustments. Although others have fewer items and stronger in psychometric properties, the MOS-SSS was having psychometric properties tested in a sample of mothers with a child in mental health treatment. It also does not show the notions of person-environment interaction and change over time as in SSCII. However, SSCII has no separate source of support as the MSPSS, therefore it is so difficult to interpret the score. Family system factors and health care system factors in combination with social support variable should be measured for all sources for the significant measurement. On the other hand, SSQ was constructed in 7 items covering information, emotion and tangible support that are not only suitable for number of items, but also appropriate for definition of social support in this study. Therefore, SSQ was used to measure social support in this study.

Barrier of sodium restriction

Among HF patients, pattern of living is related to sodium habit. To meet self-care requisite, HF patients need to keep body in low level of sodium. But the pattern of living of these patients is related to excessive sodium diet habit that might be a barrier of sodium restriction.

It is assumed that when a person gets ill or having a disease, their activities may gradually change, followed by changes in one's support networks or routine habit of family member that may influence the pattern of living. It is also possibly because of the large role of sodium intake in HF hospitalizations, therefore current dietary recommendations for patients with HF focus largely on sodium intake and a low sodium diet is recommended (Yancy et al., 2013).

However, it is not only the own habit of referring sodium diet, HF patients also meet challenges in following the recommendation as well. There have been some conflicts between patients' experience with family members regarding high sodium foods and difficulty eating out as common barriers for patients in following sodium restriction (Bentley et al., 2005). Gary (2006) said, the married women and those with caretaking responsibilities describe the preparation of what their family members preferred rather than food items on their recommended low-sodium diet. For example, one woman jokingly remarked, "if I fixed food like I am supposed to eat, no one would show up at the table..." Sodium diet as one routine food habit of all family members is commonly seen on the table of Vietnamese (Nguyen et al., 2012). Thus, a family-focused intervention may be useful in reducing dietary sodium intake in persons with HF (Dunbar et al., 2005).

Sodium restriction seems to be a challenge for health care system in caring HF patients and other cardiovascular diseases because of "cultural preference for high sodium diets" (Duong et al., 2001). Only 49% of patients reported they understood or knew how to follow a sodium-restricted diet. Most patients had difficulty picking out low-salt foods at restaurants (75%) and at the grocery store (52%). They also reported social and environmental barriers, such as restaurants that do not serve low-sodium foods and family or friends who do not eat or cook low-salt foods (54%) (Chung et al., 2006).

How measure barrier of sodium restriction

According to Bennett et al. (1997), the Belief about medication compliance and the belief about dietary compliance scale guided by Health Belief model, empirical studies, and self report from HF people. This instrument measure belief

about compliance with behavior that influence sodium retention. In which, barriers to a sodium restricted diet subscale include poor taste, lack of availability of low-salt items, difficulty eating away from home, increased food preparation time and cost. Construct validity was supported by confirmatory principal components factor analysis.

Based on the Theory of Planned Behavior (TPB), the Dietary Sodium Restriction Questionnaire (DSRQ) is developed to assess patients' perceptions of their barriers to, and attitudes toward, following a low-sodium diet (Bentley, Lennie, Biddle, Chung, & Moser, 2009). The direct determinants of behavioral intention that successfully explain the behavioral change are attitude, subjective norm, and perceived behavioral control. This instrument was tested for reliability and validity (d'Almeida, Souza, & Rabelo-Silva, 2013).

In comparing these two measurements, the barrier subscale of the Belief about dietary compliance scale relevant to construct of barrier of sodium restriction in this study. Therefore, this scale was used to measure barrier of sodium restriction in HF.

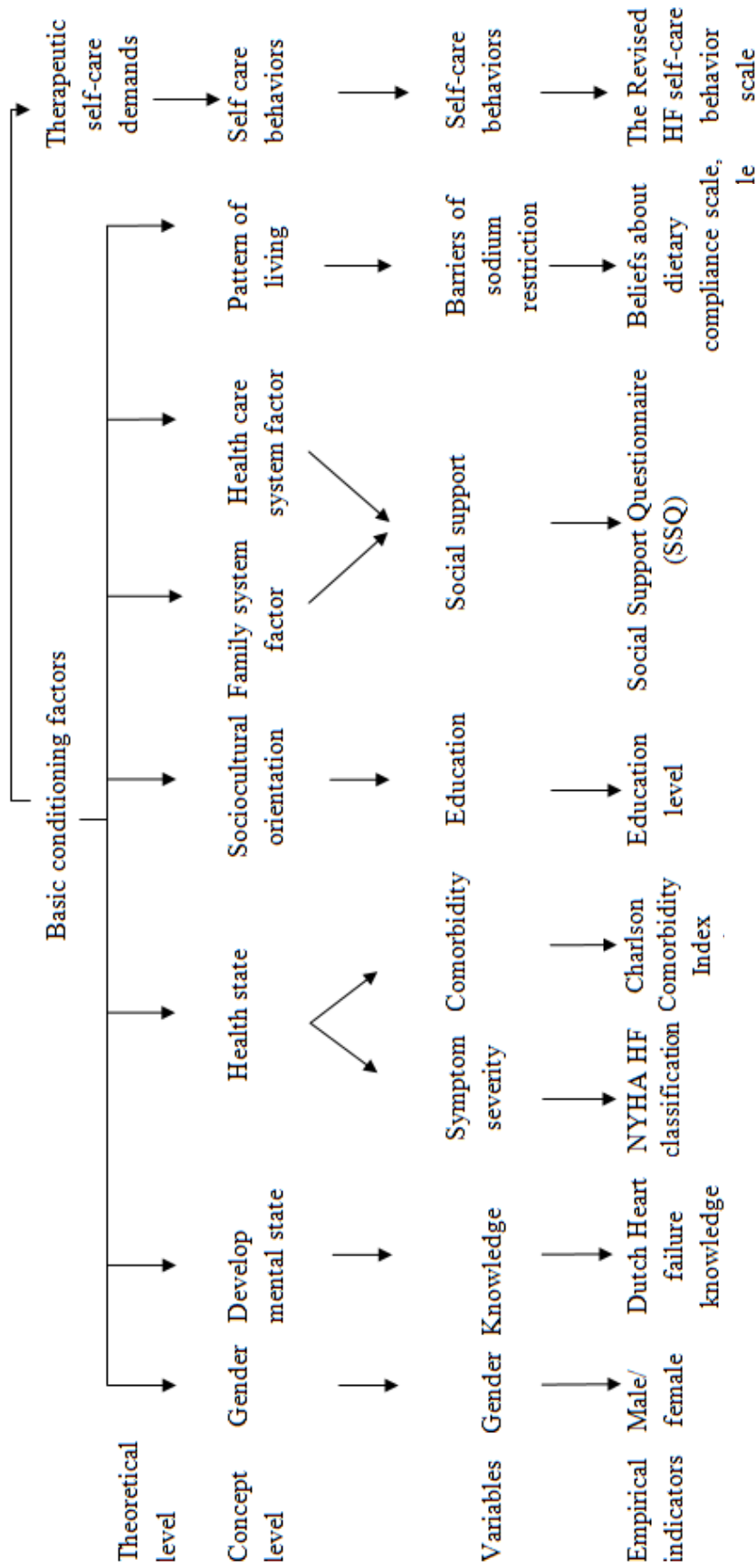


Figure 3 Theoretical substructure diagram of self-care behaviors among adult with HF

CHAPTER III

METHODOLOGY

Research design

This study used a cross-sectional, descriptive correlation research design to examine the relationships between conditioning factors and self-care behaviors.

Settings

There is no difference among health care service in three regions North, Middle and South of Vietnam (Vietnam Ministry of Health, 2013). Thus, Red River delta was selected to represent all regions in Vietnam and to compare the quality of health care service, the health utilization, and patients' satisfaction towards services among the regions. Red River delta is one of the most social-economic developed areas in Vietnam, and it includes the National City of Hanoi, and the other 9 neighbor provinces. So, the samples for this study were recruited from Red River delta.

Population and sample

Population

The target population in this study was HF patients who discharged in the last 6 months and visited outpatient department in governmental and provincial hospitals in 10 cities and provinces in Red river delta for following check-up.

Sample

The eligible participants was recruited based on inclusion criteria: Diagnosed with HF, Discharged from hospital due to treatment of HF during last six months, Age from 18 to 60; Able to communicate and understand Vietnamese language; and

Willing to participate in this study. An exclusion criterion for this study includes Patients who have HF complication (based on medical records).

Sample size

Sample size for pilot study

A pilot study was used to assess the feasibility of using the proposed instruments, assess psychometric properties, evaluate data collection procedure, and provide an opportunity to test the instructions and administration of the translated instruments. Construct validity was tested using confirmatory factor analysis (CFA). Cronbach's alpha coefficient was used for the reliability of the instruments.

Sample size in the pilot study was calculated by using Structural Equation Modeling, with the common rule called N:q (Jackson, 2003). N is the number of needed subjects per one parameter (q). In general, the proportion is generally set as 10:1. However, based on the suggestion from DeVellis (2012), the ratio can be set as 5:1, 10:1, or 20:1. For this study, the accepted ratio of 5:1 was used, and 145 participants were recruited. To compare the measurement model, the Revised Heart failure self-care behavior scale was constructed and composed with 29 items.

Sample size for the main study

An optimum sample size is needed for the rejection of the null hypothesis, which is R equal to zero. A desired ratio of 15 to 20 respondents for each variable has been recommended (Hair, Black, Babin, & Anderson, 2010). The sample size of 140 might be adequate for 7 variables of current study. However, Hair, Black, Babin, and Anderson (2006) also recommended that for a sound basic of estimate sample size is 200 participants. Therefore, the number of participants in this study was 200.

Sampling technique

Multi-stage sampling technique was employed to collect the data of Vietnamese adult heart failure patients from 10 cities and provinces of Red river delta, which consisted of: Ha Noi, Nam Dinh, Thai Binh, Ninh Binh, Ha Nam, Bac Ninh, Hai Duong, Hung Yen, Vinh Phuc, and Hai Phong. There were 4 steps to obtain the samples as following:

1. List the names of general hospitals that have outpatient cardiovascular department in each city or province in the paper.

2. One hospital was selected in each province or city using simple random sampling without replacement procedure and in equal manner by drawing. There were 10 hospitals from 10 cities and provinces had been selected, consisting of: 1) Bach Mai hospital, 2) Nam Dinh general hospital, 3) Thai Binh general hospital, 4) Ninh Binh general hospital, 5) Ha Nam general hospital, 6) Bac Ninh general hospital, 7) Hai Duong general hospital, 8) Hung Yen general hospital, 9) Phuc Yen general hospital, and 10) Viet – Tiep hospital.

3. After getting permission from each hospital, the researcher inspected patients' name from the medical record to identify the patients who were discharged during last 6 months in cardiovascular department. Actually, after hospital discharge, the HF patients were assigned to see doctor for medical check-up. The research asisstant in each hospital obtainted the list of patients, whom discharged previous six months and followed -up with physician's appointments. Potential patients were random selected by researcher. Eligible patients were invited to participate in this study when they were waiting at outpatient department. After obtaining the consent forms, questionnaires were distributed to the patients. On average, it took approximately thirty minutes for each patient to finish all instruments.

Red river delta

Area	Ha Noi	Nam Dinh	Ninh Binh	Thai Binh	Ha Nam	Bac Ninh	Vinh Phuc	Hai Phong	Hung Yen	Hai Duong
Simple random sampling	1	1	1	1	1	1	1	1	1	1
Hospital name	Bach Mai hospital	Nam Dinh GH	Ninh Binh GH	Thai Binh GH	Ha Nam GH	Bac Ninh GH	Phuc Yen GH	Viet Tiep hospital	Hung Yen GH	Hai Duong GH
Potential participant number (1570)	400	70	80	200	160	140	90	180	110	140
Participant number (200)	40	10	10	30	20	20	10	30	10	20

Figure 4 Sampling method of the study

Research Instruments

The research instruments for this study consisted of: 1) Demographic questionnaire, 2) The Revised Heart failure self-care behavior scale, 3) The Dutch Heart failure Knowledge Scale, 4) New York Heart Association (NYHA) functional classification, 5) Charlson Comorbidity Index Questionnaire, 6) Social support questionnaire, 7) Belief about dietary compliance scale.

All of the variables of this study and the indicators/instruments were presented in table 1

Table 1 Variables and indicator/instruments

	Variables	Indicator/instrument
1	Gender	Demographic questionnaire
2	Education	
3	Self-care behavior	The Revised Heart failure self-care behavior scale
4	Symptom severity	NYHA HF classification
5	Comorbidity	Charlson Comorbidity Index Questionnaire
6	Knowledge	Dutch HF knowledge scale
7	Social support	Social support questionnaire
8	Barrier of sodium restriction	Beliefs about dietary compliance scale, barriers subscale.

Content validation of the instruments

After obtaining permission from authors, content validity of English version of all questionnaires was determined by seven cardiovascular experts: one cardiologist in Vietnam, two nursing lecturers who graduated oversea and three Thai nursing instructors who have experience in instrument development. The scale development and instrument validation methods are still new in nursing in Vietnam. Therefore, validate instruments using recommendations from Thai experts were purpose of researcher. The purpose of validating instruments was clearly defined among researcher and experts individually. Thai experts were asking for giving commend on the appropriating among construct of scale and concept's operational definition, while Vietnamese experts advised for cultural validation. Then, they were asked to rate the

level of relevancy between the items and the definition of the concepts as represented. A four-point Likert-type scale ranging from 4 (strongly relevant) to 1 (strongly irrelevant) were used to rate each item. The content validity index (CVI) was calculated for each instrument.

