EXPLORATORY FACTOR ANALYSIS OF SELF-CARE AMONG MALAYSIAN HEART FAILURE PATIENTS

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ABSTRACT---Self-care has come to mean different things to other people due to individual beliefs and perspectives. On the multidimensional aspects of the self-care construct, heart failure self-care behaviours are the coping process that individuals with heart failure performs to maintain their health and control to their symptoms in response to their diseases. The performance of self-care behaviours in the heart failure population have improved outcomes in physical and emotional aspects towards quality of life.The purpose of this study is to assess the Self-Care of Heart Failure Index (SCHFI) among Malaysian. The study used a non-experimental quantitative design with a theoretical framework based on the Self Care of Heart Failure model. Random sampling was carried out, whereby the population in this pilot study came from the medical clinic and Ccardiology department of two tertiary and secondary hospitals. Data were collected for four weeks in these hospitals. The total number of respondents in this pilot study was 200. SPSS version 21.0 was used to analyse the data. The instrument was divided into three components; namely self-care confidence, self-care management, and self-care maintenance. Overall, the scale consisted of 22 items. The SCHFI was translated into Bahasa Malaysia using translation procedures conducted by experts in their fields. The results of the exploratory factor analysis (EFA) found all 21 items acceptable due to factor loading of greater than 0.6.However, only question number 16 from the self-care management component had a loading factor of 0.69. In conclusion, for local content, the items measuring the construct in respective components were rearranged accordingly before proceeding with data collection in the field study.

Keywords---self-care, exploratory, factor analysis, heart failure.

I. INTRODUCTION

Heart failure is a progressive condition that results in significant public healthcare issues, with the issues increasing as one ages (Rosamond et al., 2008). Heart failure happens when an injury to the heart muscle leads to implications such as cardiomyopathy, valve disturbances, and hypertension. More than five million people have been diagnosed yearly (Yancy etal.,2013).Heart failure diseases resulted in more than a million hospital admissions every year for those who are 65years and older. These patients are usually admitted to thehospital seven to ten days after have had the symptoms due to the lack of health literacy. Health literacy is an important aspect for the heart

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patients, if not they did not understand and apply health information in their daily life (Affika Humaira & Emma, 2016; Arina Anis, 2019; Emma et al. 2015; Mohd Rezal, Emma & Mohd Yusof, 2016;). Family caregivers also need to understand their relative' illness for them to take a care giving role (Mohamad et al. 2012).

In Malaysia, ASIAN-HF registration found that Asian patients with heart failure, their mean age was strikingly low (59.6 years) Asian patients with stable heart failure were at least a decade younger than European patients with heart failure and developed with worse symptoms compare with European country (ASIAN HF Registry European Heart Journal 2016). The increase in the cost of prenatal management of heart failure is significantly higher than that of other related disease diagnoses (Jencks Williams & Coleman, 2009). Heart failure has also resulted in over a million hospital admissions for people 65 and older. These patients typically take up to seven to 10 days in hospital (Jencks, Williams & Coleman, 2009). Patients who experience it also have the highest rates of re-entry, usually within a few weeks after discharge from the hospital (Hernandez et al., 2010). In addition, the mortality rate of this disease is as high as 50% within five years (Go et al., 2014).

The Importance of Self-Care for Heart Failure Patients

Identifying heart failure patients in healthcare and disease management are of critical importance (Carlson, Riegel, & Moser, 2001). National hospitals have been putting in numerous efforts to handle issues such as patient education, especially in identifying the disease symptoms and monitoring them more effectively to prevent the disease from getting worse. Nevertheless, the confidence in the patient's own ability to gauge or recognise their own disease symptoms is very low and this causes delay in acquiring treatment until the symptoms indicate a worsening progression of the disease to a critical level (Carlson etal., 2001). Uncertainty also happens when the disease symptoms or information regarding the disease symptoms are incomplete (Winters, 1999). Heart failure, after all, is a prevalent disease with close links to the results of weak clinical evaluations. Optimum management is highly dependent on effective self-care. Hence, it is suggested here that a better understanding on the human belief of their own disease will be able to explain and predict more holistic disease beliefs.

Theoretical Framework

Heart failure self-care is conceptualised as a process involving maintenance and management. Patients perform self-care maintenance behaviours such as medication adherence to keep themselves physiologically stable. Self-care management is performed when a heart failure symptom occurs. The patient must recognise the symptom as related to heart failure, evaluate the importance of the symptom, do something about it, and then evaluate whether the treatment is effective. Self-care confidence is not part of the self-care process per se; it is an extremely important factor influencing the effectiveness of self-care. Thus, it is included in the Diagram 1.

Figure 1: Model Illustrating the Process of Heart Failure Self-Care

II. METHODS

Research Design

This research was carried out via surveys using the Self-Care of Heart Failure Index (SCHFI) that evaluates the level of the patients' self-care. The validity of the instrument was evaluated using exploratory factor analysis (EFA), while the 'believability' or trustworthiness factor was evaluated from the aspect of 'internal resolve' using the Alpha Cronbach test.

