ORIGINAL ARTICLE

Developing Items for Measuring Illness Beliefs Among Heart Failure Patients: An Exploratory Factor Analysis Procedure

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ABSTRACT

Introduction: This study aims to explore, modify, and develop the revised instruments for measuring Illness Beliefs Construct (IPQ-R) among heart failure patients in Malaysia. **Materials and methods:** The researcher adapted 38 items from previous study and modified the statement to suit current study. The IPQ-R statement was translated into Bahasa Malaysia and validated by the experts for content validity, face validity, and criterion validity. The sampling frame is the heart-failure patients registered with the cardiology department in the selected public hospitals in Malaysia. Probability sampling was used to obtain a random sample of 200 patients to participate in this study. The data were explored and validated through exploratory factor analysis (EFA) procedure. **Results:** The results of the EFA procedure revealed 38 items fall into five underlying components. The components are renamed as a timeline, control, causes, illness coherence, and emotion. The items under these five components explained 64.1% of the total variance. The internal reliability of the illness beliefs construct was 0.94. The researchers rearranged these 38 items into their respective components accordingly. The newly arranged instruments will be the outcome of this study. **Conclusion:** In addition to adding to the current body of knowledge, these findings provide a reliable source of information for research and professional practitioner interested in future researcher in illness beliefs related to heart failure patients in Malaysia.
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Keywords: Exploratory factor analysis, Illness perception questionnaire – revised (IPQ-R), Illness beliefs, Heart-failure patients, Malaysia

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INTRODUCTION

Heart failure is a progressive condition that is a significant public health problem failure, with most published studies reporting a prevalence of between 1% and 2% of the adult population (2). Primary healthcare is the appropriate setting for follow-up of patients with chronic heart failure, as it is a prevalent condition that requires frequent and proper monitoring. Few studies have been performed in primary healthcare to investigate the illness the individual differences in patients' longer-term adjustment to their condition.

One of the strengths of this schema of beliefs is the acknowledgment that, in some cases, illness can also positively affect people's lives. In addition, these specific constructs appear to have predictive power and thus proffer explicit strategies for developing interventions based patients' cognitions. It is important to note that in any illness, the content and relative importance of each type of illness cognition may vary, and some dimensions may become fractionated, redundant, or merged. Thus, the structure of the cognitions should be. This may hinder the implementation of clinical practice guidelines regarding the level of care.

In the healthcare setting, particularly in Malaysia, it is essential for primary care providers to have an uncomplicated and dependable tool for assessing and understanding the illness perceptions of individuals with heart failure.

The Illness Perception Questionnaire-Revised (IPQ-R) is a widely used instrument designed to assess individuals' cognitive and emotional representations of their illnesses. It was developed by Professor Weinman, Professor K.J. Petrie, and Professor R. Moss-Morris in the late 1990s. The questionnaire is based on the Common-Sense Model (CSM) of illness representation,

which suggests that individuals form cognitive and emotional representations of their illnesses, influencing their coping strategies and health outcomes. Therefore, there is a need for an updated version of the Illness Perception Questionnaire-Revised (IPQ-R) to provide a more comprehensive insight into the illness beliefs held by heart failure patients in Malaysia.

MATERIALS AND METHODS

Study design

The data for this study were collected using a self-administered survey questionnaire that was an adaptation of various earlier researchers, using the Revised Illness Perception Questionnaire (IPQ-R) to assess the perception of respondents, which consists of heart failure patients regarding their illness (3).

Setting and sample

The pilot study was conducted to gather data using the newly developed questionnaire. The minimum sample size required for the pilot that required according to Hair et al. (2010), suggestion for minimum sample size depending on the model complexity and basic measurement model characteristics. If there are five or fewer latent constructs with more than three measuring items each, the minimum sample size required is 100. On the other hand, if there are seven constructs with more than three items each, the minimum sample size needed is 150.

