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Validation of the Functional Assessment of Cancer Therapy-General (FACT-G) Scale for Measuring the Health-related Quality of Life in Korean Women with Breast Cancer

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Background: The Functional Assessment of Cancer Therapy-General (FACT-G) scale, which was developed and validated in the USA, is widely used to measure the health-related quality of life in cancer patients. The purpose of the present study was to empirically validate the FACT-G scale with Korean breast cancer patients.
Methods: A convenience sample of 193 women with breast cancer was recruited from a university hospital. The subjects were asked to complete the Korean version of the FACT-G scale. The data were analyzed using exploratory factor analysis with varimax rotation to determine factor construct validity. The loading criterion was set at 0.40 and above, inter-subscale correlations were computed using Pearson correlation, and the reliability of the internal consistency for the total scale and its subscales were assessed by Cronbach's alpha.
Results: The factor structure of the Korean version of the FACT-G scale paralleled that of the English version: the physical, social/family, emotional, and functional well-being subscales were constructively valid in Korean breast cancer patients. However, there is the possibility of culture-specific differences in the social/family well-being subscale, and some problematic translations were revealed. Cronbach's alpha for the total scale was 0.89 and that for the subscales ranged from 0.78 to 0.90.
Conclusion: The Korean version of the FACT-G scale was demonstrated as reliable and valid. Therefore, the scale can be used in research and clinical settings to assess the quality of life of Korean breast cancer patients.

Key words: quality of life – instrument – breast cancer

INTRODUCTION

The incidence of breast cancer is increasing dramatically among Korean women. According to the Korea Central Cancer Registry (1), it was estimated that 31.4 per 100 000 people were diagnosed with breast cancer in 2002, which is three times higher than the figure of 10.9 per 100 000 in 1989. Breast cancer is now the most common type of cancer in Korean women.

Women diagnosed with breast cancer undergo multimodality treatments that combine surgery, radiation and/or chemotherapy based upon the stage of the disease. Clinical evaluations of outcomes of cancer treatments have traditionally included objective tumor response and survival (2). More recently, the subjective measurement of health-related quality of life (HRQOL) was acknowledged as important to determining the outcome of cancer treatments (3,4).

Lee et al. (5) selected and analyzed all 31 studies published in South Korea over the last 15 years on the cancer-related quality of life from Korean research databases. Many of the questionnaires used to measure the HRQOL were reportedly unreliable or invalid, threatening the internal validity of the findings of the studies. In addition, there have been only two studies conducted for breast cancer patients, both of which indicated that there are reliability and validity problems in measuring the quality of life. Therefore, a reliable and valid questionnaire assessing HRQOL is required for evaluating the outcome of treatments in Korean breast cancer patients.

The Functional Assessment of Cancer Therapy-General (FACT-G) scale, which was developed and validated by Cella et al. (6) in the USA, is widely used to measure HRQOL in cancer patients. The FACT-G has been translated into other languages, including Korean, using translation and back-trans-

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Table 1. Abbreviated descriptions of the subscales of the FACT-G scale

Subscale	Code No.*	Abbreviated item description
Physical well-being (GP)	GP1	Lack of energy†
	GP2	Nausea†
	GP3	Physical condition†
	GP4	Pain†
	GP5	Side effects†
	GP6	Illness perception†
	GP7	Spending time in bed†
Social/family well-being (GS)	GS1	Closeness to friends
	GS2	Emotional support from family
	GS3	Support from friends
	GS4	Accepting illness (family)
	GS5	Family communication
	GS6	Closeness to a partner
	GS7	Sex life
Emotional well-being (GE)	GE1	Sadness†
	GE2	Coping with illness
	GE3	Losing hope†
	GE4	Nervousness†
	GE5	Worry about dying†
	GE6	Worry about worsening condition†
Functional well-being (GF)	GF1	Work
	GF2	Fulfilling work
	GF3	Enjoying life
	GF4	Accepted illness (patient)
	GF5	Sleep
	GF6	Enjoying fun
	GF7	Being content with quality of life

*New alphanumeric codes noted by Cella (7). †Reverse-scored item.

lation procedures (7). However, it is unclear whether or not the Korean version is valid with Korean cancer patients. Thus, the purpose of the present study was to empirically validate the Korean version of the FACT-G scale with Korean women with breast cancer.

SUBJECTS AND METHODS

The Korean version of the FACT-G scale was validated using two steps: pretest and test of reliability and validity from March 2002 through November 2003.

