

ORIGINAL ARTICLE

Exploring and Developing Items Measuring Treatment Beliefs Construct among Heart Failure Patients: A Case of Malaysia

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ABSTRACT

Introduction: This study investigates the treatment beliefs in heart failure using the Beliefs about Medicines Questionnaire (BMQ) translated in Malaysian language. The research is cross-sectional BMQ based study done in four tertiary hospitals in Pahang and Selangor, Malaysia. **Methods:** The study used a non-experimental, quantitative design. Simple random sampling method was used in a pilot study which covered the medical and cardio clinics in two tertiary and secondary hospitals. The overall data was collected for four weeks from these hospitals. The total number of respondents in this pilot study was 200 who are diagnosed with heart failure. SPSS version 25.0 was used to analyses the data. **Results:** The overall BMQ scale consisted of 18 items. BMQ translated into Malay language by using back- to back translation procedure by experts in their fields. The results of the exploratory factor analysis (EFA) found that all 18 items were accepted due to factor loading being greater than 0.6. As a result, for local use, this instrument needs to rearrange the items measuring the construct into their respective components accordingly before proceeding with data collection in the field. **Conclusion:** It can be concluded that for local content, this instrument needs to rearrange the items measuring the construct into their respective components accordingly before proceeding with data collection practically.

Keywords: Beliefs about Medicines Questionnaire (BMQ); Patient; BMQ-M; Heart Failure

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INTRODUCTION

Improvement in adherence can be achieved by bringing change in personal beliefs about prescribed treatment (1). Around 50% patients suffering with chronic diseases do not follow the prescribed medication doses (2). It has been reported non-adherence is a major obstacle in improvements of health for patients who suffer with heart failure (3). Non-adherence is associated with Health literacy. Patient's belief on medications is affected by poor health literacy.(4). Improvement in patient adherence can be achieved by learning the patients' conception or beliefs, fears and attitude towards the harm and benefits of medications. In this manner the patients concern about medications can be taken care properly.

A holistic approach in patients care can be obtained from patients and health workers point of view. Horne et al. (1999) describes Belief about Medicine Questionnaire (BMQ), is a novel method in assessment of cognitive

representations and has been used for a better understanding of patients' perceptions of medications. There are two sections of BMQ, BMQ specific and BMQ general consisting 18 item questionnaires(5).

From English BMQ has been translated to different languages, namely Arabic, German, Italian, Japanese, Turkish, Spanish etc. BMQ-T, the Turkish version reported to be acceptable internal consistency with consistent psychometric properties as the original BMQ (6). BMQ Spanish version used in Type 2 Diabetes Mellitus (DM) patients was found to be a reliable tool (7). Similarly, BMQ which has adapted and validated on different set of diseased populations and resulted in similar constructs as in the original version (8). However, till date Malay version of BMQ is not reported. The present study focused to investigate the treatment beliefs in heart failure (HF) using the Beliefs about Medicines Questionnaire (BMQ) translated in Malaysian language.

MATERIALS AND METHODS

Research Design

This research is a cross-sectional study by using self-administered questionnaire from the Beliefs on Medication Questionnaire (BMQ). The validity of the

instrument has been evaluated by using exploratory factor analysis (EFA), while 'believability' or the trustworthiness factor was evaluated on the aspect of 'internal resolve' by using the test Cronbach Alpha.

Sample and Study Location

In this pilot study, there were about 200 experimental subjects who were suffering from heart failure diseases selected randomly from cardiology clinics from two tertiary hospitals in Selangor and Pahang.

Ethical Statement

Ethical approval for the present work has been obtained from Medical Research & Ethics Committee, Ministry of Health, Malaysia, ethical approval number NMRR116-1835-31987(IIR) vide letter no. (5)KKM/NIHSEC/P16-1769 dated 5th December 2016.

Instrument Used in the Beliefs on Treatment towards Heart Failure Patients

The study instrument used must meet the purpose of the study. The instruments in this study are divided into four components, where the first component included four items that measure specific necessity. The second component measured other aspects that comprised five items that covered "general harm". The third component measure specific concern with five components and the final component measures general overuse aspects with four items. It measures the patient's perception of heart failure and factors that influenced their beliefs on medication. The overall BMQ scale consisted of 18 items. Each item was graded on scale of 0 to 10, with the resulting scores ranging between 0 to 10. Higher score indicated an exceptionally good treatment belief on their medication compliance.