Some 200 respondents were selected randomly from the sampling frame which consists of heart failure patients from the Department of Cardiology in two public hospitals in Malaysia. The questionnaires were sent to the randomly selected respondents to gather pilot study data. From the data collected, the researchers employed the exploratory factor analysis (EFA) procedure in SPSS 25.0 to explore and assess the usefulness of every measuring item and to determines their dimensionality.

Ethical considerations

Before data collection, the study obtained an Ethical from Medical Research & Ethics Committee, Ministry of Health, Malaysia. The approval number NMR116-1835-31987(IIR)

Variables and Instruments

The study adapted a total of 38 items related for measuring the illness beliefs construct from component consists of 10 items measuring timeline; the second component consists of 6 items measuring consequences, followed by 11 items measuring control, 5 items measuring illness coherent, and 6 items measuring emotional ingredients in IPQ-R.

The construct was measured using a 10-point scale. According to (4), 1 is for strongly disagree, "while 10 is for "strongly agree." The researcher conducted a pre-test and pilot test for these adjusted items to enhance them before applying them to the final questionnaire. A pre-test involves the questionnaire being checked by experts to make sure all questions provided are suitable and necessary corrections made are incorporated before proceeding further (5). In the case of this study, content expert linguistic. Following the completion of these validation tests, we distributed the instrument to 5 respondents to guarantee that there were no more problems before distributing to the respondents for a pilot study. In the present study, the measuring items need to be reexplored since they were adapted from literature and modified to suit the current study (3,20,24,1,25). The study also needs to reassess the internal reliability of the instruments to ensure the internal reliability is still intact (8). Therefore, the present study repeated the EFA procedure for the modified items to reassess the importance of every item and to recompute the internal reliability before one can use it in actual study.

Data analysis

In this study, several preliminary analysis steps were conducted through exploratory analysis methods. At the beginning of the analysis, the correlation between items was tested. Items with correlation values ranging from 0.30 to 0.90 exhibited satisfactory correlations within the construct. Subsequently, factors were isolated using principal axis factoring. The factors were rotated using the promax method while considering the Kaiser-Meyer-Olkin (KMO) value. The Chi-square value must be less than three, and the goodness of fit value must be satisfactory. Factors score weight values and modification indices of items were either removed or retained, and the model was adjusted accordingly. A model with a satisfactory goodness of fit value was obtained.

RESULTS

Table I shoes the mean and standard deviation score for each item measuring their respective components of the Illness-Belief construct.

Table I: The mean and standard deviation score for items measuring Illness Beliefs construct.

	Mean	Standard Deviation
TL1 My illness will last a short time	9.04	.973
TL2 My illness is likely to be permanent rather than temporary	9.07	.869
TL3 My illness will last for a long time	8.82	.857
TL4 This illness will last for a long time	9.09	.878
TL5 I expect to have this illness for the rest of my life	8.90	.893
TL6 My illness will improve in time	8.95	.852
TL7 The symptoms of my illness change from day to day	8.78	.973

CONTINUE

Table I: The mean and standard deviation score for items measuring Illness Beliefs construct (CONT.)

	Mean	Standard Deviation
TL8 My symptoms come and go in cycles	8.93	.888
TL9 My illness is very unpredictable	9.07	.830
TL10 I go through cycles for my illness (for better and worse).	9.00	.842
IC3 I do understand about my illness	8.89	.898
IC4 My illness does not make any sense to me	8.84	.831
IC5 I have a clear picture or understanding of my condition.	8.84	.829
CT1 There is a lot that I can do to control my symptoms	9.26	.758
CT2 I can determine whether my illness gets better or worse	8.80	.919
CT3 The course of my illness depends on me	8.70	.952
CT4 Nothing I do which will affect my illness	8.76	.852
CT5 I have the power to influence my illness	8.93	.805
CT6 My actions will not affect the outcome of my illness	8.99	.802
CT7 There is very little that can be done to improve my illness	9.24	.862
CT8 My treatment will be effective in curing my illness	8.76	.875
CT9 The adverse effects of illness can be treated	8.76	.877
CT10 My treatment can control my illness	8.83	.894
CT11 There is nothing that can help my condition	8.78	.998
EM1 I get depressed when I think about my illness	8.53	.961
EM2 When I think about my illness, I get upset	8.45	.906
EM3 My illness makes me feel angry	8.69	.985
EM4 My illness does not worry me	8.62	.794
EM5 Having this illness makes me feel anxious	8.82	.851
EM6 My illness makes me feel afraid	8.92	.963
CS1 My illness is a severe condition	8.89	.875
CS2 My illness has significant consequences on my life	8.77	.885
CS3 My illness does not have much effect on my life	8.90	.821
CS4 My illness strongly affects the way others see me	8.96	.826
CS5 My illness causes difficulties for those who are close to me	8.80	.845
CS6 My illness has serious financial consequences	9.07	.802

