Validation and psychometric properties of the multidimensional scale of perceived social support among Korean breast cancer survivors

Mijung Kim b, Hyun-E Yeom a,*, Mi Sook Jung a

a Department of Nursing, Chungnam National University, Daejeon, Republic of Korea
b Department of Nursing, Catholic Kkottongnae University, Chungju, Republic of Korea

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ABSTRACT

Objective: Social support plays a key role in dealing with various challenges accompanying cancer treatment and survivorship. The multidimensional scale of perceived social support (MSPSS) is a valid measurement used globally to assess general support from social interpersonal relations. This study aims to validate the psychometric properties of the Korean version of the MSPSS among Korean women with breast cancer.

Methods: Two independent cross-sectional studies collected data from 349 non-metastatic breast cancer survivors. Statistical analyses of confirmatory factor analyses, t-test, and Pearson correlation were performed to test construct validity, including factorial structure, concurrent validity, and known-group comparisons. Internal consistency and test–retest reliability were used to evaluate the reliability.

Results: Factor analysis confirmed a three-factor construct (i.e., family, friends, and spouse) with good fit indices. Concurrent validity was verified by correlations with social well-being and interpersonal relationships, which are theoretically relevant concepts. Known-group validity was also confirmed by different MSPSS scores according to depression and symptom distress levels. Reliability was supported by good internal consistency and acceptable test–retest correlation coefficients.

Conclusions: The findings demonstrate the MSPSS is a valid and reliable measurement to assess the extent to which women with breast cancer perceive social support from spouses, other family members, and friends in Korea. Further studies should verify the psychometric properties of the MSPSS in patients with other cancers beyond breast cancer. Health professionals could administer the MSPSS to evaluate the diverse resources of social support among cancer survivors.

Introduction

Recent statistics indicate that breast cancer is the most common cancer in women worldwide but has a relatively high five-year survival rate. Breast cancer survivors face multifaceted challenges in cancer diagnosis and treatment that cause physical and psychosocial distress, such as fatigue, pain, depression, anxiety, social isolation, and loneliness. These problems could accelerate functional declines that limit social engagement based on interpersonal interactions and threaten cancer patients’ health-related quality of life.

Social support refers to a broad range of psycho-emotional and material resources given to individuals based on interpersonal relationships and interactions. A substantial body of literature has addressed the pivotal role of social support in improving intrapersonal competencies to cope with cancer-related distress, such as a fighting temperament, resilience, psychological adjustment, posttraumatic growth, and quality of life. More importantly, social support and integration based on interpersonal connections were beneficial in prolonging the survival of cancer patients and reducing their risk of death. Despite their critical role, there is limited information regarding the reliable and valid measurement applicable to assess social support perceived by cancer patients from diverse interpersonal sources within social contexts.

The multidimensional scale of perceived social support (MSPSS) is a globally valid instrument used to measure the extent to which an individual perceives support in interpersonal relationships from family, friends, and significant others. The MSPSS has been applied in diverse clinical populations and caregivers who might need social support to deal with personal and family problems related to health-related crises, such as stroke, Parkinson's disease, Alzheimer's disease, and depression, across different countries. There are currently 22
translated versions of the MSPSS adapted for populations in non-English speaking countries.13 However, a systematic review underscored some limitations concerning insufficient evidence about the factor structure, partly linked to interpretational and translational issues rooted in cultural and linguistic diversity.11 Regarding this apparent critique, it is necessary to evaluate the psychometric properties of the Korean version of the MSPSS, validated for a specific population with diabetes in prior research,27 to build empirical evidence of it being a reliable and valid measure applicable to the Korean population.

In addition, measurement invariance based on gender has been emphasized as an essential consideration in interpreting MSPSS scores.19 Regarding the gender-specific characteristics of interpersonal relations, several studies have shown that compared to men, women are more likely to engage in social integration and be attached to social support based on their interactive, intimate relationships.19–21 In particular, findings in the cancer literature have noted a critical impact of psycho-emotional intimacy with partners on the adjustment to sexuality and quality of life changes during cancer therapy and survivorship among patients with sexual hormone-related cancers, such as prostate,22 breast,22 and cervical cancer.22 Furthermore, a comparative study examining partner support in cancer patients found that the mental and physical quality of life of female cancer patients was more strongly dependent on their partners’ support than those in male cancer patients.25 The findings indicate the need for an exhaustive investigation of the MSPSS concerning specific sociocultural characteristics and health-related crises across diverse populations. Although a few studies have reported the psychometric properties of the MSPSS among the cancer population,10,13,18,26 evidence is still lacking to confirm the psychometric properties of MSPSS in female cancer survivors.

