

Psychometric Features of Patient Health Engagement Scale in Iranian Breast Cancer Patients

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Abstract

Background: Breast cancer is one of the most prevalent cancers among women worldwide. The phe scale is the first credible measurement tool to delve into critically ill patients' experiences and emotional state and detect their level of engagement in the treatment and care process. However the Persian version of the scale needs to be further investigated. Accordingly, the present study aimed to evaluate the psychometric features of the patient health engagement scale (phe-s) in Iranian patients suffering from breast cancer.

Methods: This is a cross-sectional study. The sample size was estimated by multiplying the total number of items by ten. The sample size was estimated for this 5-item scale 128 breast cancer patients who referred to a specialized clinic in 2020. Content validity and reliability analysis were performed, and the data were analyzed using IBM SPSS₂₆ software and R content validity package.

Results: The ordinal alpha of the sample was 0.626, indicating an acceptable internal consistency. The analysis of the rash model revealed an acceptable infit and outfit MNSQ (685-932). The polychoric correlation coefficient within the items was 46, representing a moderate correlation. All the factor loadings had a high value ($0 > 60$), thereby confirming the single dimensionality of the scale.

Conclusion: The phe scale has favorable reliability and validity to assess the patients' emotional adjustment and their engagement in their health and self-management before designing and implementing any intervention.

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Introduction

Breast cancer is one of the most prevalent cancers among women worldwide the mortality rate of which is expected to increase significantly over the next 5-10 years.¹ Despite the large number of studies in this field, breast cancer has remained a critical health problem.² An increase in chronic diseases over the recent decades in line with population aging and enhanced number of environmental stressors has resulted in further efforts in

healthcare systems.³ Nowadays new medical and public health management theories suggest that individuals must actively cooperate with healthcare organizations during treatment processes.⁴ The patients' increased awareness and accountability in health and disease management seems to be far more critical than the role of organizations.⁴ The patient's engagement in the healthcare process is considered a key strategy to improve the patients' commitment to clinical results and promote their satisfaction with the offered care

services.⁵ However the current methods promoting the patients' involvement and self-management are not equipped with standard instructions to accomplish these goals.⁵ The term "patient engagement" refers to a progressive advancement. The patient engagement in their health is beneficial to themselves and to the healthcare systems.⁶ Evidence reveals that when patients are engaged in their care and treatment processes, their health consequences improve their clinical complications and re-hospitalization decline and they are more likely to trust doctors and the medical staff.^{6,7} Studies have documented that patients who are more involved in their care are more motivated to engage in preventive behaviors (e.g. regular examination, physical activities and so on), participate in these behaviors actively, and experience better health.⁸ The concept "patient health engagement" provides psychological explanations regarding the patient's status on a broader level, which is an experimental and multidimensional process resulting from thinking (think), feeling (feel), and action (act) toward health management.⁹ In this process, the patients go through the four states of the blackout, arousal, adhesion, and eudaimonic project.⁹ The availability of a valid tool can help people diagnose early-stage disorders and seek treatment.¹⁰ As yet, internationally, patient activation measure (pam-13) has been the only tool available used to measure the patients' participation.¹¹

After patient activation measure, phe scale was extracted from the patient health engagement model (phe) and was the first credible measuring tool for evaluating the psycho-social experiences of chronic patients with engagement and participation.⁹ The scale determines the stage at which the patient is suffering from a chronic condition and his/her required health interventions, training and skills to form a healthy behavior, achieve self-management and increase the quality of life accordingly.⁶ This scale assesses the patient's emotional state is translated into Spanish, Turkish and Chinese and is validated and introduced as a credible tool.^{4,12} However the Persian version of this scale still needs to be evaluated in Iran. The present study aimed to evaluate the psychometric features of the phe scale among Iranian patients suffering from breast cancer.

Methods

This is a cross-sectional study in which the sample size was estimated by multiplying the total number of items by ten. The 5-10 participants per variable were commonly selected to and participate in the research.^{13,14} The sample size was determined for this 5-item scale 200 subjects that were invited to take part in the research. Finally 128 breast cancer patients who referred to the oncology department of Shiraz specialized clinic in 2020 participated in the study. Breast cancer patients were randomly selected based on the files in the

oncology ward and invited to answer questions by phone. Inclusion criteria were being literate, being aged below 65 years, having undergone surgery and possessing a smartphone. On the other hand exclusion criteria were not understanding Persian and incomplete response to the questionnaire.

