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Can We Create A Reliable and Valid Short Form of Champion Health Belief Model Questionnaire?

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ABSTRACT

Background: We aimed to create a shortened form of the Champion Health Belief Model instrument which is a widely used questionnaire about breast cancer screening behaviors with acceptable validity and reliability.

Methods: The Persian version of the Champion Health Belief Model (CHBM) instrument consists of 57 items in 8 concepts. The subjects of the study were 40 female faculty members and 34 nurses of Tehran University of Medical Sciences in 2014. Based on the results, the most influential questions in each concept were chosen and then analyzed for internal consistency and the mean scores of the concepts were compared to the original questionnaire. Next, the original form was delivered to a different population. The mean scores of each concept were compared between original and short forms. At last, the same second population was asked to fill in the shortened form in a two-week interval and a test re-test comparison was done.

Results: In the first step, out of 57 items in the original questionnaire, 28 items were selected based on their influence on the mean score of each concept. In 40 female faculty members who were all above 40, all of the Cronbach's alphas for all subscales were above 0.6 (ranging from 0.624 to 0.830) in the shortened form questionnaire; although they were lower than the original form. There were no significant differences between short and original questionnaires in terms of mean subscale scores. In the second step, in the second population including 34 female nurses aged over forty years in a university medical center, there was again no significant statistical difference between the 28-item and 57-item instruments. In the third step, two weeks later, the completed shortened questionnaire among 20 subjects of the same population of the nurses showed similar results, indicating the reliability of the newly design shortened form of the questionnaire.

Conclusions: The shortened 28-item form of the CHBM instrument seems to be both valid and reliable, and less time-consuming. Its results can be comparable to other studies that used the standard form.

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Introduction

Breast cancer is the most common malignancy among women and is the second fatal cancer only after lung cancer.^{1,2} Approximately half of the breast cancer incidence and the attributed mortality occurs in developing countries.³ In our country, breast cancer takes place about 10 years earlier than



developed countries and comprises 19% of all cancer incidences.^{4,5}

Considering effective treatment strategies and the indolent course of the disease, screening is a necessary tool to decrease the incidence of advanced diseases.¹ The most effective screening method with a proven role in improving the overall survival is mammography.⁶ There is a wide gap in the rate of regular women who undergo regular mammography between developed and developing nations. For example, while about 66.8% of women in the United States⁷ and 76% in England⁸ undergo regular mammography, multiple studies show that less than 5% of Iranian women get a regular mammogram.⁹⁻¹⁴

There are many causes for such low rates of regular mammography among women in Iran. Among different tools to evaluate these causes, the Champion Health Belief Model¹⁵ has been used extensively in Iran and other parts of the world.⁹⁻¹⁴ This standard questionnaire was introduced in the 60s to evaluate the potential causes of breast cancer screening participation. It has been validated in many languages, such as Spanish¹⁶, Turkish¹⁷ and also Persian.¹⁸ In the majority of these studies, women reported “lack of knowledge” and “not being recommended by their physicians” as the main causes for not undergoing regular mammography. In some studies among female physicians, only 11.8% of the women aged over 40 years had undergone regular mammography.¹³

Considering the low rate of regular screening among Iranian women, in order to change this paradigm, new breast cancer screening policies are needed. To achieve an evidence based policy, there is a need to further study the causes of such low participation in different countries and subpopulations. For this reason, the Champion Health Belief Model, which is widely accepted as a valid and reliable tool and is already available in Persian¹⁸, seems to include too many questions and takes a long time for people to fully answer.

This could be an obstacle for participation in future studies, especially when this questionnaire is combined with many other questions on various issues like demographic characteristics, screening habits, knowledge, etc. In this study, we decided to create a short form of the Champion Health Belief Model with similar validity and reliability that could replace the available standard questionnaire to be readily used in preventive practice and clinical practice..

Methods

Developing the Instrument

In this cross sectional study, the Persian version of the standard Champion Health Belief Model (CHBM) questionnaire (developed by Parvaneh Taymoori¹⁸) was first distributed among 40 women

selected from the female faculty members of Tehran University of Medical Sciences in 2014. These members were randomly selected using the names enlisted in different departments at the university official website (accessed as medicine.tums.ac.ir). The questionnaires were delivered in closed non-transparent envelopes. The Persian version of the CHBM standard questionnaire consists of 8 concepts and 57 items selected out of various versions from 1993 to 1999 based on their appropriateness to Iranian women culture and society.¹⁵ These items include: 1) perceived susceptibility to breast cancer (3 items), 2) perceived seriousness of breast cancer (7 items), 3) perceived benefits of breast self-examination (BSE) (6 items), 4) perceived barriers for BSE (9 items), 5) confidence in ability (10 items), 6) health motivation (7 items), 7) perceived mammography benefits (6 items), and 8) perceived mammography barriers (9 items).