Given the continuing growth in the incidence and prevalence of breast cancer, it is crucial to validate the psychometric properties of the MSPSS to provide sufficient social support through strategies tailored to patients’ psychosocial and interactive needs. Therefore, the current study aimed to examine the psychometric properties of the adapted version of the MSPSS among breast cancer survivors in Korea.

**Methods**

**Previous studies and samples**

This study included multi-aspect examinations of female breast cancer survivors. Data from two independent cross-sectional studies conducted between June and September 2016 (Study 1) and between January and March 2021 (Study 2) were used for this study. Study 1 aimed to evaluate physical, psychological, and social factors that affect neurotoxic symptomatology in 190 breast cancer survivors. Study 2 explored the theory-based interconnections between interpersonal and behavioral characteristics and health-related quality of life among 220 breast cancer patients survivors. Although both studies were conducted for female cancer survivors treated for non-metastatic breast cancer, we assembled the data from Study 1 and Study 2 based on the following criteria.

The inclusion criteria for this study were women: (1) aged at least 19 years, (2) diagnosed with non-metastatic breast cancer, (3) completed adjuvant chemotherapy or radiation therapy for breast cancer, and (4) had a spouse. Individuals were excluded if they had uncontrolled cognitive disorders (confirmed through medical chart review) because of the possible effect of cognitive dysfunction on the ability to respond to the survey questionnaires. Based on the criteria, the data of 61 participants were omitted for this study: 15 participants in Study 1 and 44 participants in Study 2 were categorized under “no spouse” and two were duplicate participants in Study 1 and 2. Finally, the data from 349 participants (175 from Study 1 and 174 from Study 2) were used for this study. The methodological guideline suggests that ten samples for a single item are appropriate to reach statistical power for confirmatory factor analysis.27 Therefore, the sample size is sufficient to evaluate the construct validity of the MSPSS.

**Ethical considerations and procedures**

The purposes and procedures for studies 1 and 2 were approved by the Institutional Review Board, where a principal investigator was affiliated (Approval No. 2-1046881-A-N-01-201605-HR-016-01-03 for Study 1 and 202101-SB-009-01 for Study 2).

Participants of studies 1 and 2 were recruited at a cancer center of a university hospital located in a central region of South Korea. To recruit the study participants, the principal investigator and research assistants (trained by a principal investigator) spoke to a potential participant in the outpatient division and provided information regarding the purpose of the study and procedures for the participation. Notably, the explanation of ethical considerations, including potential benefits, risks, and a right to protect the participants’ privacy, was provided to every participant. In addition, all participants who voluntarily agreed to participate signed the informed consent form.

Data of both studies 1 and 2 were collected through self-administered surveys in an independent room to maintain privacy. Research assistants helped clarify accurate meaning and understand ambiguous expression if a participant had any questions. It is beneficial to reduce missing values and methodological bias in collecting data via self-administered surveys.28 The average time to complete the survey took 10–15 min.

**Measures**

**Multidimensional scale of perceived social support (MSPSS)**

We used the Korean version of the MSPSS validated in middle-aged women with diabetes in Korea.17 The original MSPSS was validated as a reliable measure to assess the general perception of social support in various populations, and translated versions into different languages have been validated globally.13–16 The original MSPSS consists of 12 items asking about the levels of perceived support from family (four items), friends (four items), and a special someone (four items). As done previously with the Korean version validated for women with diabetes,17 we changed “a special someone” into “a spouse” to assess social support, notably including spouses’ support. The term special person implies an individual rather than a marital status, which tends to be vague and unspecified, especially when considering the interpersonal relations within the Confucian ethics in Korean culture.20

Respondents scored the level of agreement for each item on a seven-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). The scores of 12 items were summed, and the possible score ranged from 12 to 84 for overall perceived social support. The scores of three domains composed of four items, respectively, ranged from 4 to 28. The Cronbach’s alpha of the MSPSS was .88 for the original scale and 0.90 for the Korean-translated scale. In this study, the internal consistency (Cronbach’s alpha) was 0.91 for the full scale, and the three domains regarding spouse, family, and friends were 0.96, 0.90, and 0.90, respectively.