STEP I: PRETEST

The FACT-G scale was developed for adult patients with cancer at mixed sites, and evidence of its reliability and validity has been reported (6,7). Several changes were made to the scale in 1997: deletions of a subscale and items, and changes to item numbering, scoring and wording. Examples of the changes in item wording are 'I am proud of how I am coping with my illness' into 'I am satisfied with how I am coping with my illness', 'I feel distance from my friends' into 'I feel close to my illness', 'I get support from my friends and neighbors' into 'I get support from my friends' and 'Family communication about my illness is poor' into 'I am satisfied with family communication about my illness' (7).

The latest version 4 consists of a total of 27 Likert-type items formulated into separate subscales: physical (seven items), emotional (six items), social/family (seven items) and functional (seven items) well-being (Table 1). Subjects are asked to respond to each item with a score of 0–4, where 0 = not at all, 1 = a little bit, 2 = somewhat, 3 = quite a bit and 4 = very much. A higher score indicates a higher level of HRQOL.

The present study used the Korean version of version 4 of the FACT-G scale. To identify any problems with patients' comprehension of the Korean version, the scale was pretested with a convenience sample of 20 Korean breast cancer patients at a university hospital. All participants were asked to complete the FACT-G scale, and were interviewed to determine whether or not they had problems understanding the questions. Then a panel consisting of two oncology physicians, one oncology nurse and one nursing professional, all of whom were bilingual, reviewed the information obtained during patients' interviews.

STEP II: TEST OF RELIABILITY AND VALIDITY

SAMPLE AND PROCEDURES

A sample was assembled in a university hospital in Suwon, South Korea, after obtaining the approval of an institutional review board. Inclusion criteria for the subjects were women diagnosed with breast cancer aged over 18 years with no psychiatric problems and articulate in Korean. Potential participants were identified by the provider nurses or physicians at the outpatient clinics. Those who wished to participate were met in a small private room while waiting to be seen by their physicians. During the contact, the purpose of the study and nature of participation were outlined by a PhD candidate in nursing. If a patient articulated an understanding of the study and agreed to participate, the patient was asked to sign a consent form and then complete the FACT-G questionnaire. Of the women who met the inclusion criteria, 86% agreed to participate and signed the consent form.

DATA ANALYSIS

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. Descriptive statistics were calculated to describe the characteristics of the participants and the scores of each item of the FACT-G scale. The Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity were performed to justify the suitability of data for a factor analysis (8,9). Factor construct validity was tested using an exploratory factor analysis with varimax rotation. The loading criterion was set at 0.40

Table 2. Characteristics of participants (n = 193)

Variable		n (%)
Age	≤29	3 (1.6)
	30–39	38 (19.8)
	40–49	92 (47.6)
	50–59	43 (21.4)
	60–69	12 (6)
	≥70<	5 (2.6)
Marital status	Single never married	7 (3.6)
	Married	176 (91.2)
	Divorced	2 (1.0)
	Widow	8 (4.1)
Educational level	Elementary school	32 (16.6)
	Middle school	34 (17.6)
	High school	90 (46.6)
	Baccalaureate degree and over	37 (19.2)
Monthly income (W)*	≤999 999	41 (21.2)
	1 000 000–1 999 999	51 (26.4)
	2 000 000–2 999 999	49 (25.4)
	3 000 000–3 999 999	26 (13.5)
	≥4 000 000	26 (13.5)
Family living together	Husband + child(ren)	153 (79.3)
	Husband	15 (7.8)
	Child(ren)	8 (4.1)
	Alone	5 (2.6)
	Others (parents-in-law, sisters-in-law etc.)	10 (5.2)
	Missing data	2 (1.0)
Stage of disease	I	41 (21.2)
	II	122 (63.2)
	III	21 (10.9)
	IV	9 (4.7)
Treatment status	On-treatment (surgery, chemotherapy or radiation therapy)	84 (43.5)
	Off-treatment	109 (56.5)

*Korean monetary unit (KRW1200 = $1).

and above (10). Inter-subscale correlations were tested using Pearson's correlation. A coefficient of correlation less than r = 0.40 indicated that the subscales were meaningfully independent (11). The reliability of internal consistency for the total and subscales were assessed by Cronbach's alpha, which was expected to be >0.70 as recommended by Nunnally and Burnstein (10).