Sample and Study Location

In this pilot study, 200 experimental subjects who are suffering from heart failure diseases were selected randomly from the medical clinic and Cardiology Department of two Selangor hospitals.

Instrument Used in the Self-Care towards Heart Failure Patients

The instrument of the study is a tool to measure, observe, and document quantitative data (Creswell, 2012). For this purpose, the study instrument used must be suitable for the needs of the study. The instrument of this study was divided into three parts in which each part refers to the instrument chosen for adaptation and modification. The first part was related to the measurement on self-care maintenance, which consist of 10 items in the questionnaire. The second part measured self-care management and consist of six items. The final part measured self-care confidence and consist of six items.

This study adapted instruments that were constructed by previous researchers and modified certain statements to accommodate theresearch conducted. According to Hoque etal. (2016) and Siti Fardaniah (2016), if the researcher adapts the existing instruments and modify statements to new items, the researcher has to carry out exploratory factor analysis (EFA) procedures, as a different field of study would possibly render some items being unsuitable for the current study in question. Furthermore, the internal reliability of the instrument, which is measured by the Cronbach's Alpha value, would also differ from previous studies (Awang, 2012; Hoque et al., 2016, Suwaibah Zakaria et al., 2016).

Therefore, this study is necessary to test the instrument and to ensure that the questionnaire is understood by the respondents; and also that there are no ambiguities in the language or measurement. Items which are not understood

and are not suitable must be discarded to ensure that the items in the instruments used in this study are valid and reliable (Sekaran,2013).

Data Analysis

The self-care construct was measured from the Self-Care of Heart Failure Index (SCHFI) questionnaire, using 22 items divided into three subscales: Self-Care Maintenance (MT), Self-Care Management (MN), and Self-Care Confidence (CF). Each statement in the item was measured using an interval scale from 1 to 10. The mean score value and standard deviation for each item measuring the construct is shown in Table 1.

Table 1: Mean and Standard Deviation of Self-Care Items

Descriptive Statistics			
	Mean	**Std. Deviation**	**Analysis N**
MT1 Do you weigh yourself?	9.26	.758	200
MT2 Do you check your ankle for swelling?	8.80	.919	200
MT3 Doyou try to avoid getting sick? (e.g. flu shot or avoid ill people)	8.70	.952	200
MT4 Have you done any physical activity?	8.76	.852	200
MT5 Have you kept to your doctor's or nurse's appointments?	8.93	.805	200
MT6 Do you eat a low salt diet?	8.99	.802	200
MT7 Do you exercise for 30 minutes?	9.24	.862	200
MT8 Did you forget to take one of your medicines?	8.76	.875	200
MT9 Do you ask for low salt items when eating out or visiting others?	8.76	.877	200
MT10 Do you use a system (pill box, reminders) to help you remember your medicines?	8.83	.894	200
MN1 How quickly did you recognise it as a symptom of heart failure?	8.53	.961	200
MN2 Do you reduce the salt in your diet?	8.45	.906	200
MN3 Do you reduce your fluid intake?	8.69	.985	200
MN4 Do you take an extra water pill?	8.62	.794	200
MN5 Do you call your doctor or nurse for guidance?	8.82	.851	200
MN6 How sure were you that the remedy helped or did not help?	8.92	.963	200
CF1 Have you been free of heart failure symptoms?	8.89	.875	200
CF2 Did you follow the treatment advice you were given?	8.77	.885	200
CF3 Did you evaluate the importance of your symptoms?	8.90	.821	200
CF4 Did you recognise the changes in your health, if they occur?	8.96	.826	200
CF5 What did you do to relieve your symptoms?	8.80	.845	200
CF6 Did you evaluate how well a remedy works?	9.07	.802	200

The exploratory factor analysis (EFA), using the principal component analysis (PCA) with Varimax rotation, was conducted on the 22 items used to measure the self-care construct. Table 2 showed significant value for the Bartlett's Test (P-value < 0.05).At the same time, the value for the Measure of Sampling Adequacy by Kaiser-Meyer-Olkin (KMO) was 0.900, which exceeded the minimum value of 0.6 (Awang, 2012; Hoque et al.,2016). These two values (significance in the Bartlett's Test, and the value KMO> 0.6) proved that the data was suitable for the subsequent procedure in EFA.

Table 2: Value of KMO and Barlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.900**
Bartlett's Test of Sphericity	Approx. Chi-Square	2858.468
	Df	231
	Sig.	.000

Table 3 shows the total variance value estimated by the items used to measure the self-care construct. Table 3 showedthat the self-care construct was measured using three components. Component 1 measured the construct at 26.742%, Component 2 measured the construct at 18.317%, and Component 3 measured the construct at 18.159%. The total estimated variance for the self-care construct was 63.218%. This value was acceptable as it exceeded the minimum requirement of 60% (Awang, 2012; Hoque et al.,2016).

Table 3: Total Variance Value Estimated

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1 SC Maintenance	8.607	39.124	39.124	5.883	26.742	26.742
2 SC Management	3.352	15.236	54.361	4.030	18.317	45.060
3 SC Confidence	1.949	8.858	63.218	3.995	18.159	**63.218**
Extraction Method: Principal Component Analysis.						