**Social and family-related well-being**

Social and family well-being was assessed using the Korean version of Functional Assessment of Cancer Therapy-General (FACT-G).31 The FACT-G consists of 27 items categorized into four domains: physical, social or family, emotional, and functional well-being. The social or family domain was assessed in this study. Respondents scored each item on a five-point Likert scale from 0 (not at all) to 4 (very much), with higher scores indicating a better health-related quality of life. The Korean version of FACT-G showed a good internal consistency (Cronbach’s alpha) with 0.86 in a previous study20 and 0.85 in this study.

**Positive relations with others**

Relationships with others were measured with one sub-dimension of the validated Korean version of the psychological well-being scale.31 The dimensions of positive relations were assessed using seven items on a six-point Likert scale. A higher score indicates that an individual has
warm and trusting relationships with others. The internal consistency in this study was Cronbach’s alpha 0.77.

**Depression**

The Korean version of the Patient Health Questionnaire-9 (PHQ-9) was used to assess participants’ depressive mood levels. The PHQ-9 consists of nine items scored on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Higher scores indicate a more depressed mood. The internal consistency (Cronbach’s alpha) ranged from 0.86 to 0.89 in previous studies, and 0.85 in the present study.

**Cancer-related symptom distress**

Symptom distress related to breast cancer was assessed using the Korean version of the Condensed Memorial Symptom Assessment Scale (CMSAS). The CMSAS consists of 14 items asking about the frequency and severity of physical and psychological symptoms rated on a five-point Likert scale. Prior study about cancer patients has confirmed the reliability of the Korean version of CMSAS, and the internal consistency in this study was Cronbach’s alpha 0.89.

**Demographic and breast cancer-related clinical characteristics**

Sociodemographic characteristics included age, living status, years of education, and employment status. The breast cancer-related clinical features included cancer stage, types of therapies for treating breast cancer, chemotherapy status, and the months since the surgery. This information was obtained from electronic medical records.

**Data analysis**

Data analysis was performed using the SPSS 26.0 and Amos 23.0 software packages (IBM Corp., Armonk, NY, USA). Preliminary and descriptive statistics were computed to describe participants’ demographic and breast cancer-related clinical characteristics and measures. The psychometric properties of the MSPSS were tested by construct validity and reliability in terms of structure validity, convergent and discriminant validity, concurrent validity, known-group validity, internal consistency, and test–retest reliability.

First, the structural validity of the three-factor structural model was tested using confirmatory factor analysis (CFA) with maximum likelihood estimation. The goodness of fit was evaluated using multiple indices: $\chi^2/df$ (<3), comparative fit index (CFI >0.90), Tucker Lewis index (TLI >0.90), root-mean-square error of approximation (RMSEA <0.08), and standardized root-mean-square residual (SRMR <0.08).

For convergent and discriminant validity, average variance extracted (AVE) was calculated based on CFA using the formula noted by Fornell and Larcker. A cut-off value of 0.50 was considered to evaluate the adequacy for convergent validity, and the AVE square root for each sub-dimension should be greater than the correlation coefficients between sub-dimensions to verify discriminant validity.

Concurrent validity was evaluated using Pearson’s correlation coefficients between the MSPSS and social or family well-being or positive relations with others. The two concepts were chosen as the criterion to assess conceptual relevance with the MSPSS since evidence suggests an association between social support, psychosocial quality of life, and interpersonal relations. In particular, the quality of life is considered one of the most expected health outcomes in cancer patients, and a large body of cancer literature has demonstrated social support as a key related to a better quality of life. Moreover, the concept of positive relations with others reflects the extent to which individuals perceive belonging to social ties and satisfaction with the quality of interaction with others. This implies that the view toward positive relations with others reflects concordant perspectives with the social support regarding the interpersonal link.