Instrument translation and psychometric properties testing

After checking content validity, all research instruments (RHFS CBS, Charlson Comorbidity Index questionnaire, the Social support scale, Beliefs about dietary compliance scale, barriers subscale) were translated using the Brislin's back-translation model (Brislin, 1970) with the following steps: 1) the instruments were translated from English into Vietnamese by two instructors who have expertise in the English language at Language department, Namdinh University of Nursing, and an independent translator who is an instructor with expertise in Cardiovascular Nursing and completed Nursing PhD program in England, 2) The Vietnamese versions of the instruments were evaluated by two Vietnamese/English bilingual people. The questionnaires were translated back into English by two Vietnamese-English translators who have taught English to graduate student around 10 years, and a nurse instructor with expertise in cardiovascular nursing, 3) The investigator then compared both versions in the original language, checked with translators, discussed the differences to ensure linguistic and conceptual equivalence, and then produced a final consensus version. The Dutch Heart Failure Knowledge Scale (DHFKS) had already been translated into Vietnamese following the standardized procedure (Nguyen, 2011). Therefore, this instrument was used for validation step without any prior translation or modification.

Regarding to reliability, Cronback's alpha coefficients, Split-half reliability and KR20 (for DHFKS) were used. For factorial validity, confirmatory factor analysis (CFA) was tested for self-care behavior measurements.

Pilot study

The pilot study was conducted to examine psychometric properties of instruments. Five of ten hospitals of the main study (Namdinh general hospital, Thai Binh general hospital, Ninh Binh general hospital, Bach Mai hospital, Bac Ninh general) were selected for the pilot study. Sample size of the pilot study was defined by the minimum ratio of subjects to items 5:1 for the largest number of items of the self-care measurement (The Revised Heart Failure Self-Care Behavior Scale - RHFS CBS) (DeVellis, 2012). It was 145 participants were recruited for the pilot study using the sample selection criteria, and excluded from the sample frame of the main study. The mean age of the pilot study was 52.85 ± 6.8 (range from 21 to 60 years). The main duration of being diagnosed with heart failure was 4.84 ± 3.8 (range from 1 to 22 years).

Measurements

Demographics data

Demographics questionnaire was developed by the researcher. All participants completed self-report questionnaires regarding their current age, gender, education level, marital status, employment status, elapsed time since HF diagnosis, and duration of time after discharge.

Measurement of self-care behavior

The Revised Heart Failure Self-Care Behavior Scale (RHFSBS) was used to measure self-care in this study. Orem's health deviation self-care requisites guided the development of this scale (Artinian, Magnan, Sloan, et al., 2002). This measurement has 5 domains cover seeking appropriate medical assistance, being aware of and attending to the effects of HF, treatment compliance, modifying self-concept, and learning to live with effect of HF and HF treatment. The 29-item 6-point scale is ranging from "none of the time" (zero [0]) to "all of the time" (5)

Reliability

Reliability of the RHFSBS was determined by considering internal consistency analysis using Cronbach's alpha coefficient. The result showed that the RHFSBS had Cronbach's alpha of .89 that was acceptable. The summary of the measurement was presented in table 2.

Table 2 Number of items, scoring range, S-CVI, I-CVI, and reliability of RHFSBS

Instrument	Number of item	Scoring range	S-CVI	I-CVI	Reliability
Revised Heart Failure Self-Care Behavior Scale (RHFSBS)	29	0-145	.92	0.86 -1.00	$\alpha = 0.89$

Content validity

The CVI of RHFSBS was 0.92. Some items were rephrased following the experts' recommendation and the advisor's suggestions. Through content validation and translation procedure, the items selection of the RHFSBS Vietnamese version was done for identifying the appropriate items and improving the items quality that would be contained. As suggestion from validation experts, advisors and language

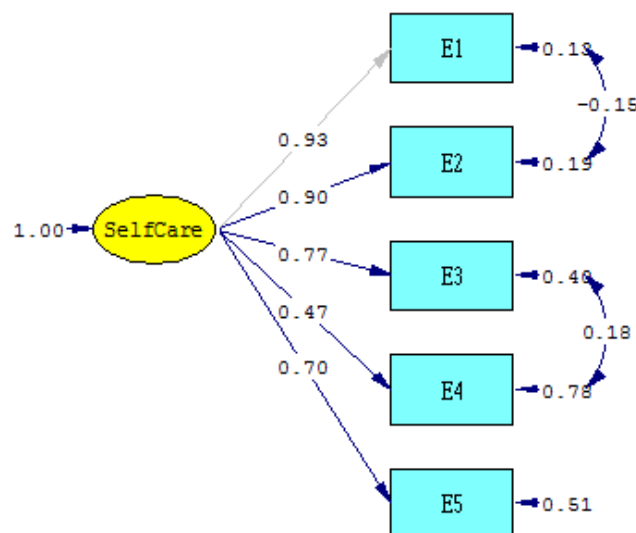
experts, some of items were modified. For instance, the term “my doctor” was not familiar with Vietnamese people, and the term “health care providers” or “health care setting” were replaced. Related to weigh in pound that was used in Western countries, the term “kg” would be used in this instrument for Vietnamese people. In addition, the term “canned soups and TV dinner” as a cultural habit of Western, especially single patient. The term “TV dinner” here can understand is one kind of a prepackaged frozen or chilled meal that usually comes as an individual portion; it requires very little preparation and contains all the elements for a single-serving meal and appeared in every seven-eleven or family mark, is not popular in Vietnam. Salty food such as “ca muoi” or “dua muoi” which also none require much time in preparing would be replaced.

Construct validity

Self-care instrument was developed to cover 5 of the 6 components of Orem’s health-deviation self-care requisites. Although a list of papers used the instrument to measure self-care, the construct test was not mentioned (Artinian et al., 2003; Jang, Toth, & Yoo, 2012; Sadeghzadeh, Kelachayeh, & Naserian, 2013). Therefore, in this study, the construct validity of the instrument was tested with 145 heart failure adult patients. Statistical criteria to evaluate the overall model-fit-index in this study as follow (Hair et al., 2010): Goodness-of-fit criteria, including the chi-square/ degree of freedom ratio ($\chi^2/df \leq 2.00$), root mean square error of approximation (RMSEA) $< .05$, goodness of fit index (GFI), adjusted goodness-of-fit index (AGFI) greater than .90 were used to determine the overall data-model fitness.

Confirmatory factor analysis (CFA) was conducted to examine whether a particular factor model provided a good fit to the data. In this model, self-care concept

consists of 5 domains include seeking appropriate medical assistance, being aware of and attending to the effects of HF, treatment compliance, modifying self-concept, and learning to live with effect of HF and HF treatment. The first domain seeking appropriate medical assistance consists of 6 items related to why patient contact to and keep appointment with health care providers. The second domain covers how patients react to their symptoms. The treatment compliance domain refers to weighing, fruit restriction, dietary restriction, medication compliance; get a flu shot, alcohol limit limitation and physical activity. The modifying self-concept domain has 2 items believe having HF is a condition which can adjust and patient can have good life after having HF. The last domain consists of 4 items quoted as patients talk to family and health care provider about anxious or their condition, quit smoking and feet up action. Most fit indices of the model were acceptable chi-square ($\chi^2=2.74$, degree of freedom (df)=3, goodness of fit index (GFI)=0.99, adjust goodness of fit index (AGFI)=0.96, root mean square error of approximation (RMSEA)=0.000 as shown in Figure 5



Chi-Square=2.74, df=3, P-value=0.43310, RMSEA=0.000

Figure 5 Measurement model of self-care scale

Scoring and interpretation:

The self-care scores measured using likert scale. The scale ranges from “none of the time” (zero [0]) to “all of the time” (5). For the convenient interpretation of score, the mean RHFS CBS scores were categorized into three levels:

Total RHFS CBS score	Interpretation
0 – 1.90	Low self-care
1.91 – 3.40	Moderate self-care
3.41 – 5.00	High self-care

Symptom severity measurement

Symptom severity was measured using New York Heart Association (NYHA) functional classification. In this measurement, the symptom severity was categorized in to 4 levels: classification I to classification IV. Dummy coding in this variable is required for multiple regressions.

Symptom severity class 2 = 1, all other = 0

Symptom severity class 3 = 1, all other = 0

Symptom severity class 4 = 1, all other = 0

Symptom severity of class 1 (all = 0) was used as the background in comparing self-care among each group in multiple regression testing.

Knowledge measurement

Knowledge about HF can be measured with the Dutch Heart Failure Knowledge Scale (DHFKS), a 15-item, self-administered questionnaire with a possible score range 0 to 15. The scale consists of items concerning HF knowledge in general and knowledge on HF treatment including diet and fluid restriction and HF symptoms and

symptom recognition (M. van der Wal et al., 2005). Each item has three choices, only one of which is correct.

Reliability and construct validity

The Dutch Heart Failure Knowledge Scale (DHFKS) was developed based on selecting correct one in three choices. Therefore, instead of determine reliability by considering internal consistency analysis using Cronbach's alpha coefficient, in this study, the researcher using KR20 (Kuder–Richardson 20). In addition, the instrument developed author concluded that the factor loadings were not strong enough to justify a clustering of 3 subscales and the scale was used as a total scale and reliability analysis was performed only for the total scale (M. van der Wal et al., 2005). Therefore, instead of CFA, construct validity was test by test analysis program (TAP) – the test of difficulty and discrimination level of scale. The result of item analysis was presented in Appendix

In interpreting item analysis, the proportion of patients answering an item correctly indicates the difficulty level of the item, and the more patients got the item right, the less difficult the item was. The percentage range of item difficulty was from 26% to 74% showing the average and from 75% to 100% meaning that item was easy. In this study, the difficulty index was from 0.25 to 0.68, and the mean of difficulty was 0.49% that indicated the patient got right answer from 25% to 68% and mean of 50%.

The discrimination index is a statistic that indicates the extent to which an item has discriminated between the high scorers and low scorers on the test. Optimally an item should have a positive discrimination index at least 0.2 (Kelley, 1939). In this study, almost of item has discrimination index above 0.3 that was good

for interpreting except the discrimination and difficulty in the item 6 was not good enough (0.11 and 0.25 respectively). However, the KR20 was 0.69 that was accepted.

Table 3 Number of items, scoring range, S-CVI, I-CVI, and reliability of Dutch Heart Failure Knowledge Scale

Instrument	Number of item	Scoring range	S-CVI	I-CVI	KR20
Dutch Heart Failure Knowledge Scale	15	0-15	0.99	0.86-1.00	0.69

Scoring and interpretation

The total number of correct answers is used in the analysis. The scale has a minimum score of 0 (no knowledge) and a maximum score of 15 points (optimal knowledge).

The comorbidity measurement

The comorbid conditions was assessed using the Charlson Comorbidity Index questionnaire (CCIQ) (Katz et al., 1996), which classifies comorbidity on the basis of the number and seriousness of comorbid diseases. This index includes 19 medical conditions, and each of these diseases was selected and assigned with a weighted index based on their association with mortality as table below.

The weighted index of comorbidity has proven to be a significant predictor of 1-year survival with higher scores indicating greater risk of death. Most diseases are assigned an index of 1, but more severe conditions are given a weighted score of 2, 3, or 6. The Charlson Comorbidity Index has been validated prospectively as a weighted index of comorbidity. By examining the relationship between the Charlson Comorbidity Index and other criterion outcomes, such as mortality, disability,

readmissions and length of stay, predictive validity and construct validity were validated in previous studies (de Groot, Beckerman, Lankhorst, & Bouter, 2003). Also, test-retest reliability and interrater reliability were defined moderate to good (Katz et al., 1996). Katz, et al (1996) transformed the Charlson Comorbidity Index into a questionnaire and found high correlation between the questionnaire and chart review based Charlson Comorbidity Index.

The split – half is one of internal consistency methods to determine how consistently the examinees performed across subsets of items on the single test form. Crocker and Algina (1986) indicated that this performance would generalize to other possible items in the content domain. Therefore, the split – half method was used to test reliability for this instrument. The Spearman – Brown coefficient among odd and even subtest was .87 and Guttman Split –Half coefficient was .86. indicated accepted reliability of instrument (Polit & Beck).

Scoring and interpretation

The comorbidity score is obtained by summing score of all 30 items. The possible scores range from 0 to 34. The higher score reflect greater burden and severity of comorbid conditions (Charlson et al., 1987).

The social support measurement

The social support scale is 7 items 5 points Likert scale from 0 (not at all) to 4 (a great deal) was measured by social support questionnaire (SSQ) (Hanucharumkul, 1989). In this instrument, the first item measures informational support, the next four items measure emotional support with an emphasis on perception of reliability, moral building, trust; and tangible support was measured by the last two items. In original scale, it was used to ask support from families, health care providers, friends,

neighbors, and supervisors. However, the most frequent chosen as source of support were family member and health care provider (Hanucharumkul, 1989, p. 97). In current study, according to presented health care system and cultural context of Vietnamese, with chronic disease such as HF, people need more support from family member of neighbor or friend in case emergency of acute care, especially living alone person or remote people. Health care providers sometime have supervision role in keeping contact after discharge to help patients recognize the significance of self-care. Therefore, social support of current study was separated into 2 parts: first was used to ask for supporting from family members and friends; then, participants were asked the same questionnaire for supporting from health care providers. To sum up, instead of 7 items for 5 groups in original scale, the total score in this study was defined as sum of the scores for family/friends and health care providers comes up with 14 items.