Present work is a modified version with certain statements of previous BMQ. According to some research work (9,10,11,12,13,14,) if the researcher adapted the existing instruments and modified the statement for use in new environment, then the researcher needs to assess the items again through exploratory factor analysis (EFA) procedure. This is because certain items might no longer be useful in the new environment. Furthermore, the internal reliability of the instruments might change as well. Therefore, the present study conducted pilot study and performed the EFA procedure for the items to ensure the validity and reliability.

RESULTS

Exploratory Factor Analysis for Treatment Beliefs Construct Analysis

Illness beliefs construct is measured using the Beliefs about Medication Index (BMQ) questionnaire which consist of 18 items that are divided into four scales: General Harm (GH), Specific Necessity (SN), General Overuse (GO) and Specific Concerns (SC). Each item in the item is measured using an interval scale ranging from

1 (strongly disagree) to 10 (strongly agree) with each statement. The mean and standard deviation score for every item measuring the construct presented in Table I.

Table I: The mean and standard deviation for BMQ items

Item Statement	Mean	Std. Deviation
SN1 Most medicines are additive	8.95	0.852
SN2 People who take medicines should stop their treatment for a while every now and again	8.78	0.973
SN3 Medicines do more harm than good	8.93	0.888
SN4 All medicines are poisons	9.07	0.830
GO1 My health at present depends on medicines	9.13	0.820
GO2 My life would be impossible without medicines	8.75	0.919
GO3 Without medicines, I would be very ill.	8.89	0.898
GO4 My health in the future will depend on medicines.	8.84	0.831
GO5 Medicines protect me from becoming worse.	8.84	0.829
GH1 Having to take medicines worries me.	8.99	0.802
GH2 I sometimes worry about long term effects of medicines.	9.24	0.862
GH3 Medicines are a mystery to me.	8.76	0.875
GH4 Medicine disrupt my life.	8.76	0.877
GH5 I sometimes worry about becoming too dependent on medicines	8.83	0.894
SC1. Doctors use too many medicines	8.53	0.961
SC2 Doctors place too much trust on medicines.	8.45	0.906
SC3 If doctors spent more time with patients, they would prescribe fewer medicines.	8.69	0.985
SC4 Natural remedies are safer than medicines.	8.62	0.794

The Exploratory Factor Analysis (EFA) Procedure utilizing Principal Component Analysis (PCA) with Varimax Rotation, was conducted on the 18 items of the treatment beliefs. Table II show a significant value for the Bartlett Test (P-value <0.05). The Measure of Sampling Adequacy by Kaiser Meyer Olkin (KMO) is 0.874, which exceeded the minimum value of 0.6 (15,16,17,18). These two values (significance in the Bartlett Test, and the value KMO > 0.6) indicate that the data was suitable for the EFA.

Table II: Value of KMO and Bartlett Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.874
Bartlett's Test of Sphericity	Approx. Chi-Square	2017.842
	df	153
	Sig.	0.000

The screen plots which indicate the number of components to emerge the exploratory factor analysis (EFA) procedure is presented in Figure 1. The pattern of scree-plot in Figure 1 clearly indicates four components emerged from the EFA procedure.

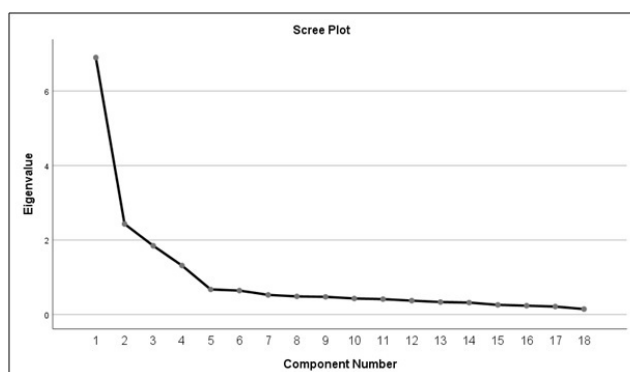


Figure 1: The Scree-Plot

Table III present four components that emerged based on the eigen value greater than 1.0. The results show the treatment beliefs construct was measured using four components with certain number of items in each component. "Specific Necessity" component items measured the construct at 19.27%, the "General Harm" component items measured the construct at 18.33%, the "Specific Concern" component items measured the construct at 16.41%, and the items under general overuse measured 15.36% of the construct. The total variance explained for treatment beliefs construct is 69.37%. This value was acceptable as it exceeded the minimum requirements of 60% (19, 20).

Table III: Total Variance Explained for every component

Component	Total Variance Explained		
	Rotation Sums of Squared Loadings		
	Eigenvalue	% of Variance	Cumulative %
<i>Specific Necessity</i>	3.469	19.271	19.271
<i>General Harm</i>	3.300	18.331	37.602
<i>Specific Concern</i>	2.954	16.411	54.013
<i>General Overuse</i>	2.765	15.363	69.376

Extraction Method: Principal Component Analysis.