Known-group validity was examined using an independent t-test to evaluate whether the MSPSS could discriminate individuals with different depressive condition levels (i.e., depression versus non-depression groups) and symptom distress (i.e., symptom distress versus non-symptom distress groups). Empirical evidence has shown that social support is negatively associated with depressed mood and symptom distress in patients with cancer. We classified depression and non-depression groups based on a cut-off score of 5 based on previous research that noted an optimal cut-off point of the PHQ-9 in Korean psychiatric patients. We hypothesized that the scores of the whole MSPSS and its sub-dimensions would differ according to depressive conditions and symptom distress levels.

Internal consistency was examined with Cronbach’s alpha coefficients of the MSPSS and the sub-dimensions, composite reliability (CR) using CFA, and item-total and inter-item correlations. Cronbach’s alpha of 0.70 considers an acceptable level of reliability, which means items measure the same underlying construct. The acceptable CR value is greater than 0.70. Acceptable ranges for item-total correlations (0.30–0.80) and inter-item correlations (0.15–0.50) are considered.

Test–retest reliability was evaluated using Pearson’s correlation coefficients of the MSPSS scores between pre-and post-test. Moderate correlation (0.5 ≤ r ≤ 0.7) indicates good reliability between the test and retest.

**Results**

**Sample characteristics**

| Characteristic                          | Mean ± SD (Range) | n (%)          |
|----------------------------------------|-------------------|----------------|
| Age (years)                            | 50.95 ± 8.32 (31–73) | 278, 79.7%     |
| Living                                 |                   |                |
| With spouse only                       | 83 (23.8)         | 266 (76.2)     |
| With spouse and another family member  |                   |                |
| Education (years)                      | 13.40 ± 2.79 (6–23) | 225, 64.5%     |
| Employment status                      |                   |                |
| Employed                               | 124 (35.5)        |                |
| Unemployed                             | 225 (64.5)        |                |
| Stage of cancer                        |                   |                |
| 0                                      | 32 (9.2)          |                |
| I                                      | 123 (35.2)        |                |
| II                                     | 141 (40.4)        |                |
| III                                    | 53 (15.2)         |                |
| Type of surgery                        |                   |                |
| Lumpectomy                             | 138 (39.5)        |                |
| Mastectomy                             | 211 (60.5)        |                |
| Chemotherapy treatment                 |                   |                |
| Yes                                    | 278 (79.7)        |                |
| No                                     | 71 (20.3)         |                |
| Since operation (months)               | 21.14 ± 10.28 (1–62) |                |

**Item analysis of the MSPSS**

The overall sum score of MSPSS was 71.24 (SD = 13.20) and the sum scores of three sub-dimensions were 23.45 (SD = 6.80) for the spouse, 24.94 (SD = 4.50) for family, and 22.85 (SD = 5.44) for friends. The mean score of every single item within a whole MSPSS ranged from 5.15 (SD = 1.80) to 6.34 (SD = 1.19) **(Table 2)**. The mean scores of items within three sub-dimensions ranged from 5.72 to 5.93 for the spouse,
6.14–6.34 for family, and 5.15–5.96 for friends. The rate of missing values was .0%, and the ceiling effect for each item ranged 30.4%–65.0%, and the floor effect ranged 0.9%–7.4%. In addition, skewness for ranged −0.74(−32.35, and kurtosis for ranged 0.45–5.75 for all items, indicating an acceptable range.27

Construct validity

Structural validity

Confirmatory factor analysis confirmed the goodness of fit of the three-factor structural model of the MSPSS (Table 2). All MSPSS items were allocated to three factors that were the same as the original structure of the MSPSS. Specifically, the subscales of support sources, including four items of spouse, family, and friends, respectively, were assigned. The model demonstrated a good fit to the data: $\chi^2/df = 3.496$, $CFI = 0.966$, $TLI = 0.956$, $RMSEA = 0.085$, and $SRMR = 0.038$.

