Title

Instrument Adaptation, Modification, and Validation for Cultural Beliefs About Colorectal Cancer Screening Among Korean Americans.

Journal

Cancer nursing, 41(3)

ISSN

0162-220X

Authors

Lee, Shin-Young
Lee, Eunice E
Aranda, Frances

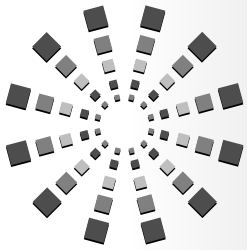
Publication Date

2018-05-01

DOI

10.1097/ncc.0000000000000523

Peer reviewed



Shin-Young Lee, PhD, RN
Eunice E. Lee, PhD, RN
Frances Aranda, PhD, MPH, MS

Instrument Adaptation, Modification, and Validation for Cultural Beliefs About Colorectal Cancer Screening Among Korean Americans

KEY WORDS
Colorectal cancer
Cultural beliefs
Instruments
Korean Americans
Screening

Background: Studies on colorectal cancer (CRC) screening among Korean Americans (KAs) lack culturally sensitive, reliable, and validated belief scales. **Objective:** The purpose of this study was to adapt, modify, and validate instruments measuring cultural beliefs (physical space, health temporal orientation, personal control, colon cancer fatalism, and health fatalism) about CRC screening in KAs. **Methods:** In phase I, instrument adaptation and modification (translation from English into Korean, individual interviews using cognitive interviewing, and expert reviews) were used to make existing cultural beliefs instruments culturally appropriate for KAs. In phase II, instrument validation (pilot test and cross-sectional survey) was used to examine the psychometric properties of the instrument among 202 KAs. **Results:** Construct validity and reliability of the final Korean version of the instruments were examined using exploratory and confirmatory factor analyses and internal consistency reliability. Exploratory factor analysis using all of the cultural beliefs items resulted in 5 factors accounting for 46.55% of the variance. Factor loadings were greater than 0.40 for most items to be added to the scales reflecting Korean cultural perspectives. Cronbach's αs for all the cultural beliefs subscales were greater than .70. **Conclusions:** Findings from this study show that KAs have unique cultural beliefs that should be reflected in the instruments used for CRC screening research with this population.

Author Affiliations: Department of Nursing, Chosun University, Gwangju, Republic of Korea (Dr S.Y. Lee); School of Nursing, University of California, Los Angeles (Dr E. Lee); and College of Nursing, University of Illinois at Chicago (Dr Aranda).

This study was supported by research fund from Chosun University, 2015 (2015-206644-01).

The authors have no conflicts of interest to disclose.

Correspondence: Shin-Young Lee, PhD, RN, Department of Nursing, Chosun University, 309 Pilmun-daero, Dong-gu, Gwangju 501-759, Republic of Korea (shinyoung0114@gmail.com).

Accepted for publication May 3, 2017.
DOI: 10.1097/NCC.0000000000000523

Implications for Practice: The revised instrument could be useful in accurately measuring cultural beliefs among KAs and in developing culturally sensitive interventions to increase CRC screening behaviors among KAs.

Colorectal cancer (CRC) is the second most commonly diagnosed cancer among Korean Americans (KAs).[1] Colorectal cancer incidence rates were 58.2 per 100 000 among KA men and 40.9 per 100 000 among KA women between 2004 and 2008, and these rates continue to increase among KAs according to data from Surveillance, Epidemiology, and End Results.[1] Although having CRC screening tests can reduce incidence and mortality rates through early detection and removal of precancerous polyps,[2] KAs continue to have lower CRC screening rates compared with non-Latino whites in the United States. According to the 2005 California Health Interview Survey, in that state, the rate of CRC screening including an annual fecal occult blood test (FOBT), flexible sigmoidoscopy, colonoscopy, or proctoscopy in the previous 5 years among KAs was approximately half that of non-Latino whites (29.5% vs 59.9%).[3]

Korean Americans tend to continue to maintain their traditional Korean cultural values and beliefs in the United States (eg, familism, crisis health orientation, and fatalism), which have been found to be associated with cancer screening use. First, family relationships are important to KAs. When KAs thought about CRC, they were concerned about their families' lives because of not being able to play their role as parents or spouses and intensifying financial and emotional difficulties in the family.[4] In fact, "fear of being a burden on the family if diagnosed with cancer" was found to be a barrier to CRC screening.[5] Second, studies have shown that, when KAs do not have symptoms, they do not go for cancer screening. Instead, they only see a doctor when they are very sick,[4,6–10] indicating that they are more likely to get cancer screening when their health is at a crisis stage. Finally, studies on cancer screening with KA populations have found that KAs had traditional fatalistic beliefs, which included life and death being controlled by a supernatural power, regardless of what they would do. Korean Americans thought that whatever will be will be[11] and believed that it would be destiny or God's will to have cancer.[4,12] Because of these fatalistic beliefs, KAs tended to ignore the value of cancer screening because they felt that the outcome is out of their control.

Cultural beliefs vary by racial/ethnic group. Culturally appropriate scales for cultural beliefs about CRC screening among KAs are needed because using culturally biased items can result in invalid or misleading findings leading to erroneous conclusions (eg, effectiveness of interventions).[13] Previous studies have used only a few items to measure cultural beliefs related to CRC screening behaviors among KAs[5,14–16] and have not indicated whether the instruments were tested to determine whether they were culturally appropriate, valid, and reliable for KAs.

There are 2 ways to make instruments culturally appropriate: (*a*) develop a new scale or (*b*) adapt and modify an existing scale.[17] Because studies with KAs demonstrate that there are some overlaps with other racial groups such as whites and African Americans regarding constructs and item contents measuring cultural beliefs related to CRC screening,[5,18–24] it is appropriate to modify existing instruments to be culturally appropriate rather than develop new instruments. Thus, the purpose of this study was to adapt, modify, and validate instruments measuring cultural beliefs about obtaining CRC screening among KAs.

■ Instrument Adaptation, Modification, and Validation Processes

This study was conducted in 2 phases (phase I, instrument adaptation and modification; phase II, instrument validation) (Figure) after the research protocol had been approved by the institutional review board. In phase I, we identified items to use, translated these items from English to Korean, and interviewed individuals using cognitive interviewing. Then, experts reviewed the items to ensure cultural appropriateness, and new items were added. In phase II, we conducted a pilot test and then a cross-sectional survey to test the psychometric properties of the instruments.