Table II shows the value of Bartlett's Test (P-value < 0.05). At the same time, the value for exceeded the minimum value of 0.6 (17,6, 8). These two values (significance in Bartlett's Test and the value KMO>0.6) proved that the data was adequate and suitable for the subsequent procedure in EFA.

Table II: Value of KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.913
Bartlett's Test of Sphericity	Approx. Chi-Square	5317.165
	df	703
	Sig.	.000

Table III shows the total variance value estimated by the items used to measure the Illness components. Component Timeline measuredthe construct at 17.27%. Component Controllability measured construct at 17.15%, component consequences at 10.78.%, component Illness coherent at 10.44%, and component Emotional measured the construct at 8.52%. This acceptable value exceeded the minimum requirement of 60% (1,17,8).

Table III: Total Variance Explained for every component

Total Variance Explained			
	Rotation Sums of Squared Loadings		
Component	**Total**	**% of Varians**	**Cumulative %**
Timeline	6.564	17.275	17.275
Controllability	6.520	17.157	34.432
Consequences	4.097	10.782	45.214
Illness Coherent	3.969	10.444	55.658
Emotional	3.231	8.502	64.160
Extraction Method: Principal Component Analysis.			

Table IV shows the distribution of items for the five components that measure the illness beliefs construct. Items TL1-TL10 measured component 1 (Timeline), whereas CT1-CT11 measured component 2 (Controllability). Items CS1-CS measured component 3 (Consequences), IC1-IC5 measured component 4 (Illness coherent), and lastly, items EM1- loading that exceeded the threshold value of 0.6 (11,25,20,3,17,6).

Table IV: Items to Measure the Illness Beliefs Construct

Rotated Component Matrix					
	Component				
	1	**2**	**3**	**4**	**5**
TL1 My illness will last a short time	.785				
TL2 My illness is likely to be permanent	.755				
TL3 My illness will last for a long time	.713				
TL4 This illness will pass quickly	.776				
TL5 I expect to have this illness for the rest of my life	.757				

CONTINUE

Table IV: Items to Measure the Illness Beliefs Construct (CONT.)

Rotated Component Matrix					
	Component				
	1	2	3	4	5
TL6 My illness will improve in time	.781				
TL7 The symptoms of my illness change a great deal from day to today	.730				
TL8 My symptoms come and go in a cycle	.791				
TL9 My illness is very unpredictable	.670				
TL10 I go through a cycle in which my illness gets better and worse	.705				
IC1 The symptoms of my condition are puzzling to me					.661
IC2 My illness is a mystery to me					.712
IC3 I don't understand my illness					.745
IC4 My illness doesn't make sense to me					.750
IC5 I have a clear picture or understanding of my condition					.740
CT1 There is a lot that I can do to control my symptoms		.706			
CT2 What I do can determine whether my illness gets better or worse.		.680			
CT3 The course of my illness depends on me		.694			
CT4 Nothing I do will affect my illness		.697			
CT5 I have the power to influence my illness		.748			
CT6 My action will not affect the outcome of my illness		.710			
CT7 There is very little that can be done to improve my illness.		.688			
CT8 My treatment will be effective in curing my illness		.731			
CT9 The adverse effects of my illness can be prevented by my treatment		.753			
CT10 My treatment can control my illness		.754			
CT11 There is nothing that can help my condition		.684			

CONTINUE

Table IV: Items to Measure the Illness Beliefs Construct (CONT.)