Convergent and discriminant validity

The AVE values for the three factors of the MSPSS were 0.67 for a spouse, 0.59 for family, and 0.48 for friends. The AVE for spouses and families, over a cut-off of 0.5, was acceptable. The AVE of the friend, less than 0.5, was not sufficient, but the CR was satisfactory at over 0.7, indicating adequacy.27 Thus, the convergent validity was verified. The AVE square root for each sub-dimension was 0.82 for spouses, 0.77 for families, and 0.69 for friends, which were greater than the correlation coefficients ($r = 0.36, 0.49, 0.52$) between sub-dimensions (Figure 1). The results verify discriminant validity.

Concurrent validity

As shown in Table 3, the whole scale of the MSPSS and three sub-dimensions were moderately correlated with social or family well-being and positive relationships with others ($r = 0.56$ to 0.59, $P < 0.001$). In particular, the sub-dimension of friends was the most strongly correlated with interpersonal relationships ($r = 0.60$, $P < 0.001$), while the sub-dimension of spouse was the most weakly correlated with social or family well-being ($r = 0.31$, $P < 0.001$).

Known-group validity

The results of independent $t$-tests showed significant differences in the whole MSPSS and sub-dimensions between groups categorized by the levels of depressive state and symptom distress (Table 4). The full scale and two sub-dimensions, including family and friends, significantly differed by depressive state ($P < 0.01$). However, the spouse sub-dimension was not entirely different according to depressive state ($P = 0.253$). Additionally, the scores of the whole MSPSS and the three sub-dimensions significantly differed between the symptom distress and non-symptom distress groups.

Reliability

Internal consistency for the whole of the MSPSS and three sub-dimensions (i.e., spouse, family, and friends) was sufficient, with Cronbach's alpha coefficients of 0.91 for all items, 0.96 for a spouse, 0.90 for family, and 0.90 for friends. The CR values for the three sub-dimensions of the MSPSS were 0.89 for a spouse, 0.85 for family, and 0.78 for friends, which were satisfactory over the cut-off of 0.70.24 The item total scale correlation coefficients ranged from 0.56 to 0.74, with a mean value of 0.65 (see Table 2). Item-to-item correlation coefficients ranged from 0.26 to 0.90, with an average item-to-item correlation of 0.46. The result was satisfactory for the criteria in an adequate range ($0.15 \leq r \leq 0.50$) of the average inter-item correlation coefficient.49

The correlation coefficients for 17 days (range = 7–29 days, $n = 14$) verified the test–retest reliability. The correlation coefficients were 0.79 for the whole scale, and each sub-dimension was 0.62 for a spouse, 0.55 for family, and 0.71 for friends.

Discussion

This study demonstrated the psychometric properties of the MSPSS, which captures multidimensional interpersonal support, in terms of the spouse, family, and friends of breast cancer survivors, based on the evidence of structural validity, concurrent validity, known-group validity, and internal consistency.

The CFA proved a specific three-factor structure with appropriate fit indices, which was consistent with the empirical findings of the original MSPSS.12 However, some studies reported a unifactorial structure47 or a two-factor structure in which the dimension of “special someone” merged into the dimension of either friends or family,42–44 Dambi et al14 addressed this inconsistency concerning linguistic and socio-contextual variances in cross-cultural translations. The original version of the MSPSS did not precisely identify who a special someone is. Therefore, the meaning of this term could be differently interpreted or modified in a manner culturally appropriate.44,45 Consequently, the subscale reflecting a special someone was changed in several versions depending on the sociocultural context.17,44,46,47

Based on the influence of Confucian values emphasizing interpersonal relationships, the term “special someone” tends to be used as an extended meaning to indicate someone that has a significant impact on an individual’s daily life within all interpersonal networks allowed in the Confucian perspective.49 This cultural perspective may prevent individuals