Phase I: Instrument Adaptation and Modification

ORIGINAL CULTURAL BELIEF SCALES

A comprehensive list of initial items from existing instruments[20,25] was compiled by reviewing literature on Korean culture and cancer screening behaviors. Cultural belief variables for this study were derived from Russell et al's[21] theoretical framework, which combines a cultural assessment for health[26] and cancer fatalism.[25] In Russell et al's[21] theoretical framework, these cultural beliefs included the following 4 variables: physical space (discomfort in relation to physical surroundings during medical procedures), health temporal orientation (perspective on current health beliefs and health behaviors related to the concerns about future health), personal control (ability to plan activities to control or direct factors within the environment), and cancer fatalism (belief that death is inevitable when cancer is present).[20,21,25]

Physical space, health temporal orientation, and personal control scales were adapted from Russell et al's[20] physical space, health temporal orientation, and personal control scales. We modified items measuring physical space and health temporal orientation by replacing mammography-related items with items assessing FOBT use. Fecal occult blood test was chosen because it is noninvasive and cost-effective.[27]

In addition, health fatalism[28] (notions of fate, luck, destiny, and predetermination regarding diseases or health conditions) was added to make the theoretical framework more culturally sensitive and comprehensive. Traditionally, KAs have fatalism about health and illness, as well as life and death, which is different from fatalism about cancer.[4] Therefore, we included

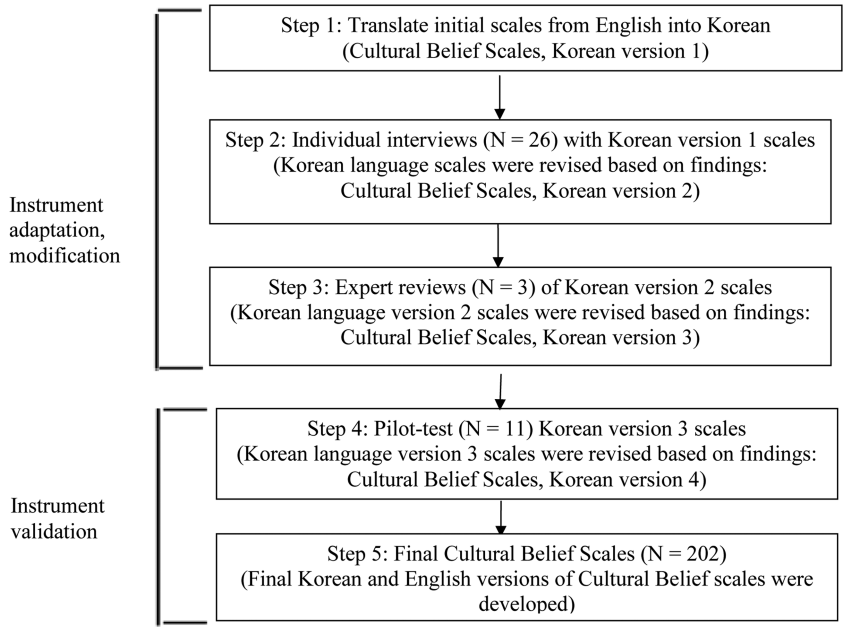


Figure ■ Instrument adaptation, modification, and validation process.

2 versions of fatalism to make a clear distinction between cancer-related outcomes versus other health outcomes. Cancer fatalism scales were adapted from Powe's[25] cancer fatalism scale (eg, "I think if someone gets colon cancer it is meant to be"). Health fatalism scale was adapted from Shen et al's[28] health fatalism scale (eg, "life is predetermined"). Because Shen et al's health fatalism scale was developed based on Powe's cancer fatalism, it has items of Powe's cancer fatalism; thus, the health fatalism scale in this study included items adapted from Shen et al[28] after excluding Powe's cancer fatalism items.

All cultural belief scales[20,25,28] had good reliability, with Cronbach's α coefficients ranging from .76 to .88. Construct validities of physical space, health temporal orientation, personal control, and cancer fatalism scales were established by exploratory factor analysis (EFA) using the principal factor extraction method and varimax rotation,[20,25] whereas Shen and other researchers[28] performed confirmatory factor analysis (CFA) to support the unidimensionality of a health fatalism scale. All scales in this study were measured on a 5-point, Likert-type scale with response options ranging from "strongly disagree" (1) to "strongly agree" (5).

STEP 1: TRANSLATION OF THE MEASURES

A committee translational approach[29] was used to translate the English version of the initial items of the cultural belief scales into Korean by 3 bilingual translators who were fluent in both Korean and English. Any translation discrepancies were reconciled by the principal investigator (PI) and committee members. This process yielded an initial Korean version 1 of the cultural belief scales.

STEP 2: INDIVIDUAL INTERVIEWS USING COGNITIVE INTERVIEWING

Individual interviews using cognitive interviewing technique were conducted to examine cultural differences in conceptual definitions of cultural beliefs about CRC and FOBT use to ensure the scales were culturally appropriate to the KA participants.

Sample and Data Collection

This study's sample consisted of KAs who were born in Korea and immigrated to the United States, were 50 years and older, and were at an average risk for CRC, which means they did not have (*a*) a history of Crohn's disease or ulcerative colitis, (*b*) a history of CRC, or (*c*) a first-degree relative with CRC based on American Cancer Society[27] guidelines. Chain referral (multiple snowball sampling) and quota sampling were used to recruit comparable participants in terms of gender (approximately 50% male and 50% female) and age (approximately 50% aged 50–64 years and 50% aged 65 and older). Participants were interviewed at their homes or work places.

During the interviews, participants discussed cultural beliefs related to CRC and FOBT behavior via a semistructured method with open-ended questions (Table 1). The participants described their FOBT experiences and their perceptions of their screening use. Next, a concurrent verbal probing method[30] was used as a cognitive interviewing technique to evaluate sources of response error in the questionnaire items. This was performed to gain a better understanding of how participants interpreted the items. Each individual interview was conducted in Korean and lasted 80 to 120 minutes. The PI conducted the individual interviews and took notes while the interviews were being audio recorded.