Instruments

In this study, a demographic form was used to collect the participants' demographic information including job, education level, marital status, tumor grade and history of other diseases.

The Patient Health Engagement Scale (phe-s)

This scale has been developed based on a four-stage model with an ordinal structure including five items with 4 main scores. It potentially demonstrates the conflict stages a patient goes through. Phe-s enables the patients to evaluate their average health engagement stage. The intermediate scores refer to the previous state. For example, the score '4' indicates that the patient is at the second engagement stage. The median of the scores and the phe-s row must be calculated to determine the stage of phe-s. A simple conversion can convert the phe-s scores into the patient's engagement stage.⁴

Translation Process

The questionnaire was first translated into Persian and delivered to the expert panel; the Persian translation was back-translated into English. The final translation and the original format have been compared and found to be consistent by the author who developed the scale.

Content Validity

Content Validity Index (CVI), according Waltz and Bausell method, was used to examine the content validity index ($cvi \geq 0/79$). Experts define each item as "relevant", "clear" and "simple" based on a four-point Likert scale. They rate each item as relevant from 1 "not relevant", 2 "relatively relevant", 3 "relevant", 4 "completely relevant". The simplicity of the item is also from 1 "not simple", 2 "relatively simple", 3 "simple", 4 "quite simple" and the clarity of the item from 1 "not clear", 2 "relatively" respectively "clear", 3 "clear", up to 4 "clearly".¹⁵ To assess Content Validity Ratio (CVR) we used Lawshe method. The questionnaire was given to a group of experts and they were asked to give their opinion on three "necessary", specify "useful but unnecessary" and "unnecessary" scales after carefully studying each question. The Persian scale and the assessment form were given to eight experts in health education health services management, public health, mental health and health education. After answering the experts the answers were compared with the Lawshe criterion $CVR \geq 0/59$.¹⁶

Table 1: Descriptive Statistics for person separation index (phe) Scale

PHE Item/ When I think about my disease	Rank Range	Min	Max	Median	Shannon Entropy
A*: I feel in blackout/I am in alarm/I am aware/ I feel positive	1-4	1	4	3	0.740
B*: I feel dazed/I am in trouble/ I am conscious/I feel serene	1-4	1	4	3	0.859
C*:When I think about my illness I feel overwhelmed by emotions/I feel anxious every time a new symptom arises/I got used to my illness condition/ Despite my illness I perceive coherence and continuity in my life	1-4	1	4	2	0.634
D*: I am very discouraged due to my illness/I feel anxious when I try to manage my illness/I feel I adjusted to my illness/I am generally optimist about my future and my health condition	1-4	2	4	3	0.524
E*: I feel totally oppressed by my illness/I am upset when a new symptom arises/I feel I have accepted my illness/ I can give sense to my life despite my illness condition	1-4	1	4	3	0.599

* An option is selected in each row

Exploratory Analysis

The categorical principal component analysis (CATPCA) was conducted for exploratory analysis and infit-outfit mean square fit statistics standardized (MNSQ), chi-square and p-value were then used. The Rash model was used to test and confirm the single dimensionality of the model.⁴ Moreover, PSI³ was used to assess the reliability of the Rash model.

Internal Consistency

Ordinal alpha was evaluated using the empirical copula index, and case-by-case Polychoric correlation was evaluated as a subtype of internal reliability. The data were analyzed using IBM SPSS software version 26 (IBM corp. Released 2019. IBM SPSS statistics for windows, version 26.0. Armonk, ny IBM SPSS) and R software content validity package.

Results

The participants (n=128) were aged 26-65 years (m=4.20, sd=8.11). In this study 87.5% of the patients were married and most of the patients (28.1%) had junior high school degree in terms of the level of education. Moreover, 82.6% of the patients were housewives, 8.6%, 9.4% and 4.7% of them were suffering from thyroid problems, diabetes and high blood pressure respectively. The content validity analysis and CVI were performed. CVI and CVR were 0.814 and 0.823 respectively (Table 1).