| Table 2 |
| Construct validity and reliability of the MSPSS ($n = 349$). |
| Sub-dimensions | Items | Scores | SD | Skewness | Kurtosis | FL | EE | CR | AVE | ITC | Cronbach’s $\alpha$ |
|----------------|-------|--------|----|-----------|----------|----|----|----|-----|-----|-------------------|
| Spouse         | There is a spouse who is around when I am in need. | 23.45 | 6.80 | -1.79 | 2.11 | 0.91 | 0.55 | 0.67 | 0.89 | 0.69 | 0.96 |
|                | There is a spouse with whom I can share joys and sorrows. | 5.93 | 1.78 | -1.70 | 1.82 | 0.94 | 0.35 | 0.72 |     |     |       |
|                | I have a spouse who is a real source of comfort to me. | 5.89 | 1.76 | -1.74 | 1.93 | 0.96 | 0.27 | 0.74 |     |     |       |
|                | There is a spouse in my life who cares about my feelings. | 5.91 | 1.76 | -1.74 | 1.93 | 0.96 | 0.27 | 0.74 |     |     |       |
| Family         | My family really tries to help me. | 24.94 | 4.50 | -1.99 | 3.74 | 0.89 | 0.29 | 0.59 | 0.85 | 0.63 | 0.90 |
|                | I get the emotional help & support I need from my family. | 6.31 | 1.20 | -1.91 | 2.44 | 0.88 | 0.39 | 0.60 |     |     |       |
|                | I can talk about my problems with my family. | 6.14 | 1.32 | -1.91 | 2.44 | 0.88 | 0.39 | 0.60 |     |     |       |
|                | My family is willing to help me make decisions. | 6.15 | 1.40 | -1.95 | 3.35 | 0.76 | 0.81 | 0.66 |     |     |       |
| Friends        | My friends really try to help me. | 22.85 | 5.44 | -1.38 | 1.43 | 0.82 | 0.74 | 0.48 | 0.78 | 0.59 | 0.90 |
|                | I can count on my friends when things go wrong. | 5.80 | 1.50 | -0.74 | 0.45 | 0.77 | 1.29 | 0.56 |     |     |       |
|                | I have friends with whom I can share my joys and sorrows. | 5.15 | 1.80 | -0.74 | 0.45 | 0.77 | 1.29 | 0.56 |     |     |       |
|                | I can talk about my problems with my friends. | 5.95 | 1.45 | -1.66 | 2.31 | 0.87 | 0.53 | 0.60 |     |     |       |
| All items      | There is a spouse who is around when I am in need. | 71.24 | 13.20 | -1.56 | 1.95 | 0.87 | 0.50 | 0.60 |     |     | 0.91 |

SD: standard deviation; AVE: average variance extracted; CR: composite reliability; EE: error estimate; FL: factor loading; ITC: item-total correlation
from interpreting the meaning of “special someone” in the same way accepted in other cultures. Additionally, a study by Prezza et al. found that a majority of the participants responding to the MSPSS, particularly a married individual, recognized the special someone as a spouse. Considering the sociocultural context of our participants being rooted in Confucianism and Asian familism, this study used “spouse” instead of “special someone” to capture gender-related unique characteristics of female cancer patients who had a spouse at the time of assessment.

Notably, the factor structure in the current study was consistent with those underlying the original scale, as factor loadings of the items about spouses were almost identical to those regarding a special someone in the original scale. Our findings were also concordant with prior evidence on middle-aged Korean women with diabetes. Additionally, the AVE values were sufficient to verify convergent and discriminant validity. It is also notable that the values of the spouse domain (AVE = 0.67, CR = 0.89) were relatively high compared to family and friends (AVE = 0.59 and 0.48, CR = 0.85 and 0.78). Taken together, the three-factor structure underlying the Korean MSPSS (i.e., family, friends, and spouse) was convincing, and the use of a spouse instead of a special person was valid.

Consistent with prior findings, the comparisons between groups according to depression and symptom distress levels demonstrated differences in the MSPSS total and sub-dimensions except for the spouse sub-dimension. Specifically, the scores of the spouse sub-dimension between the depression and non-depression groups did not show a significant difference. There are two possible explanations for these results. First, this information may suggest that participants perceived somewhat strong support from their spouses, but this support resource may not have affected the depression levels of married women with breast cancer. Second, this finding may be related to participants’ homogeneous characteristics in terms of marital status and depression levels. All participants in this study were married, and their depression levels were low.
overall, making it challenging to identify a clear picture of spouse-dependent differences. However, previous research highlighted the critical role of a spouse as the primary resource for interpersonal support in buffering distressful impacts, such as cancer diagnosis and treatment. Therefore, a further study including larger samples and more varied sociodemographic characteristics is warranted to understand the relationship clearly.