Data Analysis

The interviews were transcribed verbatim in Korean by 4 Korean research assistants, and the data were coded into concepts and beliefs and sorted using a computer-assisted text analysis software program, NVivo 7.[31] Data were then reviewed

Table 1 • Individual Interview Guide

Discussion Questions
How do you/would you feel about obtaining a sample for a stool blood test? (physical space)
Do you think it's important to detect colorectal cancer? Do you think it's important to detect health problems early? How can we find health problems? How can we maintain our health? (health temporal orientation)
Who would convince/convinces you to get a stool blood test? Yourself? Other persons? What do you think about the relationship between fate or luck and your health, illness, or getting cancer? (perceived control)
Do you think death is inevitable when colorectal cancer is present? What do you think about the relationship between fatalism (*palja*) and having cancer? (cancer fatalism)
What do you think about fate, luck, destiny, or predetermination regarding diseases or health conditions (health fatalism)

and compiled. On the basis of the compiled results, some of the initial items were modified, and new items were added after the PI consulted with translation committee members and experts who are familiar with Korean culture and/or cancer screening research. These item revisions yielded the Korean version 2 cultural belief scale.

Results: Sample Characteristics

The sample consisted of 11 men and 15 women; 13 were 50 to 64 years old, and 13 were 65 years and older. Most KAs were married (73%), had health insurance (69%), and had annual household incomes of less than $30 000 (58%).

Concept Discussions

When we asked questions about physical space, all participants said that the bathroom was a comfortable room at home to collect a stool sample for an FOBT. Most felt they had little discomfort handling, smelling, or seeing their stools. Regarding health temporal orientation, most KAs said that it is important to find health problems early to be healthy in the future for their families and themselves, but many said that they went to a clinic or hospital only when they had severe symptoms. Regarding internal control, all said that finding health problems early was their responsibility rather than others. External control included doctors, family, friends, and other powerful persons. Of these, all participants said that they would complete tests if doctors recommended them because doctors are the health experts. Some said that they would have a test if their family or friends wanted them to, whereas others felt that family and friends are not experts and that they could not trust them about such matters. On the basis of these finding, no new items were added to the physical space, health temporal orientation, or personal control scales.

Regarding fatalism, some KAs believed in destiny or fate: cancer was seen as a destiny because life was predetermined. No new items were added to Powe's cancer fatalism scale because the results of the interviews were consistent with Powe's original scale. During the individual interviews, participants also discussed fatalism related to general health and traditional Korean beliefs. Typical phrases they used included "only God or an unknown supernatural power, not humans, decides whether we live or die," "I cannot control life and death," and "I think health or illness is a matter of fate." Consequently, words and phrases about fatalism were added to the health fatalism scale.

Cognitive Interviews

All of the cultural belief scales were reviewed by participants during the cognitive interviews. Most scale items were perceived to be culturally appropriate for KAs, but they raised several issues. First, when the PI administered the fatalism items in Korean, some participants said that they did not believe in destiny, had negative feelings about the words "destiny" or "fate," and refused to answer the subsequent fatalism items. Therefore, the PI and the translation committee members decided not to use *unmyung* ("destiny") or *palja* ("fate") and instead used a different Korean phrase, *De-jang-am-e Geol-li-ge Doe-e It-da-myeon*, that was similar in meaning to the fatalism item (ie, "if someone is meant to have colon cancer"). Second, many indicated that there were problems with Powe's cancer fatalism scale. They said that the cancer fatalism items were too long to read and that some questions were repeated. For example, 3 items asked about the relationship between food and CRC. When they agreed with the first item, they thought there was no need to respond to the next 2 questions because they had already expressed their opinions. There were also assumptions of agreement with destiny in the cancer fatalism items. For example, in the item "if someone is meant to have colon cancer," some did not agree that someone could be meant to have colon cancer because they did not believe in destiny or fate. Because of this, some responded with the same response option (1, strongly disagree, or 2, disagree) to all items for the cancer fatalism scale or completely refused to answer them.

Despite problems that emerged during cognitive interviews, the PI decided to retain all the items of Powe's cancer fatalism scale because (*a*) Powe's cancer fatalism items have proven to be effective in identifying cancer fatalism among other racial/ethnic groups,[6,32,33] (*b*) problems with Powe's cancer fatalism scale have never been reported in the literature, and, finally, (*c*) the PI wanted to measure differences in fatalistic attitudes between KAs and other racial/ethnic groups by comparing our study results with other studies using Powe's cancer fatalism scale.

■ Step 3: Expert Reviews

Sample and Data Collection

The content validity of the cultural belief scales for version 2 was examined by 3 Korean researchers who were faculty members with doctoral degrees in health-related areas. We

used the guidelines on expert panels suggested in Lynn's[34] article to evaluate the content validity of an instrument. Lynn[34] suggested a minimum of 3 content experts. We used both quantitative (categorization of the level of judgment) and qualitative (writing comments about specific items) procedures for the content review. The experts independently rated content representativeness on a 4-point ordinal scale (1, "the item is not representative of the measure"; 2, "the item needs major revision to be representative of the measure"; 3, "the item needs minor revision to be representative of the measure"; and 4, "the item is representative of the measure").[35] The experts were also asked to make recommendations to improve the item content, wording, and overall comprehensiveness of the scale. The PI reviewed the experts' recommendations and calculated content validity. On the basis of the results of this step, the version 2 scale was modified creating version 3.

Data Analysis

Item and scale level content validity indexes (I-CVI and S-CVI, respectively) were calculated. The I-CVI was calculated by taking the number of experts giving a rating of either 3 or 4 and dividing it by the total number of experts.[36] The S-CVI/average was calculated by summing I-CVIs and dividing by the number of items.[36] In addition, if any of the experts suggested modification of items, those items were then reviewed by the same 3 bilingual translators who conducted the initial translation from English into Korean.

Results

Item level CVI scores ranged from 0.33 to 1.0, and S-CVI scores ranged from 0.67 to 1.0 (Table 2). Item level CVI scores lower than 1.0 and S-CVI scores lower than 0.90 were deemed as needing revision or deletion. Five items—3 physical space items ("Handling stools for a stool blood test is uncomfortable for me," "Seeing stools for a stool blood test is uncomfortable for me," and "Smelling stools for a stool blood test is uncomfortable for me"), 1 internal control item ("I can make a difference in my health by finding problems early"), and 1 cancer fatalism item ("I think getting checked for colon cancer makes people scared that they may really have colon cancer")—had I-CVI scores lower than 1.0. The 3 physical space items were developed by the PI based on the literature and were confirmed by participants during individual interviews, whereas the remaining items were the original items in cultural belief scales that were adapted from other cancer screening studies. Although the I-CVI scores of these 5 items were lower than 1.0, all were later tested for psychometric properties because (*a*) internal control and cancer fatalism items had been tested in many cancer screening studies with diverse populations including KAs and had been proven to be reliable and valid and (*b*) the PI met with the Korean researchers who reviewed items for content validity and explained that physical space items were mentioned by participants during individual interviews. The reviewers agreed to keep the physical space items and recommended further psychometric testing of them.