Reliability

Reliability of the **social support** scale was determined by considering internal consistency analysis using Cronbach's alpha coefficient. The result showed that the **social support** scale had Cronbach's alpha 0.86 and 0.83 for part 1 asking for support from family member or friends and part 2 for support from health care provider, which were acceptable respectively.

Table 4 Number of items, scoring range, S-CVI, I-CVI, and reliability of social support scale

Instrument	Number of item	Scoring range	S-CVI	I-CVI	Cronbach' alpha
Social support questionnaire	14	0-56	0.96	0.71-1.00	0.83-0.86

Scoring and interpretation

The social support score is obtained by summing score of all 14 items. The possible scores range from 0 to 56. The higher score indicates greater support.

Barrier sodium restriction measurement

Barrier of sodium restriction was measured using the “barriers” subscale of the Beliefs about Dietary Compliance Scale (Bennett et al., 1997). This subscale contained 5 items, responses used a 5-point Likert scales (1 = “strongly disagree”, 5 = “strongly agree”).

Reliability

Reliability of the Beliefs about dietary compliance scale, barriers subscale was determine by considering internal consistency analysis using Cronbach’s alpha coefficient. The result showed that the Beliefs about dietary compliance scale, barriers subscale had an acceptable Cronbach’s alpha with 0.81.

Table 5 Number of items, scoring range, S-CVI, I-CVI, and reliability of Beliefs about dietary compliance scale, barriers subscale

Instrument	Number of item	Scoring range	S-CVI	I-CVI	Cronbach’ alpha
Beliefs about dietary compliance scale, barriers subscale	5	5-25	0.89	0.86-1.00	0.81

Scoring and interpretation

The barrier of sodium restriction score is obtained by summing score of all 5 items. Possible scores ranged between 5 and 25; higher scores indicated a greater barrier to sodium restriction. In original paper, Health Belief model was used to guide

to develop instrument, include barriers of dietary compliance scale. In which, higher score of barrier perception patients define, the lower dietary compliance they do. Therefore, in testing correlation in current study, the high agreement level of barrier of sodium restriction was converted into low score which related to self-care.

Data collection

The permission letters for data collection from Faculty of Nursing, Chulalongkorn University were sent to the hospital Director in all 10 hospitals. Data were collected after getting permission from the directors of each participating hospitals, which began from July to October of 2015.

The researcher asked for cooperation from head nurse of each hospital. The appointment with head nurses of out-patients department and research assistants (who were bachelors and had experience in taking care of cardiovascular patients around 5 years at least) of 10 hospitals arranged. In that time, the researcher made self - introduction, asked for cooperation, and informed about the objectives and process of data collection of present study. The researcher also trained and tested the research assistants to make sure their understanding in using the questionnaires. Two data collection session were required before the fully involving in the process. The research asisstant in each hospital obtained the list of patients, whom discharged previous six months and followed -up with physician's appointments. Potential patients were random selected by researcher. Eligible patients were invited to participate in this study at the time waiting at outpatient department. They were informed the study objectives, process of data collection, and the right to participated or refuse to participate in this study.

Then, the participants who agreed to participate in this study were asked to sign the informed consent. After obtaining the consent forms, questionnaires and pen were distributed to the patients. In case the participants did not understand the questions or answer choices, the researcher explained those questions as well as the response options until the participants were able to response to the questionnaire items by themselves. The research assistant collected and rechecked completed questionnaire to make sure no item was left blank before terminating the data collection. The data collection among 10 hospitals was finished when 200 questionnaires obtained.

Data analysis

To prepare for data analysis, data was checked and cleaned. The Statistical Package for Social Science (SPSS) program version 17 was used to analyze data and provide descriptive statistics. The test analysis program (Jaarsma et al.) was employed for the testing difficulty and discrimination of the Dutch heart failure knowledge scale. Lisrel version 8 was used for construct validity (CFA). An alpha level of .05 was set as the acceptable level of significant for this study.

All data were double-checked to confirm the accuracy of the data file. The researcher used a frequency table to verify incorrectly keyed category variables. In addition, a summary of descriptive statistics was used to help check the range of variables for incorrectly keyed values, numbers of sample, mean, median, and maximum and minimum values.

Descriptive statistic including frequencies means, and standard deviations were used to describe the demographic data and to examine the distribution of demographic and other major variables in the study.

Stepwise multiple regressions were used to analyze the hypothesized model. The statistical assumption underlying multiple regressions including normality of distribution, linearity of relationship, homoscedascity, absent multicollinearity were assumed.

Human subject protection

The study proposal was submitted to and received ethical approval (decision No. 265/2015/YTCC-HD3) from the Institutional Review Board of the Ha Noi School of Public Health, Vietnam.

In addition, permissions for conducting research were also obtained from 10 hospitals. Informed consent forms were sent to each participant, explained the objectives of the study, benefit, risks, the kind of the questionnaires, the timing for complete these questionnaires, and asked for cooperation of the participants before data collection. This consent also made participant aware that: (a) participation in this study is absolute voluntary; (b) participation involves interviewing to fill a set of questionnaires; (c) this study does not include any intervention; (d) all the data collection are confidential, (e) whether they participate or not, there is no effect on the medical care they received. The participants can withdraw from the study at any time.

CHAPTER IV

RESULTS

The purpose of this correlation research was to determine self-care and to investigate the predicting factors of self-care among adult heart failure patients in 6 months after discharge. The data analysis is presented as follow

Characteristics of the study participants

Characteristics of the study variables

Analyses

Study results

Characteristics of the participants

In this study, 200 adults HF patients who visited outpatient departments in 10 hospitals in the north of Vietnam were studied. The mean age of participants was 53.46 ± 6.71 years and 51.5% were female and the rest were male. The majority of HF patients got married (87.5%) and more than a half living with other family members (57.5%). It was only 2.5% of them who were single, and 10% who were divorced or widowed.

In current study, the rate of participants who completed primary or secondary school was 34.5% and 30.5% respectively. It was only 7% of group had undergraduate or graduate education level. There was 14.5 % of participants were homemakers, 8% were unemployed, and it was more than a half of sample was still working at the time of data collection. However, a lot of them had a part time job, and other group might be retired.

The duration of being diagnosed with HF varied from 1 to 22 years, which the mean of such duration was 4.8 ± 3.9 years. Almost of participants had HF classification II and III (50.5% and 44%). It was quite similar among number of HF patients who had classification I and IV.

For the purpose of the study, the range of time for discharge was from 1 to 6 months with the means of the time duration was 3.4 ± 2.1 months. At most 86% participants had 2-6 score of comorbidity, which mean having 2 to 4 comorbid diseases add to their HF.

Other background characteristics of HF patients are presented in table 6.

Table 6 Demographic characteristics of the participants (n = 200)

Demographic characteristics	Frequency	Percentage (%)
Age (Range = 20-60, $\bar{X} = 53.46$, $SD = 6.71$)		
20-39	10	5.0
40-60	190	95.0
Gender		
Male	97	48.5
Female	103	51.5
Marital status		
Married	175	87.5
Divorced or separated	8	4.0
Single	5	2.5
Widowed	12	6.0
Education		
Primary school	69	34.5
Secondary school	61	30.5
High school	56	28.0
Undergraduate or graduate degree	14	7.0
Employment		

Demographic characteristics	Frequency	Percentage (%)
Homemaker	29	14.5
Employed part time	55	27.5
Employed fulltime	50	25.0
Unemployed	16	8.0
Other	50	25.0
Living		
Living alone	7	3.5
Married/ living with other	78	39.0
Living with other family member	115	57.5
Duration after discharge		
1 month	55	27.5
2 months	38	19.0
3 months	17	8.5
4 months	10	5.0
5 months	24	12.0
6 months	56	28.0
NYHA		
Class I	4	2.0
Class II	101	50.5
Class III	88	44.0
Class IV	7	3.5
Elapsed time since HF diagnosis		
1-5 year(s)	132	66.0
6-10 years	54	27.0
>10 years	14	7.0

Characteristics of the study variables

The eight variables in the current study include self-care behavior, knowledge, and social support, barrier of sodium restriction, comorbidity, symptom severity, gender, and education.

The detail regarding characteristics of each variable is presented as follows:

Self-care behaviors

The total scores of self-care behaviors ranged from 31 to 136 points with a mean of 82.23 ± 21.69 . The self-care behaviors scores had a positive skewness value (.197), thus indicating that most of the participants had scores of self-care with extreme values to the right of mean score. The kurtosis value of self-care behaviors was also a negative value (-.132), thus suggesting that the self-care behaviors scores were shaped like a platykurtic (flattened curve). Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a moderate self-care (Table 7).

Table 7 Possible range, actual range, mean, SD, skewness, kurtosis, of variables (n = 200)

Variables	Possible range	Actual range	Mean	SD	Skewness (SE= .172)	Kurtosis (SE= .342)
Self-care behaviors	0-145	31-136	82.23	21.69	.197	-.132
Knowledge	0-15	1-15	7.75	2.94	.055	-.549
Social support	0-56	12-54	37.68	8.94	-.268	-.414
Barrier of sodium restriction	5-25	5-22	12.72	4.04	-.045	-.538
Comorbidity	0-34	0-9	4.19	2.01	.060	-.602

Table 8 Mean heart failure self-care behavior item scores in rank order

Self-care behavior		Mean score	Mean (domain)
Seeking assistance	I come to a health care setting when I feel more short of breath.	3.23	2.82
	I contact health care setting when I see my feet, ankles, legs or stomach swell.	2.56	
	I contact health care setting when I have gained 2 pounds or more in a day, or 3 pounds or more	2.16	

	Self-care behavior	Mean score	Mean (domain)
	since my last visit to the doctor.		
	I contact health care setting when I have nausea or do not feel like eating.	3.63	
	I contact health care setting when I realize I am feeling tired all the time.	2.95	
	I keep my appointments with my doctor.	2.39	
Being aware of effects and results of HF	When I am short of breath, I rest.	3.47	3.16
	When I am short of breath or tired, I ask for help with something I am unable to do.	3.31	
	To help reduce my symptoms, like fatigue or shortness of breath, I limit the activities that are hard to me.	2.83	
	I spread my activities out over the whole day so I do not get tired.	2.98	
	I plan rest times during my day.	3.19	
Treatment compliance	I weigh myself on every day of the week.	2.10	2.68
	I watch how much water I pass (urinate or pee) each day.	2.18	
	I am careful not to drink “too many” fluids.	2.49	
	I watch that I do not eat salty food like “ca muoi” or “dua muoi”	2.84	
	I take my pills every day.	3.92	
	I take my pills as the doctor prescribed— I take all the doses of my pills	4.25	
	I always refill prescriptions for my pills on time.	4.12	
	I have a system to help tell me when to take my pills.	2.98	
	I stay away from people who have a cold or flu.	2.41	
	I get a flu shot once a year.	.97	
Modifying self-concept	I limit my alcohol intake to one glass of beer or wine, or one shot a day.	1.18	
	I am physically active (for example, walk or ride a bike) on 3 to 4 days per week.	2.75	
	I believe that having heart failure is a condition that I can adjust to.	2.93	2.96
Learning to live	I think a person can live a happy and good life even after having heart failure.	3.00	
	When I feel anxious about my worsening symptoms of heart failure I talk with doctor about it.	2.97	2.81
	I talk to a doctor in health care setting and family about my condition in order to make choices and plans for the future.	2.88	
	I am a non-smoker	2.28	
	I put my feet up when I sit in a chair.	3.14	

Table 8 displays the means for the HF self-care items in rank order from those performed “most of the time” to those performed “a little of the time”. Three of the top five most frequently performed self-care behaviors were related to taking prescribed medications. The other frequently performed self-care behaviors were asking for help, activities that patients attend to their HF, and believing that a person can live a happy and good life, even after having HF. The five least frequently performed self-care behaviors referred to treatment compliance. These infrequently performed behaviors included behaviors related to urination monitoring, weight gain, daily weight management, alcohol intake, and getting flu shot.

In this table, compare mean score of domain, the lowest mean score belongs to treatment compliance domain (2.68). There is similar in means score of seeking assistance and learning to live domain (2.82 and 2.81 respectively).

The self-care instrument in current study consisted of 5 domains. The range, mean, median and SD of each domain were presented as below

Table 9 Descriptive statistics of 5 domains of self-care behaviors in HF

Domain (number of items)	Range	Mean	Median	SD	Interpretation
Seeking assistance (6)	1-29	16.92	17	5.550	Moderate
Being aware of effects and results of HF (5)	3-25	15.78	16	4.333	Moderate
Treatment compliance (12)	9-59	32.18	30	9.643	Moderate
Modifying self- concept (2)	0-10	5.93	6	2.676	Moderate
Learning to live (4)	1-20	11.27	11	4.094	Moderate
Total (29)	31-136	82.23	82.50	21.69	Moderate

In table 9, statistic result indicated that the level mean score of all 5 domains are moderate. The total mean score of self-care behaviors also is moderate level.

Knowledge

The total scores of the knowledge ranged from 0 to 15 points with a mean of 7.75 (SD = 2.94). The knowledge scores had a positive skewness value (.055), thus indicating that most of participants had scores of knowledge with extreme values on the right of mean score. The kurtosis value of self-care was also a negative value (-.549), thus suggesting that the knowledge scores were shaped like a platykurtic. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a moderate knowledge (see Table 8).

