



UNIVERSITI PUTRA MALAYSIA

***ASSESSING NURSES' LEVEL OF KNOWLEDGE REGARDING
HEART FAILURE SELF-CARE EDUCATION PRINCIPLES IN A
TERTIARY CARDIOLOGY CENTRE IN MALAYSIA***

CHI SUH YENN

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By

CHI SUH YENN

**Thesis Submitted to the School of Graduate Studies,
Universiti Putra Malaysia, in Fulfilment of the
Requirements for the Degree of Master of Science**

August 2022

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia
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August 2022

Chair : Professor Soh Kim Lam, PhD
Faculty : Medicine and Health Sciences

Heart failure (HF) is an alarming global public health issue as the prevalence is increasing, associated with high morbidity, mortality, and rehospitalisation rates. Patient education on self-care is a crucial component of HF management to improve patient outcomes and prevent readmission. Nurses need to equip themselves with adequate knowledge of HF self-care education during patient education sessions. This study aimed to explore the nurses' knowledge regarding HF self-care education principles and factors associated with their knowledge. A cross-sectional design with a convenience sampling method was used to approach 78 nurses working in the cardiology department of a tertiary cardiology centre in Malaysia. An online questionnaire with the content of social-demographic characteristics and the Nurses' Knowledge of Heart Failure Educational Principles Survey (NKHFEPS) was utilised to explore the nurses' knowledge score and the social demographic factors associated with their knowledge score. Data were analysed descriptively and inferentially with SPSS version 26 software. The majority of the respondents were at the age of 20-30 (48.7%), had not attended post basic cardiac nursing course (60.3%), worked in a cardiology ward (46.2%), had working experience of 1-5 years in cardiology department (51.3%), not been attend to heart failure certificate course (85.9%), and the source of HF knowledge was from experience in taking care HF patient (76.9%). The respondents' overall mean±SD score of knowledge in self-care education was 13.36±2.53. Principle topics that scored the least were exercise, followed by sign and symptom management. A significant difference ($p < 0.05$) in the mean overall knowledge score among the nurses working in the Coronary Critical Unit (CCU) (14.38±2.31) and Cardiac High Dependency Ward (CHDW) (14.14±2.22) with nurses in the cardiology ward (12.31±2.46) was found. Nurses with over 31 years and more than six years

of working experience in the cardiology department had significantly better knowledge scores in signs and symptoms management topics, with mean±SD of 4.25±1.30 and 4.29±1.25, respectively. Nurses who had not attended the HF certificate course had significantly higher mean knowledge scores than those who had participated in the course (13.61±2.44 vs 11.82±2.64, $p<0.05$). Knowledge obtained from continuous nursing education (CNE) was significantly increased the nurses' mean knowledge score in fluid and weight topics (5.75±1.07 vs 4.53±1.58) but vice versa in sign and symptom management topics (3.40±1.27 vs 4.12±1.29). Nurses that worked in different cardiology units was the influencing factor in their knowledge of HF self-care education. Nurses in this study had an overall lower mean knowledge score than nurses in other countries. Besides the sign and symptom topics, nurses in this study showed a lack of understanding of the exercise topic; they misconstrued that HF patients should avoid exercise and restrict activity. A more comprehensive HF specialised course should be implemented, and CNE topics should be focused on exercise and sign and symptom management topics. Nurses could rotate to work in different cardiology units to understand HF management better.

Abstrak tesis yang dikemukakan kepada Senat of Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

**MENILAI TAHAP PENGETAHUAN JURURAWAT MENGENAI
PRINSIP PENDIDIKAN PENJAGAAN DIRI KEGAGALAN JANTUNG DI
PUSAT KARDIOLOGI TERTIARI DI MALAYSIA**