Table 2 • Content Validity

Scale	I-CVI Range	S-CVI/Average
Physical space	0.33–1.00	0.67
Health temporal orientation	1.00	1.00
Personal control	0.67–1.00	0.98
Cancer fatalism	0.67–1.00	0.98
Health fatalism	1.00	1.00

Regarding qualitative data, the experts offered comments on the clarity of items and made suggestions regarding translations and unclear items. After the PI and translation committee members discussed the experts' comments, the instruments were modified accordingly.

■ Phase 2: Instrument Validation

Step 4: Pilot test

SAMPLE AND DATA COLLECTION

The purposes of the pilot test were to assess respondents' understanding of the items in version 3 and to examine the feasibility of using the revised instruments. Sample selection criteria for the pilot test were the same as those used for selecting participants for the individual interviews. A combination of convenience and chain referral was used to recruit 11 KA participants from a senior apartment facility, a public restaurant, and a Korean church. A questionnaire and a consent form were given to the participants, and they completed and returned the questionnaire in person to the PI or via US mail.

DATA ANALYSIS

Feedback about the questionnaire from the participants was transcribed to, and summarized in, an electronic format. The amount of time taken to complete the instrument and the overall response rate were also calculated.

RESULTS

The sample consisted of 11 participants (4 men and 7 women; 4 were 50 to 64 years old, and 7 were 65 years and older). Nine (82%) were married, were unemployed, and had annual household incomes of less than $30 000.

All of the respondents completed the questionnaire, yielding a response rate of 100% for the pilot test. The questionnaire took approximately 60 to 90 minutes to complete. Suggestions made by respondents during the pilot testing (eg, redundancy) were used to further modify the items. The pilot test result yielded the final Korean version of the cultural belief scales.

Step 5: Cross-Sectional Survey

SAMPLE AND DATA COLLECTION

Psychometric properties of the final version of the cultural belief scale for CRC screening use among KAs were tested using a cross-sectional survey. The selection criteria for the cross-sectional survey were the same as those for the pilot test.

Participants were recruited at a Korean church and 2 Korean community centers in an urban city located in the midwest using convenience and chain referral sampling methods until an appropriate sample size (>200 participants) was reached. Generally, the absolute number of cases and the subject-to-variable ratio were used to determine the minimum sample size in factor analysis. Although researchers have proposed different guidelines for the minimum sample size in factor analysis, we followed researchers' recommendations that 200 cases would be good for factor analysis by calculating either the absolute number of cases or the subject-to-variable ratio.[37–43] Respondents received survey packets that included a flyer explaining the study, eligibility questions, a consent form, a self-administered questionnaire, and a stamped return envelope addressed to the PI's university address.

MEASURES

The final cultural belief scales in the questionnaire consists of 5 sections: physical space (4 items), health temporal orientation (8 items), personal control (4 items of internal control and 10 items of external control), cancer fatalism (15 items), and health fatalism (15 items).

DATA ANALYSIS

We conducted EFA and CFA using SPSS version 18[44] and SPSS AMOS 18.[45] The EFA and CFA were used as complementary methods in this study. An EFA was used to determine a scale's underlying structure, whereas a CFA was used to confirm the relationships predicted on the basis of theory.[46] Given that we modified items in existing measures to make them culturally appropriate for KAs, we needed to test the revised measures using EFA while insuring our hypotheses on KA cultural beliefs by also using CFA. For the EFA, principal components analysis with a varimax rotation was conducted on the final version of the cultural belief scale. Varimax rotation was used because it is the most common rotation option and provides results so that we can easily identify each variable with a single factor.[47] Factor loadings for each item in the cultural belief scale were expected to be greater than 0.40 as recommended by Nunnally.[48]

During CFA, all the items from the cultural belief scales were assessed to see whether the items in each subscale loaded on the same factor. Using structural equation modeling, data were also examined in terms of correlations among variables, path analysis, parameter estimates, and the model's fit to the observable data. Model fit was assessed by examining the relative χ^2 (χ^2/degrees of freedom), root mean square error of approximation (RMSEA), and modification indices (MIs). If the relative χ^2 value is greater than 2.00, we reject the null hypothesis that the data are an adequate fit to the model.[49] In addition, we consider RMSEA values less than 0.08 as reasonable errors of approximation in the population.[50,51] The error covariance having the largest MI was the first target for modifying the model because error covariance may represent systematic, rather than random, measurement error in item responses and a high degree of overlap in item content.[52] Thus, if a relative χ^2 value was more than 2.0, we looked at the RMSEA values and found the highest MI value. Then, the initially hypothesized model was modified by adding covariance between the paired item error terms.

RESULTS: SAMPLE CHARACTERISTICS

Two hundred seventy-seven participants were recruited from a church (n=62), 2 community centers (n=178), and the PI's personal networks (n=37). A total of 202 persons participated in this study (79 men and 123 women; response rate, 73%). Participants averaged 64 years old (mean [SD], 63.92 [8.86] years old) and had lived in the United States for an average of 25 years (mean [SD], 25.28 [9.28] years). Eighty-seven had Bachelor or