The four components that emerged from EFA procedure based on the Eigen value >1.0 in Table 3 is supported by the Scree-Plot as presented in Figure 1.

Table VI shows the distribution of items for the four components that measures the treatment beliefs construct. Items SN1, SN2, SN3, and SN4 measure specific necessity components, while item GO1, GO2, GO3, GO4 and GO5 measure general overuse components. GH1, GH2, GH3, GH4 and GH5 measure general harm components. Subsequently items SC1, SC2, SC3 and SC4 measure all the specific concern components. All items in components 1, 2, 3 and 4 have achieved the minimum value 0.6 (20, 21,16,15,14,18)

Table IV: Items to measure the treatment beliefs constructs

Rotated Component Matrix ^a	Component			
	1	2	3	4
SN1 Most medicines are additive				.764
SN2 People who take medicines should stop their treatment for a while every now and again				.768
SN3 Medicines do more harm than good				.814
SN4 All medicines are poisons				.725
GO1 My health at present depends on medicines		.709		
GO2 My life would be impossible without medicines		.741		
GO3 Without medicines, I would be very ill.		.786		
GO4 My health in the future will depend on medicines.		.785		
GO5 Medicines protect me from becoming worse.		.771		
GH1 Having to take medicines worries me.	.712			
GH2 I sometimes worry about long term effects of medicines.	.749			
GH3 Medicines are a mystery to me.	.833			
GH4 Medicine disrupt my life.	.796			
GH5 I sometimes worry about becoming too dependent on medicines	.811			
SC1. Doctors use too many medicines			.836	
SC2 Doctors place too much trust on medicines.			.885	
SC3 If doctors spent more time with patients, they would prescribe fewer medicines.			.833	
SC4 Natural remedies are safer than medicines.			.784	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Internal reliability of the instrument for measuring treatment beliefs construct

The Cronbach's Alpha values for each component which reflect the internal reliability of the items are presented in Table V. The value for Cronbach's Alpha for an instrument should exceed 0.7, to be acceptable in subsequent studies. A Cronbach Alpha value of 0.7 and above shows that the instrument has high reliability standards. Table 5 shows that the Cronbach's Alpha value for the Belief Medications Questionnaire (BMQ) instrument, has high reliability as the Cronbach's Alpha value was 0.85 for Specific Necessity construct, 0.863 for General Harm Construct, 0.886 for Specific Concern and finally 0.873 for General Overuse construct.

DISCUSSION

The Beliefs about Medicines Questionnaire (BMQ) questionnaire were originally developed and validated in Western populations to measure beliefs and barriers

Table V: The reliability assessment for each component

Component	Reliability Statistic	
	Number of items	Cronbach's Alpha
Specific Necessity	4	.859
General Harm	5	.863
Specific Concern	5	.886
General Overuse	4	.873

to medication adherence (22). Psychosocial factors are among the items measured in the Beliefs about Medicines Questionnaire (BMQ) which capture different aspects of medication behavior and beliefs about medication which may affect adherence (23). The Exploratory Factor Analysis (EFA) results show that the constructs of treatment beliefs among heart failure patients can be measured by using multiple dimensions or components and each is represented by several related items. The BMQ, has been used for follow-up screening on heart patients in Spain (7). BMQ instrument is established as sensitive to change and is a reliable instrument, but this cannot be used as general for heart failure cases in public health care. Internal consistency has been found satisfactory in all aspects with Cronbach alpha coefficients close to above or 0.6, as recommended. Ferrer and Garin (2008) found the coefficients are similar to the original version (24). Based on the reliability analysis, the items for the components measuring "specific necessity", "general harm", "specific concern" and "general overuse". These components help to measure treatment beliefs and demonstrate good internal consistency because the Alpha Cronbach value for the four components exceeded the set requirement of 0.6.

CONCLUSION

The Malaysian version of the BMQ has been found reliable and the factor analysis indicated three factors of interest. We can therefore assert that it is a reliable and valid tool for identifying treatment beliefs among patients with heart failure. Based on reliability analysis, the items for components Specific Necessity, General Harm, Specific Concern and General Overuse measure these treatment beliefs constructs and demonstrate good internal consistency because the Cronbach alpha value for the four components exceeds the set requirement of 0.6. There is less information regarding relevant data in literature. Therefore, the researcher can rearrange the items for each component to measure the constructs of this attitude and then it can be used for data collection purposes for actual research among heart failure patients in Malaysia.

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