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Kegagalan jantung (*HF*) adalah isu kesihatan awam global yang membimbangkan kerana kelaziman semakin meningkat, dikaitkan dengan kadar morbiditi, kematian dan kemasukan semula ke hospital yang tinggi. Pendidikan pesakit tentang penjagaan diri adalah komponen utama dalam pengurusan *HF* untuk meningkatkan tahap kesihatan pesakit dan mengelakkan kemasukan semula ke hospital. Jururawat perlu melengkapkan diri dengan pengetahuan yang mencukupi tentang pendidikan penjagaan diri *HF* semasa sesi pendidikan pesakit. Tujuan kajian ini adalah untuk mengkaji pengetahuan jururawat mengenai prinsip pendidikan penjagaan diri *HF* dan faktor-faktor yang berkaitan dengan pengetahuan mereka. Kajian keratan rentas dengan kaedah persampelan mudah telah digunakan untuk mengambil data daripada 78 jururawat yang bekerja di jabatan kardiologi sebuah pusat kardiologi tertiar di Malaysia. Soal selidik dalam talian dengan ciri-ciri demografi sosial jururawat dan *Nurses' Knowledge of Heart Failure Educational Principles Survey* (NKHFEP), digunakan untuk mengkaji skor pengetahuan jururawat dan faktor demografi sosial yang dikaitkan dengan skor pengetahuan mereka. Data dianalisis secara deskriptif dan inferensi dengan perisian SPSS versi 26. Majoriti responden berumur 20-30 (48.7%), tidak pernah mengikuti kursus lanjutan perawatan jantung (60.3%), bekerja di wad kardiologi (46.2%), pengalaman bekerja dalam bidang kardiologi selama 1-5 tahun (51.3%), tidak pernah menghadiri kursus sijil *HF* (85.9%) dan sumber pengetahuan *HF* adalah melalui pengalaman dalam menjaga pesakit *HF* (76.9%). Purata $\text{min} \pm \text{SD}$ skor pengetahuan dalam pendidikan penjagaan diri di antara responden ialah 13.36 ± 2.53 . Topik prinsip yang mendapat markah paling sedikit adalah mengenai senaman diikuti dengan pengurusan tanda dan gejala. Perbezaan ketara ($p < 0.05$) bagi min skor pengetahuan

keseluruhan dalam kalangan jururawat yang bekerja di *CCU* (14.38 ± 2.31) dan *CHDW* (14.14 ± 2.22) dengan jururawat di wad kardiologi (12.31 ± 2.46) dijumpai. Jururawat yang berumur 31 tahun ke atas dan lebih daripada 6 tahun pengalaman bekerja dalam jabatan kardiologi mempunyai skor pengetahuan yang lebih baik secara signifikan dalam topik pengurusan tanda dan gejala, dengan $\text{min} \pm \text{SD}$ 4.25 ± 1.30 dan 4.29 ± 1.25 . Jururawat yang tidak menghadiri kursus sijil *HF* mempunyai skor min pengetahuan yang lebih tinggi berbanding dengan jururawat yang telah menghadiri kursus tersebut (13.61 ± 2.44 vs 11.82 ± 2.64 , $p < 0.05$). Pengetahuan yang diperoleh melalui *continuous nursing education* (*CNE*) telah meningkat skor pengetahuan jururawat dalam topik pengawalan cecair dan berat (5.75 ± 1.07 vs 4.53 ± 1.58) tetapi sebaliknya dalam topik pengurusan tanda dan gejala (3.40 ± 1.27 vs 4.12 ± 1.29). Jururawat yang bekerja di unit kardiologi yang berbeza adalah faktor yang mempengaruhi pengetahuan mereka dalam pendidikan penjagaan diri *HF*. Jururawat di kajian ini mempunyai min skor pengetahuan keseluruhan yang lebih rendah berbanding dengan jururawat di beberapa negara lain. Selain daripada topik tanda dan gejala, jururawat dalam kajian ini menunjukkan kekurangan pemahaman dalam topik senaman, mereka salah faham bahawa pesakit *HF* harus mengelak senaman dan menyekat aktiviti. Kursus khusus *HF* yang lebih komprehensif harus dilaksanakan dan topik *CNE* harus difokuskan di topik senaman dan pengurusan tanda dan gejala. Jururawat boleh bergilir-gilir untuk bekerja di unit kardiologi yang berbeza supaya mereka boleh memperoleh lebih banyak pemahaman dalam pengurusan *HF*.

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- the research and the writing of this thesis were done under our supervision;
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LIST OF ABBREVIATIONS

AAHFN	American Association of Heart Failure Nurses
AAHFN-CRC	American Association of HF Nurses Certification Review Course
ACC	American College of Cardiology
ACE-I	Angiotensin-converting enzyme inhibitors
ADHERE	Acute Decompensated Heart Failure National Registry
AHA	American Heart Association
AHFCCS	Advanced HF Clinical Competency Survey
ANOVA	Analysis of Variance
ARIC	Atherosclerosis Risk in Communities
ARNI	Angiotensin receptor-neprilysin inhibitor
ASIAN-HF	Asian Sudden Cardiac Death in Heart Failure
BMI	Body Mass Index
BP	Blood pressure
CCU	Coronary Critical Unit
CHDW	Cardiac High Dependency Ward
CNE	Continuous nursing education
CPG	Clinical Practice Guidelines
CRC	Clinical Research Centre
ESC	European Society Cardiology
FP	Family practice
HF	Heart failure
HFA	Heart Failure Association