Table 3 • Rotated Exploratory Factor Analysis of Cultural Belief Scales

Factor 1: Cancer Fatalism	Factor 2: Health Fatalism	Factor 3: Health Temporal Orientation and Internal Control	Factor 4: External Control	Factor 5: Physical Space
CF1 0.48	HF1 0.21	HTO1 0.70	EC1 0.50	PS1 0.51
CF2 0.56	HF2 0.43	HTO2 0.72	EC2 0.56	PS2 0.80
CF3 0.50	HF3 0.55	HTO3 0.74	EC3 0.26	PS3 0.84
CF4 0.61	HF4 0.59	HTO4 0.26	EC4 0.36	PS4 0.81
CF5 0.57	HF5 0.70	HTO5 0.25	EC5 0.70	
CF6 0.71	HF6 0.77	HTO6 0.45	EC6 0.71	
CF7 0.63	HF7 0.80	HTO7 0.73	EC7 0.71	
	HF8 0.82	HTO8 0.36	EC8 0.60	CF8 0.43
CF9 0.49	HF9 0.68	IC1 0.71	EC9 0.41	
CF10 0.29	HF10 0.63	IC2 0.39	EC10 0.51	
CF11 0.74		IC3 0.72		HF11 0.34
CF12 0.81		IC4 0.49		HF12 0.44
CF13 0.76	HF13 0.61			
CF14 0.77				
CF15 0.71				
HF14 0.35				
HF15 0.51				
Eigenvalue, 7.28	Eigenvalue, 6.05	Eigenvalue, 4.89	Eigenvalue, 4.31	Eigenvalue, 3.40
Variance explained, 13.00	Variance explained, 10.80	Variance explained, 8.73	Variance explained, 7.69	Variance explained, 6.07

Table 4 • Confirmatory Factor Analysis of Modified Cultural Belief Scales

Scale/Items	Corrected Item-Total Correlation	Factor Loadings
Factor 1 (cancer fatalism)		
CF1. I think if someone is meant to have colon cancer, it doesn't matter what kinds of food they eat, they will get colon cancer anyway.	0.49	0.47
CF2. I think if someone has colon cancer, it is already too late to get treated for it.	0.54	0.53
CF3. I think someone can eat fatty foods all their life, and if they are not meant to get colon cancer, they won't get it.	0.59	0.54
CF4. I think if someone is meant to get colon cancer, they will get it no matter what they do.	0.68	0.63
CF5. I think if someone gets colon cancer, it was meant to be.	0.64	0.61
CF6. I think if someone gets colon cancer, their time to die is soon.	0.69	0.68
CF7. I think if someone gets colon cancer, that's the way they were meant to die.	0.65	0.66
CF9. I think if someone is meant to have colon cancer, they will have colon cancer.	0.52	0.49
CF10. I think some people don't want to know if they have colon cancer because they don't want to know they may be dying from it.	0.29	0.33
CF11. I think if someone gets colon cancer, it doesn't matter whether they find it early or late, they will still die from it.	0.66	0.72
CF12. I think if someone has colon cancer and gets treatment for it, they will probably still die from the colon cancer.	0.70	0.80
CF13. I think if someone was meant to have colon cancer, it doesn't matter what doctors and nurses tell them to do, they will get colon cancer anyway.	0.70	0.78
CF14. I think if someone is meant to have colon cancer, it doesn't matter if they eat healthy foods, they will still get colon cancer.	0.68	0.81
CF15. I think colon cancer will kill you no matter when it is found and how it is treated.	0.59	0.70
HF14 I think cancer is always fatal.	0.28	0.20
HF15. I think there is little one can do to prevent cancer.	0.50	0.52
Factor 2 (health fatalism)		
HF1. I cannot control life and death.	0.17	0.15
HF2. What will happen will happen no matter what I do.	0.41	0.41
HF3. Life is predetermined.	0.59	0.59
HF4. I think health or illness is a matter of fate.	0.64	0.68
HF5. How long I live is predetermined.	0.65	0.72
HF6. I will die when I am fated to die.	0.69	0.74
HF7. I think health or illness is determined by God.	0.71	0.73
HF8. I think destiny or fate is determined by God.	0.74	0.75
HF9. How long I live is a matter of luck.	0.67	0.70
HF10. I will stay healthy if I am lucky.	0.58	0.64
HF13. I think it's fate to get cancer.	0.66	0.72
Factor 3 (health temporal orientation and internal control)		
HTO1. Being healthy is important to my future.	0.55	0.71
HTO2. It makes sense to take care of my health now so I can be healthy in the future.	0.56	0.69
HTO3. It is important for me to do things now to prevent health problems.	0.63	0.75
HTO4. I only need to see my healthcare provider when I am sick.	0.26	0.29
HTO5. Planning for regular health screenings is not important.	0.26	0.30
HTO6. As long as I am feeling well now, it is not important for me to have regular health screenings.	0.45	0.49
HTO7. Finding health problems early is important to me.	0.63	0.68
HTO8. It is important for me to plan to have a yearly stool blood test.	0.18	0.20
IC1. I can make a difference in my health by finding problems early.	0.63	0.70
IC2. I should take it upon myself to find health problems early.	0.27	0.35
IC3. Finding health problems early is my responsibility.	0.69	0.72
IC4. I have a lot to do with finding health problems early.	0.47	0.47
Factor 4 (external control)		
EC1. My family members decide when I should be screened for health problems.	0.41	0.38
EC2. Friends decide when I should be screened for health problems.	0.58	0.60
EC3. Healthcare providers such as doctors decide when I should be screened for health problems.	0.15	0.14
EC4. Other powerful people decide when I should be screened for health problems.	0.29	0.28
EC5. I have little influence over the things that happen to me.	0.62	0.71

(continues)

Table 4 • Confirmatory Factor Analysis of Modified Cultural Belief Scales, Continued

Scale/Items	Corrected Item-Total Correlation	Factor Loadings
EC6. There is nothing that I can do to find health problems early.	0.59	0.65
EC7. There is nothing that I can do to find colon cancer early.	0.60	0.71
EC8. Finding health problems early is a matter of chance.	0.52	0.66
EC9. It is solely up to God to decide if I am healthy or ill.	0.49	0.51
EC10. Luck has a lot to do with whether I am healthy or ill.	0.61	0.61
Factor 5 (physical space)		
PS1. There is no comfortable room at home to sample a stool for stool blood test.	0.48	0.41
PS2. Handling stools for a stool blood test is uncomfortable for me.	0.68	0.81
PS3. Seeing stools for a stool blood test is uncomfortable for me.	0.74	0.99
PS4. Smelling stools for a stool blood test is uncomfortable for me.	0.68	0.91
CF8. I think getting checked for colon cancer makes people scared that they may really have colon cancer.	0.35	0.23
HF11. I often feel helpless in dealing with the problems of life.	0.27	0.15
HF12. There is really no way I can solve some of problems I have.	0.33	0.18

Underlined items were from the literature, whereas items in bold were developed by the PI based on findings from the individual interviews. Items underlined and in bold (eg, **items**) were adapted or developed by the PI based on the literature and then confirmed by participants during the individual interviews.

higher degrees (43%), 164 were married (81%), and 116 had health insurance (57%).