Table 4 shows the distribution of items for the three components that measure the self-care construct. Items MT1, MT2, MT3, MT4, MT5, MT6, MT7, MT8, MT9, and MT10 measured Component 1; whereas items MN1, MN2, MN3, MN4, MN5, and MN6 measured Component 2. Items CF1, CF2, CF3, CF4, CF5, and CF6 measured Component 3. All items in Component 1, Component 2, and Component 3 hadfactor loading values that exceeded the minimum value of 0.6 (Hoque et al., 2018).

Table 4: Items to Measure the Self-Care Constructs

Rotated Component Matrix[a]			
	Component		
	1	**2**	**3**
MT1Do you weigh yourself?	.730		
MT2Do you check your ankle for swelling?	.718		
MT3Do you try to avoid getting sick? (e.g. flu shot or avoid ill people)	.714		
MT4 Do you do any physical activity?	.709		
MT5Have you kept to your doctor's or nurse's appointments?	.794		
MT6Do you eat a low salt diet?	.756		
MT7Do you exercise for 30 minutes?	.721		
MT8Did you forget to take one of your medicines?	.750		
MT9Do you ask for low salt items when eating out or visiting others?	.789		
MT10Do you use a system (pill box, reminders) to help you remember your medicines?	.785		
MN1 How quickly did you recognise it as a symptom of heart failure?		.744	
MN2Did you reduce the salt in your diet?		.794	
MN3Did you reduce your fluid intake?		.833	
MN4Do you take an extra water pill?		.790	
MN5Do you call your doctor or nurse for guidance?		.785	
MN6 How sure were you that the remedy helped or did not help?		.696	
CF1Have you been free of heart failure symptoms?			.766
CF2Did you follow the treatment advice you were given?			.756
CF3Did you evaluate the importance of your symptoms?			.701
CF4Did you recognise changes in your health, if they occur?			.774
CF5Did you do anything that will relieve your symptoms?			.813
CF6Did you evaluate how well a remedy works?			.785
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalisation.			
a. Rotation converged in 5 iterations.			

The instrument for measuring reliability which is often used is Cronbach's Alpha. Therefore, Cronbach's Alpha was used in this study to measure the reliability of instruments for each construct. The Cronbach's Alphavalue for an instrument should exceed 0.7 in order to be acceptable in subsequent studies. A Cronbach's Alpha value of 0.7 and above shows that the instrument has high reliability standards (Hair, Black, Babin, & Anderson, 2010). Table 5 shows that the Cronbach's Alpha value for the Self-Care of Heart Failure Index (SCHFI) has high reliability as the

Cronbach's Alpha value was 0.922 forthe Self-Care Maintenance construct, 0.897 for the Self-Care Management construct, and 0.895 for the Self-Care Confidence construct.

Table 5: The Instruments' Reliability Value

Components	Number of items	Cronbach's Alpha
Self-Care Maintenance	10	0.922
Self-Care Management	6	0.897
Self-Care Confidence	6	0.895

III.CONCLUSION AND RECOMMENDATIONS

The exploratory factor analysis (EFA) showed that the constructs of self-care among heart failure patients could be measured using multiple dimensions or components,with each represented by a number of related items. The number of respondents for this study were 200 respondents. It considered sufficient for EFA especially for a pilot study. According to Costello and Osborne (1994), bigger sample size can help discover whether the individual item and factor structure are valid or not. This study has been using the Self-Care of Heart Failure Index (SCHFI) that assesses the level of the patients' self-care and it has been translated to Bahasa Malaysia. Previous research in Malaysia about self-care for heart patient only focus on certain criteria to be incorporated into caring for heart patient (Halimaton & Siti Khuzaimah, 2016).

As an outcome from EFA, three components of the SCHFI clarity 63.218 percent of the variance among the items. All three components,the items for Component 1, Component 2, and Component 3 measured these self-care constructs and demonstrated good internal consistency because the Cronbach's Alpha value for the three components exceeded 0.7. Twenty-two items remained with (i) Self-Care Maintenance: 10 items; (ii) Self-Care Management: 6 items; and (iii) Self-Care Confidence: 6 items. Therefore, the researcher can rearrange the items of each compartment to measure the constructs of attitude, which can then be used for data collection purposes among heart failure patients in Malaysia.

In the context of generalizability, this study is subjected to certain limitation related to its findings. For example, the study only involves patient's aged 20 and above and being treated in two government hospitals only. It covers two hospitals in Selangor. This is because all heart patients that are currently active in medical treatments are mainly based at these two hospitals in Selangor for pilot study. This study also includes patients who can speak and understand Malay Language and English only. This is indicated through doctor's recommendation to researcher. The findings of this study can possibly be generalized only to Malaysian and do not represent the whole population of heart patient in the hospital settings.

Based on the limitations of study in the context of generalizability, this study suggest that it would be comprehensive for future research to include private and government hospitals at all states in Malaysia. It is also important to glance over different types of citizenship and ethnic groups.

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