Exploratory Analysis

The initial analysis yielded one factor with the eigenvalue of 2.4, over Kaiser criterion of 1, explaining 48.4% of the total variability. All factor loadings had a high value (0>0.6) confirming the uni-dimensionality

Table 3: Item-item polychoric correlation matrix for ranks on the phe scale

phe item	1	2	3	4	5
Item 1	-	0.46	0.43	0.46	0.29
Item 2		-	0.43	0.45	0.35
Item 3			-	0.58	0.67
Item 4				-	0.45
Item 5					-

of the scale (Table 2).

Table 2: Factor Loadings from Categorical Principal Component Analysis (CATPA)

phe Item	One Factor Solution
1	0.651
2	0.669
3	0.762
4	0.696
5	0.695

Internal Consistency

The average inter-item polychoric correlation is a subtype of internal consistency and is obtained by summing up all the items examining the same items. Construct of a test determines the polychoric correlation coefficient for each pair of the items, and finally the average of these polychoric correlation coefficients is obtained.

The Average inter-item polychoric correlation was 0.46 in this study suggesting moderate correlation among the items (Table 3).

The internal consistency was also measured by the ordinal alpha via empirical copula revealing acceptable reliability (0.626).¹⁵ In Table 4 alpha ordinal was evaluated after removing individual items. Since deleting each item decreases the value of ordinal alpha each item significantly contributes to the total score

Table 4: Ordinal Alpha Via Empirical Copula If the Item was Deleted

Item	Ordinal Alpha If Item Deleted
phe 1	0.59
phe 2	0.56
phe 3	0.54
phe 4	0.58
phe5	0.59

Table 5: Rash analysis of phe-scale

Phe Items	Location	Infit MNSQ	Outfit MNSQ	Chisquare (df)	P-value
1	0.615	0.861	0.840	108.419 (128)	0.894
2	1.010	0.795	0.932	120.263 (128)	0.674
3	1.118	0.712	0.658	84.848 (128)	0.999
4	2.905	0.772	0.709	91.456 (128)	0.994
5	1.194	0.879	0.862	111.165 (128)	0.855

of the phe scale.

Rash Analysis

The item analysis was performed considering infit and outfit indices, the values of which ranged from 0.658-0.932, indicating an acceptable range. PSI was calculated to evaluate the reliability in the Rash model (PSI=0.735) (Table 5).

Discussion

To the best of our knowledge, this is the first study addressing the features of the phe scale in Iran. The analysis results revealed that the study findings were promising and consistent with other studies.^{4, 17} As to the median in this study the breast cancer patients were at the third engagement stage of the phe model where the patient suffering from a chronic illness is ready to exhibit health behavior such as doing physical activities, following a diet, taking medication, and so on.⁵ Rash analysis of the model confirmed the acceptability of the items and the single dimensionality of the phe scale. Moreover, the acceptable internal consistency of the phe scale for breast cancer patients was in line with other studies however, its value was slightly smaller than those of the versions translated into other languages.^{11, 18} The inconsistency seems to be caused by the density of the studied patients' responses at one or two stages. The ordinal alpha indicated that the Persian version of this scale had acceptable reliability.¹⁹ Furthermore, the reliability value was smaller than those reported for the Italian, Spanish, and Chinese versions of the scale. In this regard, the difference might be caused by the differences in the sample size.^{4, 17, 18} The infit and outfit MNSQ were acceptable at all ranges. Zhang et al also confirmed the findings of the present study.²⁰ Evidence suggests the acceptable validity of phe scale in the Eastern culture.²¹ This scale is currently the only tool specifically evaluating the patients' emotional compatibility and difficulties and their access to their potentials to engage in and manage their health.⁵ Furthermore, the phe scale can easily deal with clinical cases to train healthcare experts in patient-oriented communication skills.²²

Limitation

One of the limitations of the present study was that the participants were suffering from the same disease and those with other chronic diseases were not included in the study. This limitation might have

affected the findings.

Conclusion

The present study offers evidence indicating the satisfactory psychometric features of phe among Iranian population suffering from breast cancer. Due to its structural features the phe scale takes advantage of methodological innovations which are well-integrated with the concepts of the phe model. Regarding its conciseness, simple responding, and the coverage of different psychological states of patients the phe scale is recommended in healthcare environments to understand the emotional states and provide the health and disease management of patients suffering from chronic conditions.

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Ethical Considerations

The present study was approved by The Ethics Committee of Shiraz University of Medical Sciences (Code: IR.Sums.Rec.1399.131).

Conflict of Interest: None declared.

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