Social support

The total scores of the support ranged from 0 to 56 points with a mean of 37.68 (SD = 8.94). The support scores had a negative skewness value (-.268), thus indicating that most of the participants had scores of support with extreme values to the left of mean score. The kurtosis values of social support was also a negative value (-.414), thus suggesting that the support scores were shaped like a flattened curve, which means flatter than a normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a high support (see Table 8).

For sources of support, it can be seen that HF patients perceived support from family member/friends higher than that provided by health care providers. The mean support score for family member/friends was 19.33 (SD = 4.806) whereas for health care provider it was 18.35 (SD = 4.836).

Table 10 Descriptive statistic of two sources of social support

Sources	Range	Mean	Median	Std. Deviation
Family/ friends	7-28	19.33	19	4.806
Health care provider	5-28	18.35	18	4.836
Total	12-54	37.68	38	8.94

Barrier of sodium restriction

The total scores of the barrier of sodium restriction ranged from 5 to 25 points with a mean of 12.72 (SD = 4.04). The scores had a positive skewness value (-.045), thus indicating that most of the participants had scores of barrier of sodium restriction with extreme values to the left of mean score. The kurtosis value of barrier was also a negative value (-.538), thus suggesting that the barrier scores were shaped like a platykurtic (flattened curve). Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a moderate barrier (see Table 8).

Comorbidity

The total scores of the comorbidity ranged from 0 to 34 points with a mean of 4.19 (SD = 2.01). The comorbidity scores had a positive skewness value (.060), thus indicating that most of the participants had scores of comorbidity with extreme values to the right of mean score. The kurtosis value of comorbidity was also a negative value (-.602), thus suggesting that the comorbidity scores were shaped like a platykurtic. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a mild comorbidity (see Table 8).

Symptom severity

Heart failure consists of four classifications from I to IV presented in appendix. Because this is categories scale, the dummy coding was used. The variables D1, D2, D3 represented of symptom severity of classification 2, 3, 4 as presented in chapter 3

Gender

There was quite similar in rate of male and female (48.5% and 51.5%). Because gender is a nominal scale, the dummy coding was used. In the analysis process, 1 was equal to female and 0 was equal to male.

Education

Majority of participants completed the primary and secondary school (34.5 and 30.5% respectively). Dummy coding in this variable is also required for multiple regressions. In Vietnam, finishing secondary level is required for every student in school age. Therefore, secondary and lower level was coded as 0, and others were coded as 1.

Analysis

In order to ensure there was no violation, the underlying assumption of multiple regression, normality, multicollinearity, linearity, autocorrelation, homoscedasticity were tested. The results of testing are presented below:

1. Normality: According to Hair and colleagues (2006), the z value of skewness and kurtosis not exceeding ± 1.96 which corresponds to a .05 level or ± 2.58 at the .01 probability level reflects a normal distribution. The 90% range for sample skewness -.281 to .281 for a sample of $n = 200$ indicate a normal distribution (Doane & Seward, 2011). As for the influencing variables, the z value of skewness = .17 and

kurtosis = .34 (see Appendix) and the skewness of all variables in current study in acceptable range as suggestion from Doane and Seward (2011), so that were within the normal curve.

2. Multicollinearity: Two common criteria can be used to examine multicollinearity: 1) Pearson's correlation coefficients and 2) tolerance values and variance inflation factor (VIF). The correlation of two variables that does not exceed $\pm .9$ indicates that there is no multicollinearity (Hair et al., 2010). In the current study, the correlation coefficients among the eight major variables ranged from .00 to .89. Thus, these correlation coefficients indicated no multicollinearity.

In fact, the tolerance measures of multicollinearity among the independent variables (values ranging from 0 to 1) and the tolerance value that approaches zero indicates multicollinearity (Hair et al., 2010). It is worth noting that the values of VIF that are greater than 10 indicate a cause of concern (Hair et al., 2010). In the present study, the results of the multiple regression analysis indicated that the tolerance ranged from .93 to .98 (not approaching 0) and VIF ranged from 1.00 to 1.07 (not greater than 10) (see Appendix). Thus, these results confirmed no violation for multicollinearity.

3. Linearity: The Normal P-P plot of Regression standardized residuals showed the relationship between dependent variable with independent variables. The result showed that the plotted values fall close to straight line in the normal probability paper plot as expected in a normal distribution (see Appendix).

4. Autocorrelation: The result of analysis showed that the Durbin-Watson value was 1.59 (see Appendix). It meant no autocorrelation.

5. Homoscedasticity: Homoscedasticity means that the variance of error is the same across all levels of the independent variables (Hair et al., 2010). This assumption can be tested by a visual examination of the plot of the regression of the standardized predicted. The result of analysis in Scatter plot table showed the scatter plot between standardized predicted value and standardized residual, it stayed in a narrow space (-3, +3). Variance of Z residual across all values of Z predicted was equally distributed. Variances are homoscedasticity. In addition, no data was beyond the values of -3 or +3 (see Appendix). There was no outlier.

Study results

The findings that answered the research questions and the results of the testing of the hypothesized model are described below:

The Pearson's test was performed in order to determine the relationship among gender, education level, comorbidity, symptom severity, knowledge, social support, barrier of sodium restriction and self-care. The magnitude relationships were evaluated by criteria: $.30 \geq r$ = weak or low relationship, $.30 \leq r \leq .50$ = moderate relationship and $r > .50$ = strong or high relationship (Burn and Grove, 2005).

The result showed that self-care was significant and had negative correlation with Comorbidity ($r = -.256, p < .05$), Barrier of sodium restriction ($r = -.375, p < .05$) and self-care was significant and positive association with Knowledge ($r = .198, p < .05$), social support ($r = .312, p < .05$).

The low negative relationship exists among social support and comorbidity and gender ($r = -.124$ and $-.162, p < .05$, respectively). Knowledge had weak positive relationship with social support ($r = .214$), different from education and comorbidity that had weak association ($r = .182$). In addition, education level had low relationship

with barrier of sodium restriction ($r = .132$, $p < .05$). While education, gender had correlation to self-care, but not significant ($r = -.087$, $.040$, respectively). All level of symptom severity of HF were not significant correlation with self-care.

Table 11 Inter correlations among variables.

	1	2	3	4	5	6	7	8	9	10
1.Knowledge	1									
2.Social support	.214*	1								
3.Comorbidity	-.029	-.124*	1							
4.Gender	-.031	-.162*	.005	1						
5.Symptom severity class 2	.000	-.078	-.051	-.021	1					
6.Symptom severity class 3	-.005	.103	.097	.016	-.895	1				
7.Symptom severity class 4	.007	-.027	-.018	-.037	-.192*	-.169*	1			
8.Barrier of sodium restriction	.005	-.096	.083	.081	.050	-.051	.013	1		
9.Education	.110	.043	.182*	-.037	.035	-.101	.145*	.132*	1	
10.Self-care behaviors	.198*	.312*	-.256*	.040	-.023	.034	-.015	-.375*	-.087	1

* $p < .05$

Table 12 Summary of multiple regression analysis (n = 200)

Predictors	<i>b</i>	<i>SE(b)</i>	β	<i>t</i>	<i>p</i> - value
Barrier of sodium restriction	-1.81	.33	-.34	-5.50	.000
Social support	.545	.15	.23	3.56	.000

Predictors	<i>b</i>	<i>SE(b)</i>	β	<i>t</i>	<i>p</i> - value
Comorbidity	-2.12	.67	-.19	-3.19	.002
Knowledge	1.09	.46	.15	2.35	.020
Gender			.11	1.82	.070
Education			-.04	-.55	.580
Symptom severity class 2			.002	.03	.977
Symptom severity class 3			.01	.22	.828
Symptom severity class 4			-.009	-.14	.887
Intercept = 85.29, $R^2 = .276$, $F_{4,195} = 18.59$, $p = 0.000$					

The result of multiple regression by stepwise method showed that Comorbidity, Knowledge, Social Support and Barrier of sodium restriction could predict 27.6% of self-care ($R^2 = .276$, $F_{4,195} = 18.59$, $p < .001$). The strongest predictor self-care in patients with heart failure was barrier of sodium restriction ($\beta = -.34$, $p < .05$). The finding also showed that self-care behaviors score of HF patients increases if have more social support, increase knowledge, decrease barrier of sodium restriction and less comorbidity. Other factors include gender, education, symptom severity were non-significant related to self-care:

Regression model (Unstandardized equation)

Self-care behaviors = 85.29 - 1.8 (Barrier of sodium restriction) + .55 (Social support) - 2.12 (Comorbidity) + 1.08 (Knowledge)

Standardized equation

$Z_{\text{self-care behaviors}} = -3.4 Z_{\text{(Barrier of sodium restriction)}} + .23 Z_{\text{(social support)}} - .19 Z_{\text{(comorbidity)}} + .15 Z_{\text{(knowledge)}}$

CHAPTER V

DISCUSSION, IMPLICATION AND RECOMMENDATION

The purpose of this chapter is to summarize the study, provide conclusions and discussions, and suggest recommendations for future research.

Summary

The purpose of this cross –sectional descriptive correlation study was to test self-care behaviors and to identify the predicting factors of self-care behaviors among adult heart failure patients. The factors included gender, education, symptom severity, comorbidity, social support and barrier of sodium restriction. The conceptual framework used in this study was guided by Orem’s self-care theory and empirical literatures. Multi-stage sampling technique was used in this study, and it was 200 heart failure patients recruited from the cardiovascular outpatient department at 10 hospitals from 10 cities and province of Red River delta of Vietnam. Data were collected from July to October 2015.

Self -reported questionnaires were used for data collection, which consisted of Demographic questionnaire, The Revised Heart failure self-care behavior scale, NYHA HF classification, Charlson Comorbidity Index Questionnaire, Dutch HF knowledge scale, Social support questionnaire, and barriers subscale of Beliefs about dietary compliance scale. The validity and reliability of these instruments were examined. Data were analyzed by descriptive statistic i.e., percentage, range, mean, standard deviation, median and stepwise multiple regression.

Results

Mean age of participants in current study was 53.46 (SD = 6.71) with the range of age from 20 to 60 years. The number of male and female patients in this study was quite similar, 48.5% and 51.5 % respectively. Over a half of participants had primary and secondary school level (64.5%). A half of heart failure participants in this study were still working with part time or full time job. However, a quarter of participants were retired early than their age. The duration of being diagnosis of HF varied from 1 to 22 years, with mean of duration was 4.8 ± 3.9 years. Almost of participants had HF classification II and III (50.5% and 44%), which was quite similar among number of HF patients who had classification I and IV.

The mean of score of self-care behaviors was 82.23 (SD = 21.69). The mean score of knowledge was 7.75 (SD= 2.94). The mean score of social support was 37.68 (SD=8.94).

The result of multiple regression showed that comorbidity, knowledge, social support and barrier of sodium restriction could predict 27.6 % of self-care behaviors ($R^2 = .276$, $F_{4,195} = 18.59$, $p < .05$). The strongest predictor self-care behaviors in patients with heart failure was barrier of sodium restriction ($\beta = -.338$, $p < .05$).

Regression model (Unstandardized equation)

Self-care behaviors = 85.29 - 1.8 (Barrier of sodium restriction) + .55 (Social support) - 2.12 (Comorbidity) + 1.08 (Knowledge)

Standardized equation

$Z_{\text{self-care behaviors}} = - 3.4 Z_{\text{(Barrier of sodium restriction)}} + .23 Z_{\text{(social support)}} - .19 Z_{\text{(comorbidity)}} + .15 Z_{\text{(knowledge)}}$

Discussion

The mean self-care behavior score of this study was 82.23 lower than that of Caucasian American (85.49 ± 17.31) (using RHFScBS), but higher than that of Korean Americans with HF (79.53 ± 16.42) (Jang et al., 2012). There were significant differences between the mean scores of nine self-care behaviors when compared by race (Artinian, Magnan, Sloan, et al., 2002). In which, the mean score of item “I get a flu shot once a year” of white American was higher than that of African American, 4.48 and 2.80 respectively. Related to that mean score of Vietnamese adults with HF, the least frequently performed (.97) self-care behavior indicated that influenza vaccination administration among this population is still not common in Vietnam regardless the Ministry of Health’s regulation from 2011 recommend HF patients have flu shot annually.

The mean score of treatment compliance was lowest among 5 domains of this instrument (2.68). Treatment compliance subscale consists of medication adherence, regular weight, fluid restriction, dietary restriction, flu shot, alcohol intake, and physical activity. Among these, medication adherence is more frequently. There are similar among the most frequently performed self-care behaviors in current study and study of Artinian, Magnan, Sloan, et al. (2002). Nevertheless countries people are living or the race they are, HF patients always keep following the medication treatment recommendation. While other behaviors less performed are flu shot, alcohol intake, weighting and fluid restriction, which is consistent with that of Kato et al. (2009) and Barber, Currie, and Gardiner (2011). The findings of these studies indicated that these behaviors were shared by groups of HF patients from different countries and cultural.

In this paper, the low mean score of domain treatment compliance, seeking assistance and learning to live can explain the rational of repeated hospitalization in HF patients. This study may reflect the real situation in Vietnamese where patients only focus on medication, but less likely seeking help when symptom getting worse, contact health care provider or share their health condition with family member. They may delay contacting health care provider and find another solution such as follow the previous medication's prescription. Similarity, the more feeling of guilty, over being burden on other, and uselessness patients have, the more common family and friends isolation they presented (Jeon et al., 2010). In other words, consequent increase in readmission upon the poor self-care behaviors

Orem's self-care theory and empirical studies indicated that modify the self-concept is important in HF management (Artinian, Magnan, Sloan, et al., 2002; Goodman et al., 2013). Regarding to this domain, the mean score of items 12 and item 29 was moderate (2.93 and 3.0, respectively). It can be seen that the Vietnamese adults with HF might have positive emotion in dealing with their health problem. However, in ranking order of these items of Vietnamese, the mean scores are lower than that of participants in study of Artinian et al. (2002a) and Jang et al. (2012).