Construct Validity

Construct validity for the cultural belief scales was examined using EFA and CFA. The EFA resulted in 5 factors being extracted, and some items were moved to different factors (Table 3). The 5 factors accounted for 46.55% of the variance. Item factor loadings of the EFA ranged from 0.20 to 0.84. Next, CFA using structural equation modeling was conducted with the 5 factors that were extracted from the EFA to determine how well the items fit the cultural belief constructs. Overall, given the findings of relative χ^2s greater than 2.0 in all scales and given values of RMSEA greater than 0.08 in most scales, the model did not fit the observed data. Thus, model respecification for all scales was needed. As a result of the model respecification, factor loadings of items ranged from 0.14 to 0.99 (Table 4).

Although factor loadings of most newly added items reflecting Korean cultural perspectives were greater than 0.40, EFA showed that 7 original, and 2 newly added, items were not greater than 0.40. The CFA showed that 9 original, and 3 newly added, items had factor loadings less than 0.40. Nine items in the EFA with factor loadings less than 0.40 also had loadings less than 0.40 in the CFA.

Internal Consistency Reliability

Cronbach's αs for all cultural beliefs subscales were greater than .70, indicating that internal consistency was satisfactory for all of the subscales (Table 5).

■ Discussion

To the best of our knowledge, this is the first study that describes instrument adaptation, modification, and validation processes for instruments measuring cultural beliefs about CRC screening among KAs. Overall, revised scales including health fatalism, external control, and physical space became more culturally sensitive by adding KAs' perspectives on traditional cultural beliefs and the interpersonal context of CRC screening to the original scales that emphasized western and intrapersonal perspectives on CRC screening. Regarding the psychometric properties of the revised cultural belief scales for KAs, internal consistency reliability testing showed that all subscales had Cronbach's αs greater than .70, and construct validity testing showed that factor loadings for most newly added items were greater than 0.40. For health fatalism, many KAs believed that some things are controlled by God or an unknown supernatural power, which is similar to the findings of Straughan and Seow[53] that some Chinese people believe that some issues (eg, luck and destiny) are beyond human control. The meaning of fatalism for KAs seems to differ from that for African Americans who might be influenced by the unique historical and cultural lived experiences of angst (eg, despair about the future) and nihilism (eg, meaninglessness and hopelessness).[54] Furthermore, EFA revealed that 2 health fatalism items ("I think cancer is always fatal" and "I think there is little one can do to prevent cancer") loaded on factor 1 (cancer fatalism). These 2 items were developed from findings from the individual interviews and were considered to be part of Korean traditional health fatalism; thus, the PI initially put those items under health fatalism. However, EFA showed that they loaded on the cancer fatalism factor because these items were specific to cancer rather than to general health.

Individual interviews revealed that many KAs indicated problems with practical use of the cancer fatalism scale (overly long sentences, asking similar questions repeatedly, and unclear assumptions of agreeing with destiny). These issues might not affect the reliability of the scale, but they could negatively affect its validity. Participants' responses may not reflect their actual thoughts because they misunderstand items or disagree with assumptions about destiny and, as a result, they may only select the same response options to most items on the scale. In fact, many participants provided the

Table 5 • Internal Consistency Reliability

Scale	No. Items	Mean of Item	Mean of Item SDs	α
Factor 1: cancer fatalism	16	2.15	0.86	.88
Factor 2: health fatalism	11	2.61	1.18	.88
Factor 3: health temporal orientation and internal control	12	4.14	0.68	.77
Factor 4: external control	10	2.16	1.00	.80
Factor 5: personal space	7	2.71	1.07	.78

same response options (eg, ''disagree'') on the cancer fatalism survey. This has never been reported in other studies, although the Powe cancer fatalism scale has been the most widely used instrument.[28] To date, the Powe cancer fatalism scale has not been used in qualitative studies using cognitive interviews with KAs, which may be why the problems have not been reported before.

Another significant finding of this study was that scale items for health temporal orientation and internal control loaded on 1 factor, factor 3. Both health temporal orientation and internal control addressed preventive health orientation in this study in that individuals were aware of the importance of detecting health problems and being healthy in the future and, as a consequence, made efforts to find health problems early. Because of the similar aspects of both health temporal orientation and internal control, those constructs loaded on the same factor that can be called preventive health orientation.

Items for health temporal orientation were adapted from Russell et al's[20,21] study. The statements ''I only need to see my healthcare provider when I am sick'' and ''Planning for regular health screenings is not important'' were not good measures of the health temporal orientation concept. This finding is different from previous findings because, in those studies, these items were key factors reflecting a lack of preventive orientation.[6,55–58] In addition, a study by Russell et al (2003) on breast cancer screening among African Americans and whites reported that EFA factor loadings on these items were greater than 0.40. There are 2 possible explanations for these items performing so poorly in the current study. First, they contain specific actions related to healthcare use, whereas the other items measure thoughts about the importance of health (eg, ''being healthy is important for my future''). The participants may report their current behavior (eg, they actually go to see a doctor only when they are very sick) but not their aspirations (eg, they should see a doctor when they are not sick). The qualitative data support this point: participants knew they need a doctor even when they have no symptoms, but in practice, it is difficult for them to see a doctor when they are not sick due to reasons such as money and time. The gap between their intentions and actual behavior, in this case, regarding regular screening, may result in low reliability and validity for this item. Second, items were worded in opposite directions, which may pose problems. The health temporal orientation scale has 2 separate groups of items (present and future orientation) combined into a single group. Especially, the item ''I only need to see my healthcare provider when I am sick'' is the first item of a group of items assessing present orientation. Participants answered several positively worded items (future orientation) and then had to respond to negatively worded items. The participants may have been confused by this change, possibly marking wrong values. Another item, ''It is important for me to plan to have a yearly stool blood test,'' had very low reliability and validity. This may relate to the fact that more than half of the participants (52%) had never heard about FOBT before the survey. Korean Americans who were not familiar with FOBT may have had difficulty answering this question.