HFmrEF	Heart failure midrange ejection fraction
HFpEF	Heart failure preserved ejection fraction
HFrEF	Heart failure reduced ejection fraction
HRQoL	Health related Quality of Life
ICD	Implantable cardioverter defibrillators
ICU	Intensive Care Unit
JPEUPM	Ethnic Committee for Research Involving Human Subject UPM
LV	Left ventricular
MREC	Medical Research and Ethic Committee
NICU	Non-invasive cardiology unit
NKHFEP	Nurses' Knowledge of HF Education Principles
NMRR	National Medical Research Register
NSAIDs	Non-steroidal anti-inflammatory drugs
NYHA	New York Heart Association
SD	Standard deviation
SGLT2	Sodium-glucose co-transporter 2
UK	United Kingdom
USA	United State of America

CHAPTER 1

INTRODUCTION

1.1 Background of The Study

Heart failure (HF) is a structural or functional abnormality of the heart that results in elevated intracardiac pressure or insufficient cardiac output. This condition is related to a series of clinical syndromes consisting of cardinal symptoms such as breathlessness, fatigue and ankle swelling, accompanied by signs of raised jugular venous pressure, pulmonary crackles and peripheral oedema. Patients with chronic HF have a more gradual onset of symptoms repetitively (McDonagh et al., 2021). HF patients often progress to advanced or severe HF (Raja Shariff et al., 2019), and the disease has a poor prognosis.

Heart failure is a global and expanding worrying public health issue as approximately 26 -38 million people suffer from HF worldwide, and more than half of the new diagnosis is above 80 years old (Dokainish et al., 2017; Raja Shariff et al., 2019; Virani et al., 2020). The prevalence of HF among the adult population is between 1% -2% in Europe and USA and 1% to 6% in Asia (Reyes et al., 2016). New HF cases diagnoses are estimated to increase by 46% from 2012 to 2030 (Sundel & Ea, 2018; Virani et al., 2020).

HF was associated with high morbidity, mortality and rehospitalisation rate (Virani et al., 2020) with the survival rate estimated at 50% and 10% at 5 and 10 years after diagnosis of HF (Audi et al., 2017). The HF hospitalisation rate per year was high, with more than 1 million in the USA, 18000 in Hong Kong and 40000 in Taiwan. 50% of the readmission occurred associated with exacerbation syndrome within six months from discharge (Audi et al., 2017) because of non-compliance with the therapy regime or lack of timely treatment. The high readmission rate is expected to increase the expenses for HF treatment too. The expenses to treat HF were high, and the cost was expected to incline as HF patients will live longer due to the advancement in technology and the implementation of new therapies to prolong their life (Heidenreich et al., 2013). Approximately \$30.7 billion per year for HF treatment was spent, which includes medications, heart care services and reimbursement of the sick day for work, and it was projected to \$69.8 billion, an escalation by 127% in 2030 in the USA (Heidenreich et al., 2013; Sundel & Ea, 2018; Virani et al., 2020). A strategy to improve patients' clinical outcomes and decrease the healthcare burden was substantially needed.

Data about HF from the ASEAN region was scarce (Wan Azman et al., 2021). Lam (2015) compared ADHERE- the Asia Pacific and ADHERE US study found that the mean age of HF presentation in the Asia Pacific was younger at 54 years, the length of stay in hospital was longer at 6 vs 4.2 days, and in-hospital mortality is higher with 4.8% vs 3%. This could be explained by the notable high-risk factor of diabetes and increased smoking rates among Southeast Asians (Lam, 2015). The life expectancy of Malaysians was 74.5 years old, and Malaysia reported the highest cardiovascular risk factors among the Asia country, which could easily lead to HF (Reyes et al., 2016). An increase in HF risk factors was likely responsible for the rise in the prevalence of HF. According to the Malaysia Indicators for Monitoring and Evaluation of Strategy Health for All data, 21,337 HF patients were discharged, with a 66.57% discharge rate over 100,000 population (*Health indicators 2018: Indicators for Monitoring and Evaluation of Strategy Health for All*, 2018). This remarkable number of discharged patients required long-term treatment before coming to the end of their life. Undeniably, this would significantly affect the country's health expenditure due to the issues of high readmission rates and the high cost of long-term treatment (Dokainish et al., 2015).