Additionally, this study confirmed the concurrent validity of the MSPSS based on the significant correlations of the MSPSS whole and sub-dimensions with social or family well-being and positive relations with others. It should be noted that the spouse sub-dimension showed a relatively weak correlation ($r = 0.307$) with social-family well-being compared to the other two (i.e., family and friends) ($r = 0.452-0.595$). This finding may be associated with the typological interpretation of social support. Social support often implies a broad range of emotional, instrumental, and informational supports. Social or family well-being refers to the quality of diverse interactive relations, including family and friends. However, the items under the spouse sub-dimension focus on emotional support only from a spouse, which possibly captures a narrower view of interpersonal support than family members and friends. However, the relationships between spousal support and overall social and family-related quality of life were acceptable, based on theoretical and empirical evidence. Thus, these findings warrant further investigation to clarify the spouse sub-dimension.

The reliability of the MSPSS was verified using internal consistency and a test–retest technique. Cronbach’s alpha coefficient of the whole scale showed a sufficient value of 0.91, consistent with the value (0.90) reported for middle-aged Korean women with diabetes using the same scale, including a spousal sub-dimension. On the other hand, the value was relatively higher than the findings (i.e., 0.74 for the whole, 0.89 for spouse, 0.80 for family, and 0.73 for friends) about an Arab immigrant women living in the US using the adapted MSPSS including spousal sub-dimension. Thus, the findings supported the reliability of the revised MSPSS, which assesses a spouse’s support instead of a special person. Comparably, previous results on an original scale ranged from 0.84 to 0.92. Additionally, the internal reliability of the three sub-dimensions was acceptable (Cronbach’s alpha coefficients: 0.96 for a spouse, 0.90 for family, and 0.90 for friends). Moreover, a test–retest technique added evidence of adequate reliability by showing moderate to high correlation coefficients (i.e., 0.794 for the whole, 0.615 for spouse, 0.549 for family, and 0.711 for friends) between the initial and repeated examinations. Additionally, the CR values beyond the cut-off of 0.70 (i.e., 0.89 for spouse, 0.85 for family, and 0.78 for friends) also support the reliability. In sum, the findings supported good internal reliability of the whole scale of the MSPSS and the three sub-dimensions. The issues pertaining to the ceiling effects were found to be possibly related to the skewed distributions of the scores. This may be due to the homogeneity of the sample—all the participants were married and reported moderate to high levels of perceived social support, and most of them lived with a spouse and another family member. This result was consistent with that of a previous study regarding the MSPSS’ Swedish version—which reported an issue regarding the ceiling effects related to the overall high support from family members. However, there are limited empirical studies that report on the ceiling and floor effects for the MSPSS. Further studies which include samples with more diverse sociodemographic characteristics are needed to confirm the MSPSS’ sensitivity in discriminating the sample’s characteristics.

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### Table 4

|                      | Depression ($n = 55$) | Non-depression ($n = 120$) | $t$ ($P$) | Symptom Distress ($n = 95$) | Non-symptom Distress ($n = 79$) | $t$ ($P$) |
|----------------------|----------------------|----------------------------|-----------|-----------------------------|-------------------------------|-----------|
| **MSPSS full-scale** |                      |                            |           |                             |                                |           |
| Spouse               | 65.96 (15.54)        | 72.92 (10.51)              | 3.47 (0.001) | 68.28 (15.53)               | 75.90 (9.69)                  | -3.94 (<0.001) |
| Family               | 21.85 (7.79)         | 23.25 (7.32)               | 1.15 (0.253) | 22.60 (7.09)                | 25.89 (3.63)                 | -3.94 (<0.001) |
| Friends              | 23.73 (3.30)         | 26.23 (2.82)               | 3.29 (0.002) | 23.72 (5.64)                | 25.29 (3.86)                 | -2.18 (0.031) |
|                      | 20.58 (6.63)         | 23.44 (4.87)               | 3.06 (0.003) | 21.97 (5.72)                | 24.72 (4.04)                 | -3.79 (<0.001) |

MSPSS: Multidimensional scale of perceived social support.