Among the significant predicting factors in this study, the barrier of sodium restriction was most strongly negative correlated with self-care behaviors scores ($\beta = -.338, p < .05$). This result appears to consistent with a systematic review of determinants of heart failure self-care behaviors which reported that perceived barriers to restriction were negatively correlated with sodium intake restriction (Oosterom-Calo et al., 2012). This result also consists with the definition of BCF pattern of living. Pattern of living is the information sought included usual repetitively

performed daily activities, including self-care measures performed daily, and responsibilities for other persons that may limit health deviation self-care requisites (Orem et al., 2001). In HF patients, to meet self-care requisite is to keep body in low level of sodium by low sodium diet. However, living with family members who prefer salty food, having salty habit, and lack of support from society were barriers for HF patients to follow the recommendation. These barriers were consistent with the results from the previous studies (Chung et al., 2006; Van Der Wal et al., 2006). Otherwise, patients who lived alone without motivation to cook, meet challenges in following low sodium diet (Sheahan & Fields, 2008).

Sodium restriction is seen among the most effort-intensive self-care requirements, particularly regarding adults. Many cost-effective interventions for reducing salt intake have been conducted among people at high risk of cardiovascular disease (Nguyen et al., 2012). This may mean that participants are now able to effectively reduce their sodium intake by overcome barriers. In addition, women appear to more strictly follow required low salt diet than men (Chung et al., 2006). Therefore, female patients may more commonly prepare their own meals and persuaded other family members to follow a low salt diet. In addition, regarding cultural context, many Vietnamese mothers abstain from “eating out” in order to save money and avoid high sodium food.

Comorbidity had a significant negative correlation to self-care behaviors ($\beta = -.19, p < .05$). The health maintaining practice was decreased among adults with HF when having two or more illness conditions (Bayliss, John, Douglas, Lori, & Deborah, 2003; Holzapfel et al., 2009). When HF patients had an additional chronic condition, they were prone to poor self-care behaviors because of low priority perceived for HF

self-care (Siabani et al., 2013). Patients may find difficulties to interpret or respond to complex symptom in combination with other diseases. Thirty nine percent of remote Vietnamese population reported at least one chronic disease (V. M. Hoang et al., 2008). In this situation, they also have lack of sufficient skills in practicing self-care behaviors, such as adherence to many medication, restriction to more than two diet categories or symptom management (Dickson, Buck, & Riegel, 2011). The result of this study is also supported by other studies (Bayliss et al., 2003; Holzappel et al., 2009). However, in another study, comorbidity is also associated with self-care expertise who were better at HF self-care (Riegel, Vaughan, Goldberg, & Deatruck, 2007). It might be due to patient's motivation to attend more closely to self-care behaviors to keep their condition stable. Thus, the significant symptoms of HF along with symptoms of common comorbidities should be explained in detail to help patients to fulfill their gap of knowledge and capability in interpreting the coming symptoms.

Knowledge had a significant positive correlation with self-care behaviors ($\beta = .147, p < .05$). A qualitative study found that clinical and management knowledge of patients were important for their self-care behaviors (Riegel & Carlson, 2002). It is supported by systematic review study, which its authors revealed that insufficient knowledge was associated with all aspects of self-care behaviors (Siabani et al., 2013). Another study also indicated that patients who did not follow recommended self-care behaviors because of lack of knowledge on the reason for weighing; misconception about illness, influencing adherence; and the ability to connect knowledge about illness and symptom with medication's effectiveness (MacInnes, 2008; Vaughan Dickson, Lee, & Riegel, 2011). Patients were more likely to carry out effective self-care behaviors when they understood its importance and the reasons for

the requirements self-care behaviors placed on them. The significant relationship among knowledge and self-care behaviors was also found in other researches (Heo et al., 2008; Hsiao-Yun & Yann-Fen, 2011; Son et al., 2011). In this study, participants' mean knowledge score remained somewhat low (7.7 ± 2.94), compared to that score of 11 ± 2.4 (Van Der Wal et al., 2006). Therefore, in order to motivate HF patients to undertake effective self-care behaviors, nurses should understand patients' knowledge level and the positive effect of linking self-care behaviors requirements to patients' understanding of self-care behaviors' importance.

Social support had a significant relationship to self-care behaviors ($\beta = .225, p < .05$). As literatures said that, patients get many challenges and are suffering from practicing self-care behaviors because of dealing with progressive nature of HF and physical symptoms. Therefore, social support from family, friend and health care professionals are needed to assist patients not only on daily activities, but also information in providing guidance when monitoring symptoms and promoting healthy behaviors, and tangible to maintain self-care behaviors (Graven & Grant, 2014). Another qualitative research also indicated the significant relationship between social support and self-care behaviors (Riegel et al., 2010). In contrast, the result of current study is inconsistent with others, which social support was negative correlated with self-care behaviors in group of chronically ill adults (Nordgren, Asp, & Fagerberg, 2008). Chronic illness Vietnamese people may need more support due to the insufficiencies of food (Wagstaff, 2007), and extra medical care expenditure (V. M. Hoang et al., 2009). However, it seems non straightforward in support Vietnamese HF patients whereas they rarely share idea with others (Labun, 2001). In addition, similar with finding from Hanucharumkul (1989), which indicated that support from family

member and health care provider was more important than other. Therefore, in helping HF patients, the combination among family and health care providers to understand and support patients are significance.

In this study, education was not correlated with self-care behaviors scores. Patients with greater education may be more likely to already recognize and understand the symptoms of HF and other chronic diseases, facilitating adherence to self-care requirements. In contrast, patients with less education may be readily able to acquire such knowledge, particularly as self-care behaviors involves education processes (Orem et al., 2001). However, in current study, it seems higher education level patients have, subjectively taking care of themselves and less likely to follow recommendation from health care provider ($r = -.89$). It may be explained that greater education level patients who believe that they can understand their body and manage the changes by HF syndrome. It is also explained by cultural belief—one special point looking for health of Vietnamese people. It seems that some greater education level people may think too much about effects of modern medication (Wingham, Harding, Britten, & Dalal, 2014) then choose traditional medication instead of or denied the personal significance of HF.

Gender was not correlated to self-care behaviors. This null association is consistent with prior studies (Jurgens, 2006; Lee, Tkacs, & Riegel, 2009). Among adult patients with HF, females had a significant role in preparing meals and more positively motivated in taking care of themselves. However, the nature of females is that they have more psychosocial distress and need more social support, which is related to poor self-care behaviors if psychosocial distress and social support remain low (Chriss et al., 2004; Heo et al., 2008).

Although symptom severity did not significantly relate to self-care behaviors, in current study, this factor did not play any role in defining self-care behaviors among HF patients. Interestingly, the results showed that the patients with the classification III of symptom severity, they may more involvement in self-care. It could be said that patients who had symptoms, they had more experiences in dealing with it and reacting to the changes of symptoms. They are also more motivated in preventing the exacerbation of HF than those with mild syndrome (classification 1). However, with the most dangerous symptom severity (classification IV), it seems affect activities of patients; they have less energy and fail to see the importance to attend to self-care behaviors.

Finally, the study finding showed that among adult HF patients, barrier of sodium restriction, comorbidity, social support, and knowledge impacted on self-care behaviors more than entire variables symptom severity, education, and gender. These factors could predict self-care in Vietnamese adults with heart failure during 6 months after discharge ($R^2 = .276$).

This study had several limitations. Although data was collected from 10 cities and provinces in Red River delta with a variety circumstances and groups of patients in self-care, the patient population was relatively small and the patients were limited to outpatients. The limitation of overestimated self-care behaviors might exist in this study because of the patient's self-reporting. The other limitation is due to the cross-sectional design of the study, which could not test for a cause–effect relationship.

Conclusion

This study examined factors predicting self-care behaviors in heart failure patients following Orem's self-care theory. The strongest positive predicting factor

was barrier of sodium restriction. Patients, who were knowledgeable about HF symptoms and HF self-care requirements, who received more social support and who had fewer comorbid diseases, and less barrier of sodium restriction, tend to carry out better self-care behaviors. Interventions improving self-care knowledge should aim to explain why self-care is important and how to carry it out effectively. Additionally, intervention addressing family member support may effectively promote self-care among adults with HF, particularly among remote people with comorbid diseases.

Implication for nursing practice

To recognize the level of barrier of sodium restriction in heart failure patients, cooperation with family member is needed, especially to encourage women to enjoy and manage cooking in family and share experience with other patients. In addition, follow sodium restriction should be concerned in other patient groups to restrain the “cultural preference for high sodium diet”.

In motivating self-care among HF patients, nurses should closely discuss with HF patients to understand the belief and level of their knowledge on self-care behaviors and their capability in linking these knowledge and action system of self-care in managing HF.

Nurses have significant role in support HF patients, especially give them advice and feedback, emotional support with intimacy, attachment, reassurance, confidence and reliance; and tangible support of direct aid and giving of material supplies or services.

For patients who have comorbid diseases, nurses should help them to discriminate the symptoms, contribute and follow an appropriate dietary restriction.

Recommendation for further research

The recommendations for further research include:

The replication and extending the framework of this study for elderly or young adult heart failure patients might be needed. Regarding the nature of developmental stage of each group (Orem theory of self-care), the predicting factor of self-care behaviors may change.

Nursing intervention reducing barrier of sodium restriction, improving social support and knowledge should be investigated, and provided in order to enhance self-care behaviors of heart failure patients.

Further research should be conducted testing and using the Revised heart failure behavior scale to measure self-care behaviors in large sample throughout country to represent picture about self-care behaviors in Vietnamese HF patients.

Conflict of Interest

The authors have no conflicts of interest to declare.

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APPENDIX



จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Appendix A: Approval of dissertation proposal



Announcement

Faculty of Nursing, Chulalongkorn University
Proposal Approved in the academic year 2013

ID	5477405036
Name	Mrs. Pham Thi Thu Huong
Academic Program	Doctor of Philosophy Program in Nursing Science
Chairperson	Assoc. Prof. Dr. Waraporn Chaiyawat
Major-advisor	Assoc. Prof. Dr. Jintana Yunibhand
Co-advisor	Asst. Prof. Dr. Chanokporn Jitpanya,
Examiner	Asst. Prof. Dr. Sunida Preechawong
Examiner	Assoc. Prof. Dr. Orasa Panpakdee
External Examiner	Assoc. Prof. Dr. Siripaarn Suwanmonkma,
Title of Thesis	PREDICTING FACTORS OF SELF CARE IN VIETNAMESE ADULTS WITH HEART FAILURE

Approval by Faculty Board No. 8/2014, May 14, 2014.

Announce date May 16, 2014

(Sureeporn Thanasilp, D.N.S.)

Associate Professor and Dean, Faculty of Nursing

Appendix B: Approval of ethical review committee

MINISTRY OF HEALTH
HANOI SCHOOL OF PUBLIC HEALTH

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

No. 265/2015/YTCC-HD3
Subject: Ethical Approval

Ha Noi, July 27, 2015

DECISION

On Ethical approval for research involving human subject participation

THE CHAIR OF THE ETHICAL REVIEW BOARD FOR BIOMEDICAL RESEARCH
HANOI SCHOOL OF PUBLIC HEALTH

- Based on Decision No. 116/QĐ-YTCC by the Dean of Hanoi School of Public Health on Establishment of The Institutional Ethical Review Board of Hanoi School of Public Health; 02 February 2015 ;
- Based on decision No. 651/QĐ-YTCC by the Dean of Hanoi School of Public Health on the Issuing Regulation of the Institutional Ethical Review Board of Hanoi School of Public Health; 26 June 2016;
- After reviewing research ethics application No. 015-265/DD-YTCC;

DECIDED

Article 1. Grant ethical approval for ethnographic study project:

- Project Title: **Predicting factors of self care in Vietnamese adults with heart failure**
- Principal Investigator: **Thi Thu Huong Pham**- PhD Candidate, Faculty of Nursing, Chulalongkorn University, Thailand.
- Supervisor: **Assoc. Prof. Jintana Yunibhand**, R.N, PhD- Faculty of Nursing, Chulalongkorn University, Thailand.
- Research site: Cardiology Departments of 10 hospitals in Red river region, Vietnam
- Project time: from 01/05/2014 to 31/12/2015
- Data collection time: from 30/07/2015 to 30/09/2015
- Review type: Expedited review

Article 2. This decision is effective from **30/07/2015** to **31/12/2015**

Article 3. Principal Investigator has to send progress report once each year and a final report upon the study completion to the Institutional Ethical Review Board of Hanoi School of Public Health (IRB of HSPH).

Article 4. Principle Investigator should notify (IRB of HSPH) immediately of any adverse effects arising from this study (e.g. unexpected adverse outcomes, unexpected community/subject risk factors or complaints, etc.). Active research projects are subject to random audit by the IRB of HSPH.