HF patients have knowledge gaps and a lack of understanding or support about their condition (Zeng et al., 2017). A continuum of patient education in self-care management is important to break the cycle of rehospitalisation and improve patient quality of life. Continually adjusting the education according to the patient's need can reduce gaps in knowledge and skill (Jankowska-Polanska et al., 2017). Patients needed to be communicated with in detail to improve their self-care knowledge and treatment compliance (Albert et al., 2002; Gilmour et al., 2014).

Promoting self-care has become the cornerstone of HF disease management. Effective HF self-care education delivered before a patient is discharged is vital to reducing the rehospitalisation rate (Boyde et al., 2017; Grange, 2005). This self-care skill was able to assist patients in managing their complications of HF symptoms as well as improve their quality of life. This was revealed in some studies that patients had significantly improved their HF knowledge, self-care practices and compliance with the treatment (Boyde et al., 2017; Dalfó-Pibernat et al., 2019).

A multidisciplinary care team to deliver HF care based in the hospital or outpatient clinic was promoted by the American Heart Association (AHA), and the European Society Cardiology (ESC) emphasised that the continuum of patient education was crucial (McDonagh et al., 2021; Virani et al., 2020). Nurses must continuously educate and empower HF patients to optimise their self-care practices (Dalfó-Pibernat et al., 2019; Jankowska-Polanska et al., 2017). Nurses were the primary education provider to patients in most healthcare settings (Albert et al., 2002). However, effective patient education

requires optimum knowledge based on HF self-care education principles. Nurses, as self-care advocators, should be equipped with sufficient knowledge to educate their patients about self-care (Albert et al., 2002; Dalfó-Pibernat et al., 2019). Hence, this study aimed to explore the nurses' knowledge regarding HF self-care education principles and measure the nurses' social demographic factors that influence and predict their knowledge.

1.2 Problem Statement

Generally, nurses commonly gained HF knowledge from basic nursing school curriculum (Albert et al., 2002; Washburn et al., 2005) or advanced their study into cardiac nursing speciality courses as well as HF speciality courses (Anderson et al., 2018; Dalfó-Pibernat et al., 2019). Nurses are also able to obtain the relevant knowledge from continuous nursing education (CNE) in the workplace, on job training (Dalfó-Pibernat et al., 2019), as well as self-learning from the seminar, articles, cardiologists, HF clinical practice guidelines (Dalfó-Pibernat et al., 2019; Fowler, 2012) or informally by working experience. However, the sources of knowledge were scattered and possibly inadequately prepared the nurses to provide HF self-care education because educating HF patients in self-care needed highly trained knowledge and skill (Hart et al., 2011; Kalogirou et al., 2013; Willette et al., 2007). The knowledge nurses obtain during their undergraduate study might not sufficiently equip them to perform this specialised care because the school curriculum tends to focus on the pathophysiology of the disease process (Albert et al., 2002). On the other hand, the knowledge they gained during orientation programs emphasises only the policies and procedures instead of the essential content when delivering HF education (Albert et al., 2002).

Most of the studies stated that nurses did not possess satisfactory knowledge of HF self-care education principles (Dalfó-Pibernat et al., 2019; Jankowska-Polanska et al., 2017; Sterne et al., 2014; Sundel & Ea, 2018) especially nurses that did not pursue HF special course training (Anderson et al., 2018). The majority of the nurses did not receive specific HF training (Dalfó-Pibernat et al., 2019) and were not adequately trained to educate the HF patients, as evidenced by some studies indicating that nurses would like to request more information about HF education (Jankowska-Polanska et al., 2017; Kalogirou et al., 2013). Mahramus et al. (2013) stated that patients received standardised reading materials about HF before discharge, but the nurses did not regularly review the information with the patients as the nurses' knowledge about self-management is unknown and has never been assessed. Albert et al. (2002) stated that home care nurses only received four hours of intensive course to manage patients with left ventricular dysfunction in the home care program, which might insufficiently prepare them for the education session. Other than that, cardiac nurses in the

hospital recognised the importance of patient education. Still, they had time constraints or feared encouraging patients to ask questions beyond their knowledge level (Albert et al., 2002).

There was a lack of studies focusing on nurses' knowledge regarding HF self-care education principles in Malaysia. In Malaysia, there was a lack of nurse specialists trained in HF or HF clinical nurse specialists to provide patient education in hospitals before HF patient discharge. HF self-care was not adopted in the nursing curriculum in nursing school (Albert et al., 2002; Dalfó-Pibernat et al., 2019) or in cardiac speciality courses in Malaysia. Nurses could only learn about it through continuous education in clinical conferences or through their own experience (Dalfó-Pibernat et al., 2019; Delaney et al., 2011; Roussel et al., 2015; Willette et al., 2007). Without proper education input, nurses were unconfident and uncomfortable providing the appropriate information to educate HF patients (Albert et al., 2015).