RESULTS

Step I: Pretesting

The ages of the participants ranged from 29 to 69 years, with a mean age of 48.05 years. Eighty-five percent of the participants (n = 17) were married. Seventy-five percent (n = 15) had graduated from high school, and the remainder had graduated from elementary school. All patients were receiving chemotherapy or radiation therapy. Thirty percent of the participants had stage I breast cancer, 40% had stage II and 30% had stage III.

There were some problems in the participants' comprehension of the Korean version of the FACT-G scale. When responding to GP6 ('I am forced to spend time in bed'), five women answered that they were uncertain how to respond because they had no bed at their houses. Six women stated that GE2 ('I am satisfied with how I am coping with my illness') was difficult to understand, especially the word 'coping'. Four women stated that GS4 ('My family has accepted my illness') was unclear and three women stated that GF4 ('I accepted my illness') was unclear.

A panel reviewed all the items of the English and Korean versions of the FACT-G and the information from the patient interviews. Although comprehension problems were experienced with other items, the panel decided to modify only GP6. Most Koreans use a Korean style of bedding called a Yeeboochalee, which comprises a mattress spread directly on the floor of a living room, instead of a Western style of a bed – this is a clearly distinguishable difference in style between the two cultures. Thus, item GP6 was revised to 'I spend time lying in a room' so as to maintain semantic equivalence and avoid the expression of a culturally different bedding style. The other three items were kept without changes. However, even though it did not emerge as a comprehension problem, the panel additionally adapted GP2 because the item was translated into a Korean word meaning 'vomiting' rather than one meaning 'nausea' as used in the English version.

Step II: Test of Reliability and Validity

The mean age of the women was 46.01 years (SD = 9.27 years; range = 27–75 years). They were predominantly married (91.2%) and living together with a husband and/or child(ren) (87.1%). One hundred and twenty-seven women (65.8%) had graduated from high school. Women with a monthly income of KRW1 000 000–1 999 999 (US$833–1666) represented 26.4% of the cohort. Most of the women had stage I or II disease (84.4%) and 84 women (43.5%) were currently receiving treatment (Table 2).

Descriptive statistics of all 27 items are presented in Table 3. More than 50% of participants answered at the highest response category 4 (very much) in items GP2, GP5, GP7, GE1 and GE3. The mode and median scores for the five items were both 4, and the means were high at 3.25–3.74. Standard deviations of the five items were narrow, at 0.57–0.96. These characteristics appear to reveal a ceiling effect in the items.

Table 3. Percentage distributions of the response categories, and central tendency and standard deviations of item scores

Code no.	Percent distribution on response categories					Central tendency		
	Not at all (0)	A little bit (1)	Somewhat (2)	Quite a bit (3)	Very much (4)	Mode	Median	Mean (SD)
GP1	2.1	7.3	24.9	36.3	29.5	3	3	2.84 (1.00)
GP2	0	0.5	5.2	14.0	80.3	4	4	3.74 (0.57)
GP3	2.1	7.3	11.4	34.2	45.1	4	3	3.13 (1.01)
GP4	4.7	6.2	7.3	40.9	40.9	4	3	3.13 (1.07)
GP5	3.1	3.1	6.2	25.9	61.7	4	4	3.40 (0.96)
GP6	2.6	4.7	11.9	42.5	38.3	3	3	3.09 (0.96)
GP7	1.0	2.1	5.2	15.0	76.7	4	4	3.64 (0.76)
GS1	11.9	15.5	45.1	18.7	8.8	2	2	1.97 (1.08)
GS2	9.8	13.5	25.4	26.9	24.4	3	3	2.42 (1.26)
GS3	26.4	16.6	34.2	17.1	5.7	2	2	1.59 (1.21)
GS4	7.3	11.9	22.8	31.1	26.9	3	3	2.59 (1.21)
GS5	13.5	11.9	30.1	23.8	20.7	2	2	2.26 (1.29)
GS6	10.9	5.7	22.3	32.1	29.0	3	3	2.63 (1.26)
GS7	23.3	8.3	48.7	10.9	8.8	2	2	1.74 (1.19)
GE1	2.1	3.6	11.4	32.6	50.3	4	4	3.25 (0.94)
GE2	16.6	23.3	36.3	14.5	9.3	2	2	1.77 (1.17)
GE3	0	2.6	10.4	11.9	75.1	4	4	3.60 (0.78)
GE4	2.6	14.5	13.5	39.4	30.1	3	3	2.80 (1.10)
GE5	4.1	4.7	12.4	34.2	44.6	4	3	3.10 (1.06)
GE6	13.0	15.0	11.4	40.9	19.7	3	3	2.39 (1.31)
GF1	3.6	8.8	30.6	28.0	29.0	2	3	2.70 (1.09)
GF2	7.3	12.4	45.6	19.7	15.0	2	2	2.30 (1.08)
GF3	4.7	13.0	45.6	21.2	15.5	2	2	2.30 (1.03)
GF4	4.1	9.3	25.4	32.1	29.0	3	3	2.73 (1.11)
GF5	6.2	9.3	28.0	24.4	32.1	4	3	2.67 (1.20)
GF6	5.7	11.4	33.7	25.4	22.3	2	2	2.50 (1.14)
GF7	6.7	13.0	40.9	22.3	17.1	2	2	2.30 (1.11)