CHAIR OF INSTITUTIONAL ETHICAL REVIEW BOARD

(Signature and full name)

SECRETARY

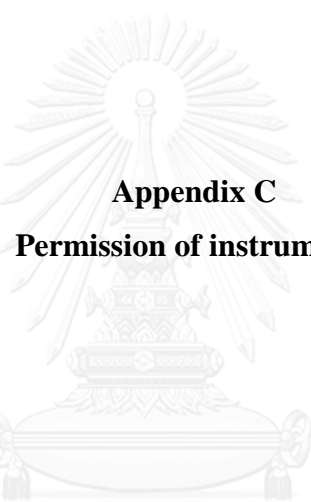
(Signature and full name)



Ha Van Nhu



Nguyen Thi Minh Thanh



Appendix C
Permission of instruments

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Asking for permission: the Revised Heart failure self-care behavior scale

Nancy Marie Trygar Artinian <nancy.marie.artinian@wayne.edu>

Here you go! Good luck to you!

Nancy T. Artinian, PhD, RN, FAHA, FPCNA, FAAN
Interim Dean and Professor
College of Nursing
Wayne State University
Detroit, MI 48202
313-577-4071 (phone)
313-577-4571 (fax)



Sorry for my delayed response. You most definitely have permission to modify the words on the instrument so that it accurately measures in your target population.

Sounds like you are doing great work!

Good luck to you!

Nancy

Nancy T. Artinian, PhD, RN, FAHA, FPCNA, FAAN
Professor Emeritus
College of Nursing
Wayne State University

Asking for permission: the Dutch Heart Failure Knowledge Scale

Wal, MHL van der (thorax) <m.h.l.van.der.wal@umcg.nl>

Dear Pham Thi Thu Huong,

Thank you for the interest in our work on the Dutch Heart Failure Knowledge Questionnaire. Ofcourse you are allowed to use the scale without any special permission or fee. Attached you find the English and Vietnamese version of the scale and instruction on how to analyze the scale.

The reference you can use is ' van der Wal, MHL, Jaarsma T, Moser DK, van Veldhuisen DJ. Development and testing of the Dutch Heart Failure Knowledge Scale. European Journal of Cardiovascular Nursing 2005;4:273-277.

The last question of the scale is a bit problematic in English (in Dutch the last answer is 'take a 'dropje' which is a very salted lozenge. They don't know that kind of lozenge in other countries, so it was decided to transplate it in 'take a lozenge' which isn't exactly the same.

Maybe in the future I and my co-workers will ask you to share your data with us to further validation of the Scale.

I would suggest to use the official version of the scale. If you want to add questions, you can put them in another questionnaire, otherwise it is not the official version of the Dutch HF Knowledge Scale anymore.

Kind regards,

dr. Martje van der Wal RN, PhD
Senior Researcher
University Medical Center Groningen
Department of Cardiology
PO Box 30.001
9700 RB Groningen
The Netherlands

Asking for permission: Beliefs about dietary compliance scale

Pressler, Susan <spressle@med.umich.edu>

Hello, I am pleased to have you use the scales. I will send them tomorrow. Susan

Pressler, Susan

Dear Ms. Pham,

You have my permission to use the Belief Scale for Diet.

Please find attached the belief scales for diet with scoring information. I sent several publications to you about the scale in a separate file. I think it would be good to evaluate validity again. When we used the scales, we found them very Easy for patients to use and they did direct interventions. I know they have been translated into other languages but I do not remember it being into Thai. Best wishes with your research.

I would be interested in hearing about your results.

Susan Pressler



Asking for permission: Social support Questionnaire

2015-03-24 11:15 GMT+07:00 Somchit Hanuchareonkul

<somchit.han@mahidol.ac.th<mailto:somchit.han@mahidol.ac.th>>:

Dear Pham Thi Thu Huong

You are welcome to use Social Support Questionnaire.

Somchit Hanucharunkul RN, PhD

Editor, Pacific Rim Int. JNR

Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University

260 Rama 6 Road, Payathai, Rachathevee, Bangkok, Thailand, 10400

Tel +662 201 2013, mobile +6681 774 9313

email somchit.han@mahidol.ac.th<mailto:somchit.han@mahidol.ac.th>



Asking for permission: Comorbidity questionnaire

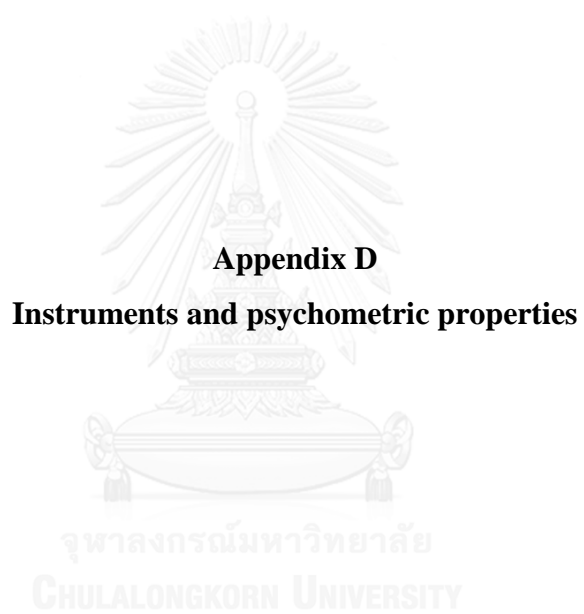
từ: **Katz, Jeffrey Neil, M.D.** <JNKATZ@partners.org>

tới: thu huong Pham <phamhuongddnd@gmail.com>

Dear Pham,
Sure permission granted. Jeff Katz.

Jeffrey N. Katz, MD, MSc
Professor of Medicine and Orthopedic Surgery
Harvard Medical School
Clement Sledge and Thomas Thornhill Chair in Orthopedic Surgery
Director, Orthopedic and Arthritis Center for Outcomes Research
Brigham and Women's Hospital
Phone: 617 732 5338 Fax 617 525 7900
<http://brighamandwomens/research/labs/oracore/>





Appendix D

Instruments and psychometric properties

Approach dateHospital nameParticipant code

Research Questionnaires

Part 1 Demographic questionnaire

Please tell me about your personal information

1. Age Years
2. Gender Male Female
3. Marital status

<input type="checkbox"/> Married	<input type="checkbox"/> Divorced
<input type="checkbox"/> Separate	<input type="checkbox"/> Widowed
4. Education level

<input type="checkbox"/> No schooling	<input type="checkbox"/> High school
<input type="checkbox"/> Primary school	<input type="checkbox"/> Undergraduate
<input type="checkbox"/> Secondary school	<input type="checkbox"/> Graduate
<input type="checkbox"/> Other: please indicate.....	
5. Employment status

<input type="checkbox"/> Homemaker	<input type="checkbox"/> Employed part time
<input type="checkbox"/> Employed fulltime	<input type="checkbox"/> Unemployed
6. Living arrangement
 - Living alone
 - Married or living with significant other
 - Living with other family member
 - Living with friend(s)
7. How long has it been since you were told you have HF?
.....years.....months
8. How long has it been since you admit the latest hospital?
.....monthsdates

Self-care measurement

Part 2: THE REVISED HEART FAILURE SELF-CARE BEHAVIOR SCALE

Directions: Listed below are behaviors that people with heart failure commonly use to take care of themselves. We are interested in how often you use these behaviors. Circle your response for each behavior listed.

Self-care Behavior	None of the Time	A Little of the Time	Some of the Time	A Good Bit of the Time	Most of the Time	All of the Time
1. I weigh myself on every day of the week.	0	1	2	3	4	5
2. When I am short of breath, I rest.	0	1	2	3	4	5
3. When I am short of breath or tired, I ask for help with something I am unable to do.	0	1	2	3	4	5
4. I come to a health care setting when I feel more short of breath.	0	1	2	3	4	5
5. I contact health care setting when I see my feet, ankles, legs or stomach swell.	0	1	2	3	4	5
6. I contact health care setting when I have gained 2 kg or more in a day, or 3 kg or more since my last visit to the doctor.	0	1	2	3	4	5
7. I watch how much water I pass (urinate or pee) each day.	0	1	2	3	4	5
8. I am careful not to drink "too many" fluids	0	1	2	3	4	5
9. When I feel anxious about my worsening symptoms of heart failure I talk with my doctor about it.	0	1	2	3	4	5
10. I contact health care setting when I have nausea or do not feel like eating.	0	1	2	3	4	5
11. To help reduce my symptoms, like fatigue or shortness of breath, I limit the activities that are hard for me.	0	1	2	3	4	5
12. I believe that having heart	0	1	2	3	4	5

failure is a condition that I can adjust to.						
13. I spread my activities out over the whole day so I do not get too tired.	0	1	2	3	4	5
14. I plan rest times during my day.	0	1	2	3	4	5
15. I contact healthcare setting when I realize I am feeling tired all the time.	0	1	2	3	4	5
16. I watch that I do not eat salty food like “ca muoi” or “dua muoi	0	1	2	3	4	5
17. I take my pills every day.	0	1	2	3	4	5
18. I take my pills as the doctor prescribed— I take all the doses of my pills.	0	1	2	3	4	5
19. I always refill prescriptions for my pills on time.	0	1	2	3	4	5
20. I have a system to help tell me when to take my pills.	0	1	2	3	4	5
21. I stay away from people who have a cold or flu.	0	1	2	3	4	5
22. I am physically active (for example, walk or ride a bike) on 3 to 4 days per week.	0	1	2	3	4	5
23. I get a flu shot once a year.	0	1	2	3	4	5
24. I limit my alcohol intake to one glass of beer or wine, or one shot a day.	0	1	2	3	4	5
25. I am a non-smoker.	0	1	2	3	4	5
26. I keep my appointments with health care setting..	0	1	2	3	4	5
27. I put my feet up when I sit in a chair.	0	1	2	3	4	5
28. I talk to a doctor in health care setting and family about my condition in order to make choices and plans for the future.	0	1	2	3	4	5
29. I think a person can live a happy and good life even after having heart failure.	0	1	2	3	4	5

Symptom severity measurement

PART 3: New York Heart Association (NYHA) functional classification

Instruction: Listed below are a number of statements. Read each statement and place an [X] in the box that describes how your heart failure makes you feel most days.

- No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
- Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF.
- Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF.
- Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.

Comorbidity measurement

Part 4: Charlson Comorbidity Index Questionnaire

Instruction: please read carefully and answer which of the following health problem(s) you experience and/or are diagnosed with in addition to heart failure.

Myocardial Infarction

1. Have you ever had a heart attack? No Yes

Congestive Heart Failure

2. Have you ever been treated for heart failure? (You may have been short of breath and the doctor may have told you that you had fluid in your lungs or that your heart was not pumping well.)

No Yes

Peripheral Vascular Disease

3. Have you had an operation to unclog or bypass the arteries in your legs?

No Yes

Cerebrovascular Accident

4. Have you had a stroke, cerebrovascular accident, blood clot or bleeding in the brain, or transient ischemic attack (TIA)?

No Yes

Hemiplegia

4a. Do you have difficulty moving an arm or leg as a result of the stroke or CVA?

No Yes

Chronic Obstructive Pulmonary Disease

5. Do you have asthma? No Yes

If yes, do you take medicines for your asthma?

a. Yes, with flare-ups of asthma only No Yes

b. Yes, I take medicines regular, even when I'm not having a flare-up.

No Yes

6. Do you have emphysema, chronic bronchitis, or chronic obstructive lung disease?

No Yes

If yes, do you take medicines for your lung disease?

c. Yes, only with flare-ups No Yes

d. Yes, I take medicines regularly, even when I'm not having a flare-up.

No Yes

Ulcer Disease

7. Do you have stomach ulcers or peptic ulcer disease?

No Yes

If yes, has this condition been diagnosed by endoscopy (where a doctor looks into your stomach through a scope) or an upper GI or barium swallow study (where you swallow chalky dye and then x-rays are taken)?

No Yes

Diabetes

8. Do you have diabetes (high blood sugar)?

No Yes

a. Is by medications taken by mouth?

No Yes

b. Is it treated by insulin injections?

No Yes

c. Has the diabetes caused:

1) Problems with your kidneys?

No Yes

2) Problems with your eyes; treated by an ophthalmologist?

No Yes

Renal

9. Have you ever had the following problems with your kidneys?

Poor kidney function (blood tests show high creatinine)?

No Yes

Have used hemodialysis or peritoneal dialysis?

No Yes

Have received kidney transplantation?

No Yes

Connective Tissue Disease

10. Do you have rheumatoid arthritis that you take medications for regularly?

No Yes

Do you have Lupus (systemic lupus erythematosus)?

No Yes

Do you have Polymyalgia rheumatica?

No Yes

Dementia, liver disease, leukemia, lymphoma, tumor, metastases, AIDS:

11. Do you have:

a. Alzheimer's Disease or another form of dementia?

 No Yes

b. Cirrhosis or serious liver damage?

 No Yes

c. Leukemia or polycythemia vera?

d. Lymphoma?

 No Yes
 No Yes

e. Cancer, other than skin cancer, leukemia, or lymphoma?

If yes, has the cancer spread or metastasized to other parts of your body?

f. AIDS?

 No Yes No Yes

Table 13 Weight index of Charlson Comorbidity

	Condition	Point	Notes
1.	myocardial infarction	1	
2.	HF	1	
3.	peripheral vascular disease	1	
4.	cerebrovascular disease	1	
5.	dementia	1	
6.	chronic pulmonary disease	1	
7.	connective tissue disease	1	
8.	ulcer disease	1	
9.	mild liver disease	1	
10.	diabetes mellitus without end organ damage	1	
11.	hemiplegia	2	If hemiplegia, do not count CVA separately
12.	moderate or severe renal damage	2	
13.	diabetes mellitus with end organ damage	2	If end organ damage, do not count DM separately
14.	any tumor or cancer	2	Nonmetastatic cancer only
15.	leukemia	2	
16.	lymphoma	2	
17.	severe liver disease	3	
18.	metastatic solid tumor	6	If metastatic do not count cancer separately
19.	AIDS	6	

Knowledge measurement

Part 5: The Dutch Heart failure Knowledge Scale

Instructions: This list contains a number of questions and statements about heart failure. Please tick off what you think is the right answer (only tick 1 box per question).