Rotated Component Matrix					
	Component				
	1	2	3	4	5
EM1 I get depressed when I think about my illness.			.737		
EM2 When I think about my illness, I get upset			.792		
EM3 My illness makes me feel angry			.829		
EM4 My illness does not worry me			.786		
EM5 Having this illness makes me feel anxious			.783		
EM6 My illness makes me feel afraid			.683		
CS1 My illness is a severe condition				.761	
CS2 My illness has significant consequences on my life				.734	
CS3 My illness does not have much effect on my life				.696	
CS4 My illness strongly affects the way others see me				.760	
CS5 My illness causes difficulties for those who are close to me				.802	
CS6 My illness has serious financial consequences				.768	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The Cronbach's Alpha for each component that reflects the internal reliability of the measuring items for the component is presented in Table V. The Cronbach alpha for all components exceeded 0.7, which indicates excellent internal reliability (Hair et al., 2010).

Table V shows Cronbach's Alpha for all components of the Illness Beliefs constructs among heart-failure patients (IPQ-R). The CR value is 0.94 for the Timeline, 0.86 for Controllability, 0.92 for Consequences, 0.89 for Illness Coherent, and 0.89 for Emotional.

Table V: The reliability assessment for each component

Component	No item	Cronbach Alpha
Timeline	10	.940
Controllability	11	.863
Causequences	6	.926
Illness Coherent	5	.897
Emotional	6	.895

DISCUSSION

The exploratory factor analysis (EFA) showed that the constructs of illness beliefs among heart failure patients could be measured using multiple dimensions or components, with each represented for this study 200 respondents. It is considered sufficient for EFA, especially for individual item and factor structure are valid. This study has been using the IPQ-R that assesses the level of the patient's illness beliefs, and it has been translated into Bahasa Malaysia.

As an outcome of EFA, five components of the IPQ-R clarity 64.160 percent of the variance among the items. All five components, the items for component 1, component 2, component good internal consistency because the Cronbach Alpha value for the five components exceeded 0.7. Thirty-eight items remained with (i) Timeline: 10 items; (ii) Consequences: 11 items; (iii) Control:6 items; (iv) coherent: 5 items and (v) emotion: 6 items. Therefore, the researcher can rearrange the items of each component to measure the constructs of illness beliefs, which can then be used for data collection purposes among heart failure patients in

In the context of generalizability, this study is subjected to certain limited findings. For example, the study only involves patients aged 20 and above and being treated in two government hospitals only. It covers two hospitals in Selangor. This is because all heart patients currently active in medical treatments are mainly based at these two hospitals in Selangor for a pilot study. This study also includes patients who can speak and understand the researcher. The findings of this study can possibly be generalized only to Malaysian and do not represent the whole population of heart patients in the hospital setting.

CONCLUSION

The Malay adaptation of the IPQ-R demonstrates strong internal reliability, as evidenced by yield high Cronbach's Alpha values, satisfying the Bartletts test requirement (significant).

Satisfactory KMO scores (>0.6) and factor loading s greater than 0.6. As a result, this study establishes its potential as a dependable and substantial tool for discerning the illness beliefs it into their clinical practice to enhance the recognition of patients whose health-related beliefs may impact their quality of life.

The Malay version of the IPQ-R offers a comprehensive approach to assessing illness beliefs, with promising implications for future research and clinical applications, especially in

Given the limited available data in existing literature, researchers may consider reconfiguring the questionnaire items within each component to measure the specific constructs related to patients' attitudes. This adaptation can then serve as a valuable data collection instrument for research among heart failure patients in Malaysia.

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