For external control, all of the items loaded on factor 4. Although the original personal control scale included items for both internal and external control, this study did not establish the unidimensionality of the personal control scale. Thus, it is recommended that the personal control scale should not be used to measure a single construct, and items for external control should be separated from items for internal control. Moreover, external control itself was conceptualized as multidimensional including items showing significant individuals' support for cancer screening, God, and luck as ways to detect health problems and illness early. Surprisingly, the item ''My family members decide when I should be screened for health problems'' had a low factor loading, indicating that this item is not a good indicator of the external control concept. However, it represents an important characteristic of Korean familism. Previous studies found that family relationships are an important factor associated with cancer screening behavior in KAs[5] and Koreans.[59] Qualitative data in this study may explain this issue. During individual interviews, some KAs said that they would have screening if their family wanted them to, whereas others would not because family members are not experts. Furthermore, the item ''Healthcare providers such as doctors decide when I should be screened for health problems'' was not a good measure of the external control concept. Compared with other powerful people, healthcare providers such as doctors may exert more influence on health screening behavior. This difference might result in weak validity of the item on healthcare providers. Thus, it might be better for this item to be an independent item rather than an item within a scale.

Finally, CFA showed that factor 5 (physical space) included 1 cancer fatalism item (''I think getting checked for colon cancer makes people scared that they may really have colon cancer'') and 2 health fatalism items (''I often feel helpless in dealing with the problems of life'' and ''There is really no way I can solve some of problems I have''). These items had factor loadings less than 0.40. The possible explanation for this finding is that these items (uncomfortableness, scaredness, and helplessness) are affective, whereas fatalism is cognitive. Affect and cognition are distinct constructs. Therefore, it is recommended that affect (eg, scaredness or helplessness) should not be a component of

fatalism; instead, it is more appropriate to consider those feelings as a consequence of fatalism.[28] Furthermore, although factor 5, physical space, was derived from theory, it seems to represent affective items; thus, it would be better to change the factor name from physical space to affect.

We kept items based on findings from the cognitive interviewing or expert reviews that may not be appropriate to see how the instrument behaves in the validation processes. There were some issues about cancer fatalism during the cognitive interviews, and the 5 items that were less than 1.0 on the CVI were recommended to be revised or deleted.[34] However, EFA and CFA showed that the factor loading of only 1 cancer fatalism item was less than 0.4, so we decided to wait and make a final decision on item removal after the final step of the instrument validation process was completed.

Although this study contains useful information on the cultural belief scales for KAs, there are limitations to it. It was based on a convenience sample of KAs who were mostly married and who resided in an urban city in the midwest. Thus, we advise caution in generalizing the results of this study to the entire KA population. Another limitation of this study is that other construct validities and reliabilities of cultural belief instruments were not assessed. Further psychometric testing for validity and reliability of cultural belief scales could generate more refined instruments.

This is the first study that has described processes of cultural belief scale adaptation, modification, and validation regarding CRC screening among KAs. We conducted the processes of revising existing instruments step-by-step as thoroughly as possible to make instruments culturally appropriate. The description of the adaptation, modification, and validation of the instruments could be valuable for other studies with the purpose of revising existing instruments to be culturally appropriate. The revised instrument also could be useful in accurately measuring cultural beliefs among KAs, and this information could be used to develop culturally sensitive interventions to increase CRC screening behaviors among this population and thus to lessen disparities in cancer rates.

References

1. Gomez SL, Noone AM, Lichtensztajn DY, et al. Cancer incidence trends among Asian American populations in the United States, 1990–2008. *J Natl Cancer Inst*. 2013;105(15):1096–1110.
2. American Cancer Society. *Colorectal Cancer Facts & Figures 2014–2016*. Atlanta, GA: American Cancer Society; 2014.
3. Lee HY, Lundquist M, Ju E, Luo X, Townsend A. Colorectal cancer screening disparities in Asian Americans and Pacific Islanders: which groups are most vulnerable? *Ethn Health*. 2011;16(6):501–518.
4. Lee SY, Lee EE. Korean Americans' beliefs about colorectal cancer screening. *Asian Nurs Res*. 2013;7(2):45–52.
5. Jo AM, Maxwell AE, Wong WK, Bastani R. Colorectal cancer screening among underserved Korean Americans in Los Angeles County. *J Immigr Minor Health*. 2008;10(2):119–126.
6. Kim JH, Menon U, Wang E, Szalacha L. Assess the effects of culturally relevant intervention on breast cancer knowledge, beliefs, and mammography use among Korean American women. *J Immigr Minor Health*. 2010;12:586–597.
7. Lee HY, Roh S, Vang S, Jin SW. The contribution of culture to Korean American women's cervical cancer screening behavior: the critical role of prevention orientation. *Ethnic Dis*. 2011;21:399–405.
8. Kim K, Yu ES, Chen EH, Kim J, Kaufman M, Purkiss J. Cervical cancer screening knowledge and practices among Korean-American women. *Cancer Nurs*. 1999;22(4):297–302.
9. Juon HS, Choi Y, Kim MT. Cancer screening behaviors among Korean-American women. *Cancer Detect & Prev*. 2000;24(6):589–601.
10. Wismer BA, Moskowitz JM, Chen AM, et al. Mammography and clinical breast examination among Korean American women in two California counties. *Prev Med*. 1998;27(1):144–151.
11. Lee MC. Knowledge, barriers, and motivators related to cervical cancer screening among Korean-American women. A focus group approach. *Cancer Nurs*. 2000;23(3):168–175.
12. Lee EE, Tripp-Reimer T, Miller AM, Sadler GR, Lee S. Korean American women's beliefs about breast and cervical cancer and associated symbolic meanings. *Oncol Nurs Forum*. 2007;34(3):713–720.
13. Carmines EG, Zellers RA. *Reliability and Validity Assessment*. Thousand Oaks, CA: Sage Publications, Inc; 1979.
14. Kim K, Yu ES, Chen EH, Kim J, Brintnall RA. Colorectal cancer screening. Knowledge and practices among Korean Americans. *Cancer Pract*. 1998;6(3):167–175.
15. Juon H-S, Han W, Shin H, Kim KB, Kim MT. Predictors of older Korean Americans' participation in colorectal cancer screening. *J Cancer Educ*. 2003;18(1):37–42.
16. Maxwell AE, Bastani R, Warda US. Demographic predictors of cancer screening among Filipino and Korean immigrants in the United States. *Am J Prev Med*. 2000;18(1):62–68.
17. Vijver FV, Leung K. *Methods and Data Analysis for Cross-cultural Research*. Thousand Oaks, CA: Sage Publications, Inc; 1997.
18. Lee EE, Fogg L, Menon U. Knowledge and beliefs related to cervical cancer and screening among Korean American women. *Western J Nurs Res*. 2008;30(8):960–974.
19. Han Y, Williams RD, Harrison RA. Breast cancer screening knowledge, attitudes, and practices among Korean American women. *Oncol Nurs Forum*. 2000;27(10):1585–1591.
20. Russell KM, Champion V, Perkins SM. Development of cultural belief scales for mammography screening. *Oncol Nurs Forum*. 2003;30(4):633–640.
21. Russell KM, Perkins SM, Zollinger TW, Champion VL. Sociocultural context of mammography screening use. *Oncol Nurs Forum*. 2006; 33(1):105–112.
22. Eun Y, Lee E, Kim MJ, Fogg L. Breast cancer screening beliefs among older Korean American women. *J Gerontol Nurs*. 2009;35(9):40–50.
23. Juon H-S, Kim M, Shankar S, Han W. Predictors of adherence to screening mammography among Korean American women. *Prev Med*. 2004;39(3):474–481.
24. Juon HS, Seung-Lee C, Klassen AC. Predictors of regular Pap smears among Korean-American women. *Prev Med*. 2003;37(6, pt 1):585–592.
25. Powe BD. Fatalism among elderly African Americans: effects on colorectal cancer screening. *Cancer Nurs*. 1995;18(5):385–392.
26. Giger JN, Davidhizer RE. *Transcultural Nursing: Assessment and Intervention*. St Louis, MO: Mosby; 1999.
27. American Cancer Society. Colorectal cancer: early detection. American Cancer Society Web site. http://www.cancer.org/docroot/CRI/content/CRI_2_6X_Colorectal_Cancer_Early_Detection_10.asp. Accessed March 2, 2011.
28. Shen L, Condit CM, Wright L. The psychometric property and validation of a fatalism scale. *Psychol Health*. 2009;24(5):597–613.
29. Harkness JA, Schoua-Glusberg A. Questionnaires in translation. *ZUMA*. 1998;(S):87–128.
30. Willis GB. *Cognitive Interviewing: A Tool for Improving Questionnaire Design*. Thousand Oaks, CA: Sage; 2005.
31. Qualitative Solutions and Research. *Nvivo 7: Software for qualitative research* [computer program]. Cambridge, MA: Qualitative Solutions and Research International, Inc; 2006.
32. Powe BD. Cancer fatalism among elderly Caucasians and African Americans. *Oncol Nurs Forum*. 1995;22:1355–1359.
33. Morgan PD, Fogel J, Tyler ID, Jones JR. Culturally targeted educational intervention to increase colorectal health awareness among African Americans. *J Health Care Poor Underserved*. 2010;21(3):S132–S147.
34. Lynn MR. Determination and quantification of content validity. *Nurs Res*. 1986;35:382–385.