From the researcher's personal experience as a nursing educator in the Ministry of Health Malaysia, the gap between specialised nursing education provided to train cardiac specialist nurses and information needed to deliver to patients for self-care was identified. In Malaysia, nurses are qualified to care for patients after completing a three-year diploma or four-year degree in undergraduate study in nursing. After that, they were allocated to the hospital or community area to serve the nation. Nurses in the cardiology department attended hospital in-service training to obtain more cardiac specialised care knowledge. They could apply for post-certificate cardiac care training once they have at least three years of specialised field working experience. Yet, this post-certificate training did not provide complete information and knowledge for nurses to care for HF patients. Nurses need to comprehend the disease process and the content of self-care for HF. Other than that, they also need to learn ways to assess HF patients, such as patients' health literacy, ability to read materials and skills of processing the health information to make health decisions, because these are the precursor for successful self-care (Ekong et al., 2016). The nurses needed to understand and convey the importance of recognising warning signs and symptoms of deteriorating so that patients could obtain and adjust early treatment to prevent rehospitalisation (Sundel & Ea, 2018). Yet, Malaysia's current cardiac course training did not adequately equip the nurses with these skills. This would create a gap in the demand of a patient's learning needs and the action nurses take as a patient's self-care educator in HF (Albert et al., 2002).

Furthermore, some countries have implemented nurse-led HF clinics or outpatient clinics to manage HF discharge planning programs in the clinical (Boyd et al., 2011). Several studies showed that long-term programmes or follow-up interventions by HF specialised nurses in outpatient clinic settings

significantly reduced HF patients' readmission rates (Anderson et al., 2005; Jaarsma et al., 2008; Naylor et al., 2004). In certain countries such as the USA and Europe, not merely inpatient education was provided for HF patients during their hospitalisation; they had nurse specialists or cardiac-trained community nurses to follow up with HF patients either via telephone-based or home visit. Their role was to assess HF patients' needs, provide support and education for them to empower patients' self-care practice, as well as liaise with physicians or other teams for collaboration when needed (Anderson et al., 2005; Thompson et al., 2005). However, outpatient clinic follow-up care by nurses in Malaysia has not been established and studied yet. Malaysia still had neither nurse-led HF clinics nor any HF specialised nurses or cardiac-trained community nurses to follow up on HF patients at home or via a telephone call. Hence, this study could be a preliminary survey to understand the nurses' knowledge in providing a patient's self-care education. We could plan to develop a new nursing curriculum to train HF specialised nurses in the hospital and the community setting in the future.

1.3 Objectives

1.3.1 General objective

To explore the nurses' knowledge regarding HF self-care education principles.

1.3.2 Specific objectives

1. To examine the nurses' knowledge regarding HF self-care education in each principles topic.
2. To measure the association between nurses' demographic characteristics, work setting, education source and knowledge regarding HF self-care education principles.
3. To examine the predicting factors of nurses' knowledge of HF self-care education principles.

1.4 Research Question

1. What was the nurses' knowledge regarding HF self-care education especially in each principles topic?

2. What were the association between nurses' demographic characteristics, work setting, education source and knowledge regarding HF self-care education principles?
3. What were the predicting factors of nurses' knowledge of HF self-care education principles?

1.5 Research Hypothesis

- H1 : Nurses' knowledge regarding HF self-care education is unsatisfactory especially in signs and symptom management topics.
- H2: There is significant association between nurses' demographic characteristics, work setting, education source and knowledge regarding HF self-care education principles.
- H3: Work setting and education sources were the predicting factors of nurses' knowledge score in HF self-care education principles.

1.6 Significant of The Study

The researcher could identify the need to implement appropriate educational programs to increase nurses' understanding and confidence during patient education sessions with HF patients before discharge. This educational program could be embarked into the nursing curriculum of cardiac speciality courses to prepare the nurses in teaching patients effectively for future implication.

1.7 Definition of The Term

- a) Heart failure
 - Chronic HF with ejection fraction $\leq 40\%$.
- b) Chronic HF
 - A chronic state when patients have stable symptoms but acute aggravating factors may cause acute cardiac decompensation.
- c) Ejection fraction
 - Amount of blood pumped out of the heart with each contraction and is measurable with echocardiogram in percentage. A normal

ejection fraction is about 51% - 75%, ejection fraction of 41% - 50% consider mildly abnormal.

- d) Young nurses
 - Early career registered nurses who's in the first five years of practice
- e) HF specialise training
 - At least a 20 minute of HF education provided to the nurses



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