Table 4. Rotated factor analysis of the Korean version of the FACT-G scale

Factor 1: Functional well-being		Factor 2: Social/family well-being I		Factor 3: Physical well-being		Factor 4: Emotional well-being		Factor 5: Social/family well-being II	
Code no.	Loading	Code no.	Loading	Code no.	Loading	Code no.	Loading	Code no.	Loading
GF1	0.77	GS1	(0.19)	GP1	0.63	GE1	0.65	GS1	0.70
GF2	0.78	GS2	0.77	GP2	0.62	GE2	(0.00)		
GF3	0.70	GS3	(0.29)	GP3	0.77	GE3	0.68	GS3	0.78
GF4	0.67	GS4	0.78	GP4	0.68	GE4	0.64		
GF5	0.67	GS5	0.81	GP5	0.59	GE5	0.70		
GF6	0.79	GS6	0.77	GP6	0.76	GE6	0.73		
GF7	0.73	GS7	0.60	GP7	0.56				
Cronbach's alpha	0.90	Cronbach's alpha	0.86*	Cronbach's alpha	0.82	Cronbach's alpha	0.78†	Cronbach's alpha	0.70

*Cronbach's alpha excluding two items loaded below 0.4 on the factor 2. †Cronbach's alpha excluding one item loaded below 0.4 on the factor 4.

Table 5. Inter-subscale correlations

	Physical well-being	Social/family well-being	Emotional well-being	Functional well-being
Physical well-being	1.00			
Social/family well-being	0.13	1.00		
Emotional well-being	0.55*	0.17*	1.00	
Functional well-being	0.37*	0.55*	0.35*	1.00

*$P < 0.05$.

The value of KMO's measure of sampling adequacy was 0.87, which is meritorious for a factor analysis (8). Bartlett's test of sphericity revealed a χ^2 value of 2463.77 ($P = 0.00$). Thus, the obtained data were suitable for a factor analysis. As the result of an exploratory factor analysis, a five-factor solution was extracted using the criterion of an eigenvalue greater than one. These five factors explained 60.33% of the total variance. The loadings of items on the extracted factors are listed in Table 4.

All the items of the functional and physical well-being subscales on the English version (6) were significantly loaded on factors 1 and 3, respectively, in the current study and Cronbach's alpha of factors 1 and 3 were 0.90 and 0.82, respectively. However, the items on the social/family well-being subscale of the English version (6) were separately loaded into factors 2 and 5 in the present study. Of the seven items of the social/family well-being subscale, five items were significantly loaded on factor 2, for which Cronbach's alpha was 0.86. The remaining two items, GS1 (I feel close to my friends) and GS3 (I get support from my friends), significantly loaded on factor 5, and its Cronbach's alpha was 0.70, which is borderline for the criterion of internal consistency of reliability (10). If factors are correlated at 0.40 or higher, the possibility of collapsing the factors may be considered. However, the decision to collapse factors is based upon the levels of reliability of the uncollapsed factors and the conceptual meaningfulness of such collapsing (11). That is, if the factors are reliable and clearly meaningful, the collapsing is optional. In this study, the correlation coefficient between factors 2 and 5 was 0.43 ($P = 0.01$), which was the highest between factor 2 and other factors. Even though Cronbach's alpha of factor 5 was at the borderline value of 0.70, the content of the two items loaded on factor 5 clearly reflected social aspects of well-being. Thus, factor 5 was collapsed to factor 2 in this study and Cronbach's alpha of the collapsed factor was 0.84. On the emotional well-being subscale, all items on the English version except GE2 (I am satisfied with how I am coping with my illness) significantly loaded on factor 4 in the current study. Cronbach's alpha of the factor, when the GE2 was included, was 0.66. However, when the item was deleted, Cronbach's alpha of factor 4 increased to 0.78. This increase in Cronbach's alpha implies that the item is heterogeneous (12) with the emotional well-being subscale in Korean patients. The GE2 also failed to load meaningfully on any factor in the present study. Cronbach's alpha of all 26 items (excluding GE2) was 0.89, indicating good internal consistency of reliability.