Each item is scored from 1 to 5 based on a Likert scale: “I strongly disagree” (1 point), “I disagree” (2 points), “I am not sure” (3 points), “I agree” (4 points), and “I strongly agree” (5 points). The score of each subscale is treated separately and is not merged into a single overall score of all the subscales. Then, the filled questionnaires were collected and analyzed. Next, apparently repeated and similar questions were removed and the items which had a higher agreement with the total concept score were selected. So, the selected questions were entitled as the short form questionnaire. Then, for the second time, the standard 57-item CHBM questionnaire was distributed among a different population comprising 34 female nurses of the teaching hospitals of the same university. After collecting the completed questionnaires, the scores of the selected items were compared to standard items. After that, in the test/re-test step, the shortened questionnaire was delivered to the same population of the female nurses and the results were compared with the earlier ones.

Statistical Methods

In order to evaluate the reliability of the shortened questionnaire as compared to the concept score of the standard questionnaire, Cronbach’s Alpha was used to evaluate the internal consistency. To compare each concept score between original and shortened questionnaires and in order to compare the results of the answers between the two times the questionnaires were completed by the same population, paired samples T test was utilized on the mean score in each concept. SPSS software version 20 was used for all the statistical tests, and alpha was considered 0.05.

Results

Step1. Comparison of concept internal consistency between shortened and original questionnaires



At first, after collecting the standard 57-item CHBM questionnaire from the randomly selected 40 female faculty members of our university, 28 items were selected (about half of the original questionnaire) that had the highest impact on the score of each concept (or subscale) and the items

that their removal did not influence the subscale score were removed (Table 1). Then, the internal consistency of the items in each concept was assessed using Cronbach's Alpha. As shown in Table 2, despite a decline in the shortened form, none of the concepts had a Cronbach's Alpha less than 0.6.

Table 1. Selected 28 items in 8 concepts out of standard 57 item CHBM instrument

| | |
|----------------------------|---|
| Susceptibility | |
| 1 | It is likely that I will get breast cancer |
| 2 | My chances of getting breast cancer in the next few years are great |
| Seriousness | |
| 1 | The thought of breast cancer scares me |
| 2 | If someone had breast cancer, her whole life would change |
| BSE Benefits | |
| 1 | When I do self-examination, I feel self-satisfied |
| 2 | When I complete monthly breast self-examination I don't worry as much about breast cancer |
| 3 | Completing BSE each month may decrease my chances of dying of breast cancer |
| BSE Barriers | |
| 1 | Doing breast examination will make me worry about what is wrong with my breast |
| 2 | BSE takes too much time |
| 3 | It is hard to remember to do breast examination |
| 4 | BSE is not necessary if you have a routine mammogram |
| Confidence in BSE efficacy | |
| 1 | I could find a breast lump by performing BSE |
| 2 | I am able to tell something is wrong with my breast when I look in the mirror |
| 3 | I can perform BSE correctly |
| Health Motivation | |
| 1 | I exercise at least 3 times a week |
| 2 | I eat well-balanced meals |
| 3 | I have regular checkup even when I am not sick |
| 4 | Maintaining good health is extremely important to me |
| Mammography Benefits | |
| 1 | If I find a lump through a mammogram, my treatment for breast cancer may not be as bad |
| 2 | Having a mammogram is the best way for me to find a very small lump |
| 3 | Having mammogram will decrease my chances of dying from breast cancer |
| 4 | When I get a recommended mammogram, I feel self-satisfied |
| Mammography Barriers | |
| 1 | I have other problems more important than getting a mammogram |
| 2 | Having a mammogram is too painful |
| 3 | I don't know how to go about getting a mammogram |
| 4 | I am too old to need a routine mammogram |
| 5 | Having a mammogram is too embarrassing |
| 6 | Having a mammogram takes too much time |

Table 2. Internal consistency and result of comparing the mean score of each concept item in original and shortened form of CHBM instrument

| Fields of Questions | Original Form of Questionnaire | | | | Short Form of Questionnaire | | | | Paired Differences | | |
|----------------------|--------------------------------|----------|------|------|-----------------------------|----------|------|------|--------------------|------|---------|
| | Num of Questions | α | Mean | SD | Num of Questions | α | Mean | SD | Mean | SD | P-Value |
| Total Questions | 57 | 0.83 | - | - | 28 | 0.74 | - | - | - | - | - |
| Susceptibility | 3 | 0.86 | 1.93 | 0.86 | 2 | 0.79 | 1.94 | 0.93 | 0.00 | 0.20 | 0.90 |
| Severity | 7 | 0.82 | 2.83 | 0.82 | 2 | 0.68 | 2.73 | 1.15 | 0.10 | 0.48 | 0.20 |
| BSE Benefits | 6 | 0.80 | 3.68 | 0.58 | 3 | 0.80 | 3.70 | 0.70 | -0.03 | 0.21 | 0.45 |
| BSE Barriers | 9 | 0.81 | 2.49 | 0.58 | 4 | 0.63 | 2.47 | 0.67 | 0.03 | 0.29 | 0.58 |
| BSE Self Efficacy | 10 | 0.93 | 2.73 | 0.90 | 3 | 0.83 | 2.70 | 1.06 | 0.03 | 0.37 | 0.61 |
| Health Status | 7 | 0.83 | 4.00 | 0.76 | 4 | 0.75 | 4.03 | 0.85 | -0.03 | 0.23 | 0.43 |
| Mammography Benefits | 6 | 0.80 | 3.95 | 0.55 | 4 | 0.73 | 3.92 | 0.59 | 0.03 | 0.17 | 0.26 |
| Mammography Barriers | 9 | 0.77 | 2.42 | 0.63 | 6 | 0.62 | 2.44 | 0.64 | -0.03 | 0.18 | 0.38 |

Step 2. Comparison of the concept scores between original and shortened CHBM instruments

In order to compare the mean acquired score of each concept (subscale), paired samples T test was

used. As it is shown in Table 2, no statistical difference were found in the mean score of each concept between original and shortened questionnaires and all of P-values were more than 0.05.