1. **How often should patients with severe heart failure weigh themselves?**
 - every week
 - now and then
 - every day
2. **Why is it important that patients with heart failure should weigh themselves regularly?**
 - because many patients with heart failure have a poor appetite
 - to check whether the body is retaining fluid
 - to assess the right dose of medicines
3. **How much fluid are you allowed to take at home each day?**
 - 1.5 to 2.5 liters (6 to 10 cups) at the most
 - as little fluid as possible
 - as much fluid as possible
4. **Which of these statements is true?**
 - when I cough a lot, it is better not to take my heart failure medication
 - when I am feeling better, I can stop taking my medication for heart failure.
 - it is important that I take my heart failure medication regularly
5. **What is the best thing to do in case of increased shortness of breath or swollen legs?**
 - call the doctor or the nurse
 - wait until the next check-up
 - take less medication
6. **What can cause a rapid worsening of heart failure symptoms?**
 - a high-fat diet
 - a cold or the flu
 - lack of exercise
7. **What does heart failure mean?**
 - that the heart is unable to pump enough blood around the body
 - that someone is not getting enough exercise and is in poor condition
 - that there is a blood clot in the blood vessels of the heart
8. **Why can the legs swell up when you have heart failure?**
 - because the valves in the blood vessels in the legs do not function properly
 - because the muscles in the legs are not getting enough oxygen
 - because of accumulation of fluid in the legs
9. **What is the function of the heart?**
 - to absorb nutrients from the blood
 - to pump blood around the body

- to provide the blood with oxygen

10. Why should someone with heart failure follow a low salt diet?

- salt promotes fluid retention
- salt causes constriction of the blood vessels
- salt increases the heart rate

11. What are the main causes of heart failure?

- a myocardial infarction (heart attack) and high blood pressure
- lung problems and allergy
- obesity and diabetes

12. Which statement about exercise for people with heart failure is true?

- it is important to exercise as little as possible at home in order to relieve the heart
- it is important to exercise at home and to rest regularly in between
- it is important to exercise as much as possible at home

13. Why are water pills (diuretics) prescribed to someone with heart failure?

- to lower the blood pressure
- to prevent fluid retention in the body
- because then they can drink more

14. Which statement about weight increase and heart failure is true?

- a weight gain of 2 pounds in 1 day or 4 pounds in 1 week should be reported to the doctor at the next check-up
- if you gain 2 pounds in 1 day or 4 pounds in 1 week, you should contact your doctor or nurse
- If you gain 2 pounds in 1 day or 4 pounds in 1 week, you should eat less

15. What is the best thing to do when you are thirsty?

- suck an ice cube
- suck a lozenge
- drink a lot

Table 14 Items analysis of Dutch Heart Failure Knowledge scale

Knowledge Items	Difficulty (d)	Discrimination (r)	Interpretation
1. How often should patients with severe heart failure weigh themselves	0.26	0.60	Average and good
2. Why is it important that patients with heart failure should weigh themselves regularly	0.42	0.38	Average and good
3. How much fluid are you allowed to take at home each day	0.46	0.31	Average and good
4. Which of these statements is true	0.52	0.68	Average and good
5. What is the best thing to do in case of increased shortness of breath or swollen legs	0.66	0.43	Average and good
6. What can cause a rapid worsening of heart failure symptoms	0.25	0.11	Hard and fair
7. What does heart failure mean	0.55	0.57	Average and good
8. Why can the legs swell up when you have heart failure	0.50	0.58	Average and good
9. What is the function of the heart	0.67	0.58	Average and good
10. Why should someone with heart failure follow a low salt diet	0.35	0.44	Average and good
11. What are the main causes of heart failure	0.68	0.35	Average and good
12. Which statement about exercise for people with heart failure is true	0.53	0.52	Average and good
13. Why are water pills (diuretics) prescribed to someone with heart failure	0.55	0.57	Average and good
14. Which statement about weight increase and heart failure is true	0.59	0.55	Average and good
15. What is the best thing to do when you are thirsty	0.45	0.56	Average and good
Reliability (KR20) = 0.697 Mean difficulty = 0.496 Mean Discrimination = 0.482			

Social support measurement

Part 6: Social support questionnaire

Direction: listed below are supporting from family members, friends or health care providers that you may concern. We are interested how you can receive supporting from these sources. Circle your response for each support listed.

Asking for your supporting from family members and friends

Asking for your supporting from health care provider

Items	Not at all	A little	Moderate	Quite a bit	A great deal
1. How much did this person give you information, suggestions, and guidance during your present illness that you found helpful?	0	1	2	3	4
2. How reliable is this person? Is this person there when you need him/her during your present illness?	0	1	2	3	4
3. How much has this person boosted your spirits when you feel low during your present illness?	0	1	2	3	4
4. How much has this person made you feel he/she cares about you during your present illness?	0	1	2	3	4
5. How much do you feel you can confide in this person during your present illness?	0	1	2	3	4
6. If you need to borrow 100000 Vnd (4US) or need someone to take you to the hospital or need some other immediate help during your present illness, how much could this person help you?	0	1	2	3	4
7. How much has this person helped you in your activities of daily living during your present illness?	0	1	2	3	4

Barrier of sodium restriction measurement

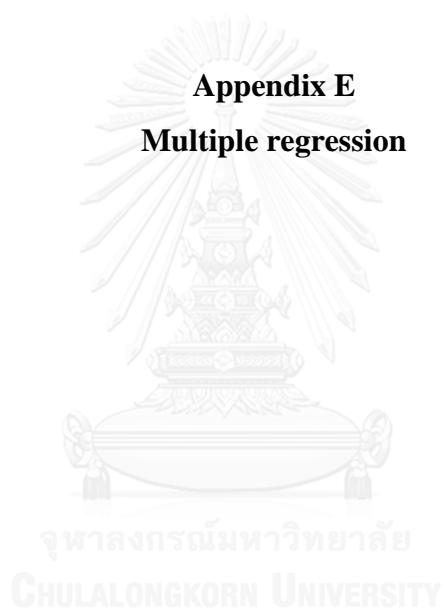
Party 7: Belief about dietary compliance scale

Instruction: This scale contains statements about barriers of sodium restriction. Note that the different answer alternatives constitute a scale ranging between the extremes of “strong disagree” to “strong agree”. Respond to each statement by circle the number respectively, you think best applies to you

Barrier subscale

Items	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1. Following a low salt diet takes too much time.	1	2	3	4	5
2. Following a low salt diet costs too much money	1	2	3	4	5
3. Food does not taste good on the low salt diet.	1	2	3	4	5
4. Following a low salt diet is too hard to understand	1	2	3	4	5
5. I cannot go out to many places to eat because of the low salt diet.	1	2	3	4	5

Appendix E
Multiple regression



```
FREQUENCIES VARIABLES=Selfcar Knowledge2 Suppo Barri Comob Classifi
/STATISTICS=STDDEV VARIANCE RANGE MINIMUM MAXIMUM SEMEAN MEAN MEDIAN
MODE SUM SKEWNESS SESKEW KURTOSIS SEKURT /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] C:\Users\PHAM HUONG\Desktop\16 01 2016 v2.sav

Statistics

		Self-care	Knowledge	Social Support	Barrier of sodium restriction	Comorbity
N	Valid	200	200	200	200	200
	Missing	0	0	0	0	0
Mean		82.23	7.75	37.68	17.23	4.19
Std. Error of Mean		1.534	.208	.632	.290	.142
Median		82.50	8.00	38.00	17.00	4.00
Mode		85	8	43	17	4
Std. Deviation		21.693	2.942	8.942	4.107	2.006
Variance		470.577	8.653	79.967	16.869	4.024
Skewness		.197	.055	-.268	.062	.060
Std. Error of Skewness		.172	.172	.172	.172	.172
Kurtosis		-.132	-.549	-.414	-.550	-.602
Std. Error of Kurtosis		.342	.342	.342	.342	.342
Range		105	14	42	17	9
Minimum		31	1	12	8	0
Maximum		136	15	54	25	9
Sum		16445	1549	7536	3445	838