Table 5 shows the inter-subscale correlations. The highest correlation was observed between the physical and emotional well-being subscales, and between the social/family and functional well-being subscales, but these correlations were modest ($r = 0.55$). The other correlations were <0.40, indicating that they were meaningfully independent.

DISCUSSION

The present study demonstrates that the FACT-G scale exhibits the psychometric properties of factor construct validity and internal consistency reliability when applied to Korean women with breast cancer. A factor analysis provides a way to assess the factor construct validity to indicate whether a questionnaire, such as the FACT-G, is conceptually equivalent when applied in other populations (13). In the present study, five factors extracted from the exploratory factor analysis generally paralleled those of the physical, social/family, emotional, and functional well-being subscales reported by Cella (7). Therefore, the FACT-G can be considered to be a conceptually cross-cultural equivalent questionnaire for Korean women with breast cancer.

However, three items on factor loadings were problematic. The item GE2 (I am satisfied with how I am coping with my illness) did not load significantly on any other factor (including factor 4: emotional well-being subscale) in the present study. This may be explained as follows. In the pretest of the present study, participants reported GE2 as being difficult to understand, especially the term 'coping'. The translated Korean term for coping (pronounced 'daecheo' in Korean) is closer to an academic terminology commonly used in medicine, nursing and psychology than to everyday language. According to the Scientific and Technological Terminology published by the Korean Academy of Science and Technology (14), the Korean term for coping was registered as a health-related scientific terminology. Considering that 34.2% of participants in Step II of the present study had not graduated from high school, it is conjectured that incomprehension would be a problem for many participants. This might contribute to measurement error (13), resulting in no significant factor loading for the item. Thus, it was considered that the item should be changed into an easily comprehensible Korean term.

Table 6. Comparisons of the aim, subjects, used FACT-G, and factor analysis of the validation studies of the FACT-G

	American study (6)	Japanese study (15)	Chinese study (16)	Korean study (Present study)
Aims	Development and validation of the FACT-G	Cross-cultural validation of the FACT-G	Cross-cultural validation of the FACT-G	Cross-cultural validation of the FACT-G
Subjects	Mixed-type cancer patients (breast, lung, colorectal, others)	Lung cancer patients	Mixed-type of cancer patients (breast, liver, lung, others)	Breast cancer patients
Used FACT-G	Version 3	Version 3	Version 3	Version 4
Result of factor analysis	The item concerning coping with illness significantly load onto the emotional well-being subscale	The item concerning coping with illness did not significantly load onto the emotional well-being subscale	The item concerning coping with illness did not significantly load onto the emotional well-being subscale	The item concerning coping with illness did not significantly load onto the emotional well-being subscale
% of the total variance explained by the extracted factor solution	51%	Not mentioned	44%	60.33%

Another possible reason is that GE2 was a heterogeneous item for Korean women with breast cancer. In a similar vein, in validation studies (Table 6) of the FACT-G (version 3) with Japanese lung cancer patients (15) and Chinese mixed-type cancer patients (16), the item did not meaningfully load onto the emotional well-being subscale, unlike the loading with American cancer patients reported by Cella et al. (6). These empirical findings are suggestive of a cultural difference between Western and Asian cancer patients, which should be investigated further.

On the factor loadings (Table 4), GS1 (I feel close to my friends) and GS3 (I get support from my friends) were initially loaded on factor 5 separately from factor 2 (the social/family well-being subscale on the English version). The separated loadings of GS1 and GS3 were about support from friends and relationship with friends. Korean breast cancer patients have a tendency to conceal their disease from others, such as friends or neighbors, by avoiding contact with them (17). In other words, Korean cancer patients tend to keep themselves in social isolation. This tendency may make the two friend-related items separately loaded from factor 2.