35. Waltz CW, Bausell RB. *Nursing Research: Design, Statistics and Computer Analysis*. Philadelphia, PA: F.A. Davis; 1981.
36. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. *Res Nurs Health*. 2006;29(5):489–497.
37. Kline RB. *Principles and Practice of Structural Equation Modeling*. 2nd ed. New York, NY: The Guilford Press; 2005.
38. Gorsuch RL. *Factor Analysis*. 2nd ed. Hillsdale, NJ: Erlbaum; 1983.
39. Hatcher L. *A Step-by-Step Approach to Using the SAS System for Factor Analysis and Structural Equation Modeling*. Cary, NC: SAS Institute, Inc; 1994.
40. Hutcheson G, Sofroniou N. *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models*. Thousand Oaks, CA: Sage Publications; 1999.
41. Comrey AL, Lee HB. *A First Course in Factor Analysis*. Hillsdale, NJ: Erlbaum; 1992.
42. Cattell RB. *The Scientific Use of Factor Analysis*. New York, NY: Plenum; 1978.
43. Kline P. *Psychometrics and Psychology*. London, England: Academic Press; 1979.
44. SPSS. *SPSS 18.0 for Windows*. Chicago, IL: Statistical Package for Social Sciences, Inc; 2009.
45. *AMOS 18* [computer program]. Chicago, IL: Statistical Package for Social Sciences, Inc; 2009.
46. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. 4th ed. Boston, MA: Allyn and Bacon; 2001.
47. Russell DW. In search of underlying dimensions: the use (and abuse) of factor analysis in personality and social psychology bulletin. *Pers Soc Psychol B*. 2002;28(12):1629–1646.
48. Nunnally JC. *Psychometric Theory*. 2nd ed. New York, NY: McGraw-Hill; 1978.
49. Ullman JB. Structural equation modeling. In: Tabachnick BG, Fidell LS, eds. *Using Multivariate Statistics*. 4th ed. Needham Heights, MA: Allyn & Bacon; 2001:653–771.
50. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, eds. *Testing Structural Equation Models*. Newbury Park, CA: Sage; 1993:136–162.
51. MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychol Methods*. 1996;1:130–149.
52. Aish AM, Joreskog KG. A panel model for political efficacy and responsiveness: an application of LISREL 7 with weighted least squares. *Qual Quant*. 1990;19:716–723.
53. Straughan PT, Seow ALH. Fatalism reconceptualized: a concept to predict health screening behavior. *J Gender Cult Health*. 1998;3(2):85–100.
54. Powe BD, Johnson A. Fatalism among African Americans: philosophical perspectives. *J Relig Health*. 1995;34(2):119–125.
55. Anderson G, Jun M, Choi K. Breast cancer screening for Korean women must consider traditional risks as well as two genetic risk factors: genetic polymorphisms and inheritable gene mutations. *Cancer Nurs*. 2007;30(3):213–222.
56. Kandula NR, Wen M, Jacobs EA, Lauderdale DS. Low rates of colorectal, cervical, and breast cancer screening in Asian Americans compared with non-Hispanic whites: cultural influences or access to care? *Cancer*. 2006;107(1):184–192.
57. Lum OM. Health status of Asians and Pacific Islanders. *Clin Geriatr Med*. 1995;11:53–67.
58. Hoeman SP, Ku YL, Ohl DR. Health beliefs and early detection among Chinese women. *Western J Nurs Res*. 1996;18(5):518–533.
59. Kang HS, Hyun M, Kim M. The effects of daughter's breast health education on mother's breast cancer screening attitude. *J Korean Acad Community Health Nurs*. 2010;21(3):273–281.