Step3. Comparison of the mean score of each concept between shortened and original questionnaires in a different population

As selection of the desired items for our shortened form was performed based on the results of the standard 57-item CHBM questionnaire, further evaluation of the validity of the new questionnaire had to be performed. Thus, the original questionnaires were distributed among a different population (34 female nurses) and again, the mean scores in each concept were compared between the shortened and standard instruments. There was no significant difference in the mean score

of the concepts between the original and the shortened questionnaire.

Step4. Testing the reliability of the shortened form

In order to test the reliability of the new shortened 27-item instrument, we again distributed only the shortened form of the questionnaire among 20 subjects of the same population of nurses (step 3). Next, we compared the mean score of each concept between questionnaires completed two weeks apart. Our study did not show significant difference in any of the concept mean scores, indicating the reliability of our designed shortened instrument.

Table 3. Results of the paired samples T test for comparison of mean concept score between shortened and original forms of the CHBM instrument in nurses population

| Concept | Mean | SD | P-Value |
|----------------------|-------|------|---------|
| Susceptibility | 0.00 | 0.12 | 0.81 |
| Severity | -0.01 | 0.38 | 0.87 |
| BSE Benefits | 0.03 | 0.23 | 0.47 |
| BSE Barriers | -0.05 | 0.24 | 0.22 |
| BSE Self Efficacy | -0.05 | 0.28 | 0.26 |
| Health Status | 0.02 | 0.32 | 0.66 |
| Mammography Benefits | 0.03 | 0.21 | 0.41 |
| Mammography Barriers | 0.02 | 0.21 | 0.62 |

Table 4. Results of the paired samples T test for comparison of concept mean scores of the shortened forms filled out two weeks apart

| Concept | Mean | SD | P-Value |
|----------------------|-------|------|---------|
| Susceptibility | 0.10 | 0.48 | 0.36 |
| Severity | 0.08 | 0.47 | 0.48 |
| BSE Benefits | 0.02 | 0.43 | 0.86 |
| BSE Barriers | 0.05 | 0.61 | 0.72 |
| BSE Self Efficacy | 0.05 | 0.69 | 0.75 |
| Health Status | -0.08 | 0.60 | 0.58 |
| Mammography Benefits | -0.15 | 0.52 | 0.21 |
| Mammography Barriers | -0.06 | 0.32 | 0.42 |

Discussion

Breast cancer survival rates vary widely in different parts of the worlds and this variation is in agreement with rates of screening by routine mammography.³ Previous studies among different populations in Iran, although not nationally representative, have indicated very low levels of women’s participation in screening mammography, even in educated individuals.¹³ Among different studied instruments, the Champion Health Belief Model instrument seems to be widely accepted throughout the world based on which a number of studies in Iran have been carried out investigating the causes of such a low participation rate. Some authorities recommend to establish appropriate policies to encourage women to pay more attention to breast cancer early detection by means of screening mammography. In this regard, extensive investigation of the cause(s) of low participation in all parts of the country using a short and less time-consuming instrument is needed. The standard Persian version of the CHBM instrument with 57

items in 8 concepts seems too long and time-consuming and could have a negative impact on the participation of the individuals when investigating the causes, especially when it is combined with many other questions on various issues like demographic characteristics, screening habits, knowledge, etc. So we decided to develop a shortened form of the standard CHBM instrument with comparable results to the original form.

Our study showed that our 28-item questionnaire had acceptable internal consistency within each covered concept (all Cronbach’s alphas were >0.6) despite being lower than its original counterpart. In the next step, we found no significant difference between the shortened and original forms of the instrument in terms of concept scores (Table 2). In the third step, we found a good agreement between the results of the shortened form and the original form in a different population which indicated the validity of our brief instrument. Finally, in the fourth step, in order to show the reliability of the shortened newly-designed 28-item questionnaire, we found



no statistically significant difference in the mean score of each subscale (concept) in the same population, when they were asked to complete the short form with an interval of 2 weeks.

A good agreement was found between the shortened and original CHBM instrument; thus, the results of the causes of not undergoing routine mammography screening using the short form are comparable to other studies using the standard CHBM questionnaire. Based on the results of this study, it could be concluded that the shortened 28-item questionnaire which is less time-consuming is a valid and reliable instrument to investigate the underlying cause(s) of the low participation of Iranian women in large population-based studies.

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