The remaining items on factor 2 were about family or interpersonal relationships with the family: GS2 (I get emotional support from my family), GS4 (My family accepted my illness), GS5 (I am satisfied with family communication about my illness), GS6 (I feel close to my partner) and GS7 (I am satisfied with my sexual life). According to Tae (18), Korean cancer patients are strongly family-oriented, and they try to connect the meaning of their lives into their family since the Koreans are basically dominated by Confucian ideals of respecting kinship (19). Based upon this family-oriented perspective, Korean cancer patients may perceive family aspects differently from friends-related well-being.

Considering the separated pattern of the social/family well-being subscale in this study, it is conjectured that the subscale of the FACT-G is independently separable into social well-being and family well-being subscales in Korean patients with breast cancer, even though factors 2 and 5 were collapsed in this study. Similar findings have been reported by others. In a study with Japanese cancer patients using version 3 of the FACT-G scale, the items 'I feel distance from my friends' and 'I get support from my friends and neighbors' did not load on the social/family well-being subscale since Japanese patients consider family members more important than others such as friends and neighbors (15). In studies with Chinese (16) and American rural (20) cancer patients, the item 'I feel distance from my friends' also did not load on the social/family well-being subscale. Future studies should investigate whether or not the construct of the social/family well-being subscale is divisible depending upon different populations with different cultures or places of residence.

The inter-subscale correlations in this study demonstrated that there was modest relationship between the physical and emotional well-being subscales in Korean breast cancer patients. The same has also been reported for Japanese lung cancer patients (15) while a weak relationship has been reported for American lung cancer patients (21). This may be attributable to an Asian-specific characteristic, in that Asians tend to share more commonality of the physical and emotional aspects of HRQOL.

In the current study the relationship between functional and social/family well-being subscales was also modest, which may be due to the demographic characteristics of participants. The incidence of breast cancer is highest in those aged 40–45 years (1). Reflecting this, most participants in this study were in their 40s. They comprised housewives with a living husband, child(ren) and/or others such as parents-in-law. In other words, they are expected to play multiple roles as wife, mother, daughter-in-law and independent person, thereby performing daily activities such as housework, bringing up child(ren) and supporting parents-in-law. However, many of them were in the early stage of disease and not receiving treatment, implying that they were relatively independent from the disease and its treatment in performing such daily activities and roles. Thus, the participants' functional status was relatively favorable so that they could perform their roles for others and continue a relatively gratifying relationship with their families and friends. It is therefore conjectured that there is moderate correlation between the functional and social/family well-being subscales.

The internal consistencies of the total scale and subscales of the Korean version of the FACT-G were over the Cronbach's alpha cutoff value of 0.70. Cronbach's alpha for the total score in this study was the same as in the study (using version 3 of the FACT-G) by Cella et al. (6) and similar to a study (using version 4) with American cancer patients undergoing chemotherapy (Cronbach' alpha = 0.87) (22). Cronbach's alpha values for subscales in the present study were 0.78–0.90, which are higher than those reported in studies with American cancer patients (0.69–0.82) (6) and Japanese lung cancer patients (0.55–0.81) (14).

The distribution of response categories (Table 4) reveals a possible ceiling effect in the physical and emotional well-being subscales. This may be attributable to about half of the participants not receiving treatment, so that they experienced lower levels of side effects and hence exhibited a higher level of emotional well-being. Another possible reason for the ceiling effect is in the translation of the response categories. According to a Korean dictionary (23), 'quite a bit' translates into 'a little bit more than average' in Korean. However, 'very much' was translated into the meaning of 'much' (sangdanghee in Korean) in the Korean version of the FACT-G. The Korean word sangdanghee originates from a Chinese word (with the same pronunciation) that was translated into 'quite a bit' in the responses of the Chinese version of the FACT-G (16). Therefore, the response category of 'very much' on the Korean version may not encapsulate the participant's maximum score of the items of the physical and emotional well-being subscales. We therefore recommend modifying the response category 'very much' in the Korean version of the FACT-G.

Overall, the Korean version of the FACT-G scale represents a reliable and valid measure of the HRQOL of Korean women with breast cancer, and hence can be used in clinical practice. However, there are possible culture-specific differences in the social/family well-being subscale, and some problematic translations are present. Future studies should test the psychometric properties of the scale, including its test–retest reliability and convergent/divergent validity to increase confidence in the findings of the present study.

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