```

REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05)
POUT(.10) /NOORIGIN /DEPENDENT Selfcar /METHOD=STEPWISE
Knowledge2 Suppo Barri Comob Gende education1 d1 d2 d3
/SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN.

```

Regression

[DataSet1] C:\Users\PHAM HUONG\Desktop\16 01 2016 v2.sav

Descriptive Statistics

	Mean	Std. Deviation	N
Selfcar	82.23	21.693	200
Knowledge2	7.75	2.942	200
Suppo	37.68	8.942	200
Comob	4.19	2.006	200
Gende	.53	.501	200
d1	.5050	.50123	200
d2	.4400	.49763	200
d3	.0350	.18424	200
bar	12.7200	4.03896	200
education1	.35	.478	200

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Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	bar		Stepwise (Criteria: Probability-of-F- to-enter <= .050, Probability-of-F- to-remove >= .100).
2	Suppo		Stepwise (Criteria: Probability-of-F- to-enter <= .050, Probability-of-F- to-remove >= .100).
3	Comob		Stepwise (Criteria: Probability-of-F- to-enter <= .050, Probability-of-F- to-remove >= .100).
4	Knowledge2		Stepwise (Criteria: Probability-of-F- to-enter <= .050, Probability-of-F- to-remove >= .100).

a. Dependent Variable: Selfcar

Model Summary^e

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.375 ^a	.141	.136	20.161	
2	.467 ^b	.218	.210	19.283	
3	.506 ^c	.256	.244	18.859	
4	.525 ^d	.276	.261	18.645	1.557

a. Predictors: (Constant), bar

b. Predictors: (Constant), bar, Suppo

c. Predictors: (Constant), bar, Suppo, Comob

d. Predictors: (Constant), bar, Suppo, Comob, Knowledge2

e. Dependent Variable: Selfcar

**ANOVA^e**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13160.910	1	13160.910	32.377	.000 ^a
	Residual	80483.965	198	406.485		
	Total	93644.875	199			
2	Regression	20389.788	2	10194.894	27.416	.000 ^b
	Residual	73255.087	197	371.853		
	Total	93644.875	199			
3	Regression	23934.349	3	7978.116	22.431	.000 ^c
	Residual	69710.526	196	355.666		
	Total	93644.875	199			
4	Regression	25853.534	4	6463.384	18.592	.000 ^d
	Residual	67791.341	195	347.648		
	Total	93644.875	199			

a. Predictors: (Constant), bar

b. Predictors: (Constant), bar, Suppo

c. Predictors: (Constant), bar, Suppo, Comob

d. Predictors: (Constant), bar, Suppo, Comob, Knowledge2

e. Dependent Variable: Selfcar

Coefficients^a

Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error		Beta	Tolerance			VIF	
1 (Constant) bar	107.836	4.721			22.840	.000			
	-2.013	.354	-.375		-5.690	.000	1.000		1.000
	80.498	7.671			10.494	.000			
2 (Constant) bar Suppo	-1.870	.340	-.348		-5.500	.000	.991		1.009
	.677	.154	.279		4.409	.000	.991		1.009
	90.543	8.149			11.111	.000			
3 (Constant) bar Suppo Comob	-1.794	.333	-.334		-5.382	.000	.986		1.014
	.621	.151	.256		4.109	.000	.977		1.023
	-2.126	.673	-.197		-3.157	.002	.980		1.021
	85.293	8.360			10.202	.000			
4 (Constant) bar Suppo Comob Knowledge2	-1.815	.330	-.338		-5.505	.000	.985		1.015
	.545	.153	.225		3.559	.000	.933		1.072
	-2.118	.666	-.196		-3.182	.002	.980		1.021
	1.081	.460	.147		2.350	.020	.954		1.049

a. Dependent Variable: Selfrar

Excluded Variables^e

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics			
					Toleranc e	VIF	Minimum Tolerance	
1	Knowledge2	.201 ^a	3.109	.002	.216	1.000	1.000	1.000
	Suppo	.279 ^a	4.409	.000	.300	.991	1.009	.991
	Comob	-.226 ^a	-3.523	.001	-.243	.993	1.007	.993
	Gende	.070 ^a	1.062	.290	.075	.994	1.007	.994
	d1	-.004 ^a	-.062	.950	-.004	.997	1.003	.997
	d2	.015 ^a	.220	.826	.016	.997	1.003	.997
	d3	-.010 ^a	-.145	.885	-.010	1.000	1.000	1.000
	education1	-.038 ^a	-.577	.565	-.041	.983	1.018	.983
2	Knowledge2	.148 ^b	2.312	.022	.163	.954	1.049	.945
	Comob	-.197 ^b	-3.157	.002	-.220	.980	1.021	.977
	Gende	.116 ^b	1.828	.069	.130	.969	1.031	.967
	d1	.016 ^b	.260	.795	.019	.992	1.008	.985
	d2	-.013 ^b	-.205	.838	-.015	.988	1.012	.981
	d3	-.002 ^b	-.039	.969	-.003	.999	1.001	.990
	education1	-.054 ^b	-.852	.395	-.061	.980	1.021	.972
3	Knowledge2	.147 ^c	2.350	.020	.166	.954	1.049	.933
	Gende	.112 ^c	1.806	.072	.128	.969	1.032	.953
	d1	.004 ^c	.062	.950	.004	.988	1.012	.971
	d2	.010 ^c	.153	.879	.011	.975	1.026	.965
	d3	-.007 ^c	-.111	.912	-.008	.999	1.001	.977
	education1	-.019 ^c	-.305	.761	-.022	.947	1.055	.947
4	Gende	.112 ^d	1.824	.070	.130	.969	1.032	.911
	d1	.002 ^d	.028	.977	.002	.988	1.012	.927
	d2	.013 ^d	.217	.828	.016	.974	1.027	.921
	d3	-.009 ^d	-.142	.887	-.010	.999	1.001	.932
	education1	-.035 ^d	-.554	.580	-.040	.937	1.067	.930

a. Predictors in the Model: (Constant), bar

b. Predictors in the Model: (Constant), bar, Suppo

- c. Predictors in the Model: (Constant), bar, Suppo, Comob
 d. Predictors in the Model: (Constant), bar, Suppo, Comob, Knowledge2
 e. Dependent Variable: Selfcar

Coefficient Correlations^a

Model			bar	Suppo	Comob	Knowledge2
1	Correlations	bar	1.000			
	Covariances	bar	.125			
2	Correlations	bar	1.000	.096		
		Suppo	.096	1.000		
	Covariances	bar	.116	.005		
		Suppo	.005	.024		
3	Correlations	bar	1.000	.086	-.072	
		Suppo	.086	1.000	.117	
		Comob	-.072	.117	1.000	
	Covariances	bar	.111	.004	-.016	
		Suppo	.004	.023	.012	
		Comob	-.016	.012	.453	
4	Correlations	bar	1.000	.090	-.072	-.027
		Suppo	.090	1.000	.113	-.213
		Comob	-.072	.113	1.000	.005
		Knowledge2	-.027	-.213	.005	1.000
	Covariances	bar	.109	.005	-.016	-.004
		Suppo	.005	.023	.012	-.015
		Comob	-.016	.012	.443	.001
		Knowledge2	-.004	-.015	.001	.212

a. Dependent Variable: Selfcar

Collinearity Diagnostics^a

Model	Dimensi	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	bar	Suppo	Comob	Knowle dge2
1	1	1.953	1.000	.02	.02			
	2	.047	6.469	.98	.98			
2	1	2.898	1.000	.00	.01	.01		
	2	.081	5.976	.01	.67	.24		
	3	.020	11.925	.99	.32	.75		
3	1	3.745	1.000	.00	.01	.00	.01	
	2	.156	4.899	.01	.04	.05	.88	
	3	.081	6.802	.01	.70	.22	.00	
	4	.018	14.248	.98	.26	.73	.11	
4	1	4.634	1.000	.00	.00	.00	.01	.01
	2	.176	5.134	.00	.00	.02	.76	.13
	3	.103	6.699	.00	.47	.00	.13	.43
	4	.068	8.226	.02	.27	.36	.00	.41
	5	.018	15.996	.97	.25	.62	.11	.02

a. Dependent Variable: Selfcar

Casewise Diagnostics^a

Case Number	Std. Residual	Selfcar	Predicted Value	Residual
152	3.119	132	73.85	58.150

a. Dependent Variable: Selfcar

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	54.18	110.23	82.23	11.398	200
Residual	-55.447	58.150	.000	18.457	200
Std. Predicted Value	-2.460	2.457	.000	1.000	200
Std. Residual	-2.974	3.119	.000	.990	200

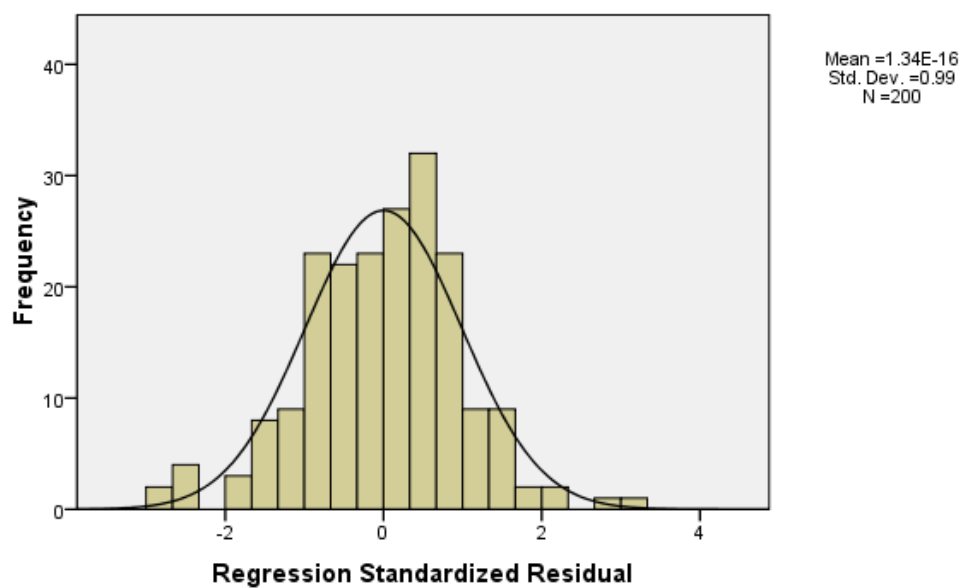
a. Dependent Variable: Selfcar

Charts

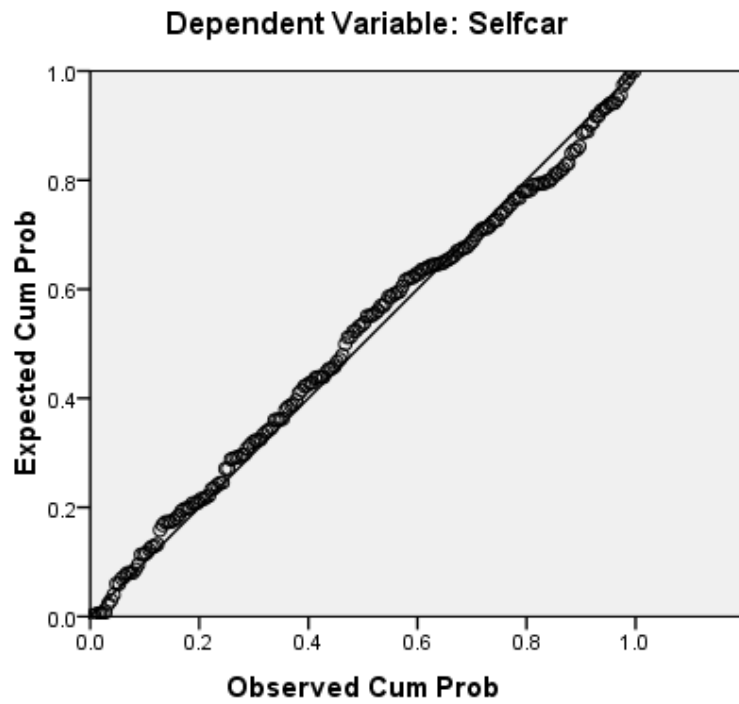


Histogram

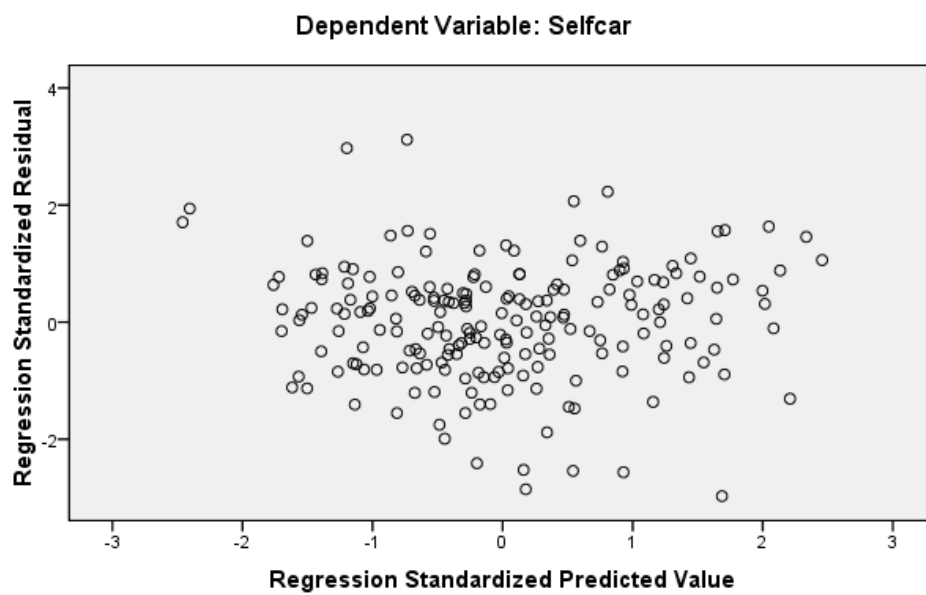
Dependent Variable: Selfcar



Normal P-P Plot of Regression Standardized Residual



Scatterplot





Appendix F
Participant information sheet

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Participant information sheet

1. **Title:** Predicting factors of self-care in Vietnamese adults with heart failure
2. **Researcher name:** Mrs. Pham Thi Thu Huong
3. **Office:** Namdinh University of Nursing, NamDinh, Vietnam

Mobile phone: 0935151466

Email: h26112003@yahoo.com

4. Information relevant to informed consent form of this study consist of:

I am a graduate student in nursing science at Chulalongkorn University, doing a doctoral dissertation on self-care of heart failure patient. The purpose of this information is to tell you about the researcher and allow you to make a clear decision about whether you would like to participate or not.

4.1. This study focuses on the examination the relationship of factors to self-care in heart failure patients. The objectives of this study are to examine the relationship among gender, education, comorbidity, symptom severity, knowledge, social support, barriers of sodium restriction and behavior of self-care in heart failure patients.

4.2. The benefits of this study are providing a basic knowledge base to understanding, explain and predict the phenomena of poor self-care in Vietnam heart failure patients. The research contributes to the body of knowledge concerning the Orem' theory of self-care. The finding will provide and explain relationship of relevant aspects of the theory in the phenomena. Nurse will be able to use this findings to develop research and nursing intervention to help heart failure patients to improve self-care that direct improve their health outcome, decrease readmission rate and mortality of heart failure patients.

4.3. Participants in this study are the persons with heart failure age from 18 to 60. They can communicate in Vietnamese language; do not HF complication (based on medical record). The total of participants is 200.

4.4. The participants will receive the information from the researcher about objective of the study and the process of data collection. Then the researcher will be informed clear explanation about the study objectives, process of data collection, and the right to participated and refuse to participate in this study. Then, the participants who agree to participate in this study will be asked to sign the informed consent before data collection.

4.5. Participation to this study is voluntary and participants should know whether they participate, no effect on the medical care they received, and they can withdraw from the study at anytime.

4.6. If you have any question or would like to obtain more information, you can contact researcher by cell phone anytime.

4.7. Information related directly to you will be kept confidential.

Informed consent form

Title: Predicting factors of self-care in Vietnamese adults with heart failure

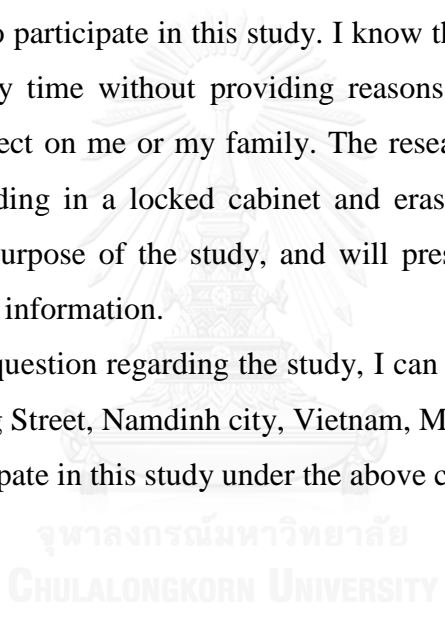
Code number: Participant.....

I was informed by the nurse researcher namely, Pham Thi Thu Huong, PhD student, Doctor of Philosophy in Nursing Science Program, Faculty of Nursing, and Chulalongkorn University about the research objective, characteristic, procedures, as well as benefits, risks or harm that may occur in this study. I already ask questions regarding the study until I thoroughly understanding it.

I am willing to participate in this study. I know that I have a right to withdraw from the study at any time without providing reasons to the researcher. This will cause no negative effect on me or my family. The researcher will keep all copies of the transcript and coding in a locked cabinet and erased them after the data is no longer used for the purpose of the study, and will present only the findings of the study and no personal information.

If I have any question regarding the study, I can contact the researcher at 12B Lien Co, Hung Vuong Street, Namdinh city, Vietnam, Mobile phone 0935151466.

I am willing to participate in this study under the above conditions.



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Place /Time	()
	Participant signature

.....

Place/Time	()
	Main researcher signature

.....

Place/ Time	()
	Witness signature

VITA

Mrs. Pham Thi Thu Huong was born in Nam Dinh province, Vietnam on 19th January, 1981. She completed her Bachelor program in Nursing Science at Ha Noi Medical University, Ha Noi, Vietnam in 2005. After graduation, she became an instructor at Nam Dinh University of Nursing, Nam Dinh, Vietnam.

In 2009, the project that cooperation among Vietnam Ministry of Health and Nuffic organization, The Netheland granted her scholarship to study her Advanced Nursing practice course at Saxion University, the Netherland. She got Master degree in 2010.

She had received the scholarship for Doctoral of Philosophy in Nursing program from Chulalongkorn University since 2011 to 2016