This study demonstrated that the adapted Korean version of the MSPSS was a valid and reliable measure for assessing social support among Korean breast cancer survivors. Notably, this study modified the term ‘special someone’ to ‘spouse’ based on Korean sociocultural norms and population-specific characteristics. This study also demonstrated the construct validity of the MSPSS based on intimate relationships with theoretically and empirically relevant issues in terms of social well-being, depression, and symptom distress in breast cancer patients. The test for reliability, including internal consistency and test–retest reliability, showed good values, and the structural robustness was confirmed through acceptable levels of construct and concurrent validity. Taken together, the MSPSS was appropriate for assessing social support in women with breast cancer in Korea. The findings implied the applicability of the MSPSS to evaluate social support and thereby develop an intervention for psychological support and symptom management tailored by patients’ social resources.

### Conclusions

This study demonstrated that the adapted Korean version of the MSPSS was a valid and reliable measure for assessing social support among Korean breast cancer survivors. Notably, this study modified the term “special someone” to “spouse” based on Korean sociocultural norms and population-specific characteristics. This study also demonstrated the construct validity of the MSPSS based on intimate relationships with theoretically and empirically relevant issues in terms of social well-being, depression, and symptom distress in breast cancer patients. The test for reliability, including internal consistency and test–retest reliability, showed good values, and the structural robustness was confirmed through acceptable levels of construct and concurrent validity. Taken together, the MSPSS was appropriate for assessing social support in women with breast cancer in Korea. The findings implied the applicability of the MSPSS to evaluate social support and thereby develop an intervention for psychological support and symptom management tailored by patients’ social resources.

### Author contributions

Conceptualization, M.K., H.Y. and M.S.J.; methodology, M.K. and H.Y.; investigation, M.K., H.Y. and M.S.J.; formal analysis, M.K. and H.Y.; validation, M.K., H.Y. and M.S.J.; writing—original draft preparation, M.K. and H.Y.; writing—review and editing, M.K., H.Y. and M.S.J.; supervision, H.Y.; project administration, H.Y. and M.S.J.; funding acquisition, H.Y. and M.S.J.

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Data availability statement
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

Declaration of competing interest
None declared.

References
1. WHO. WHO Report on Cancer: Setting Priorities, Investing Wisely and Providing Care for All. 2020. Available from: https://apps.who.intiris/handle/10655/330745. Accessed June 20, 2021.
2. Stein KD, Syrijala KJ, Andrykowski MA. Physical and psychological long-term and late effects of cancer. Cancer. 2006;112(11 Suppl):2577–2592.
3. Dumas A, Vaz Luis I, Bovagnet T, et al. Impact of breast cancer treatment on employment: results of a multicenter prospective cohort study (CANTO). J Clin Oncol. 2020;38(7):734–743.
4. Schmidt ME, Scherer S, Wiskemann J, Steinendorf K. Return to work after breast cancer: the role of treatment-related side effects and potential impact on quality of life. Eur J Cancer Care. 2019;28(4), e13051. https://doi.org/10.1111/ecc.13051.
5. Helgren VS. Social support and quality of life. Qual Life Res. 2003;12(4 Suppl 1):25–31.
6. Calderon C, Gomez D, Carmona-Bayonas A, et al. Social support, coping strategies and sociodemographic factors in women with breast cancer. Clin Transl Oncol. 2021;23:1955–1960.
7. Zhang H, Zhao Q, Cao P, Ren G. Resilience and quality of life: exploring the mediator role of social support in patients with breast cancer. Med Sci Monit. 2017;23:5969–5979.
8. G ümüs AB, Cam Ö. Effects of emotional support-focused nursing interventions on the psychosocial adjustment of breast cancer patients. Asian Pac J Cancer Prev. 2008;9(4):691–697.
9. Allaham A, Soltan M, Mollazadeh J. Posttraumatic growth, meaningfulness, and social support in women with breast cancer. Int J Cancer Manag. 2018;11(10):e14696. https://doi.org/10.5812/ijcm.11469.
10. Ng GJ, Mohamed S, See MH, et al. Anxiety, depression, perceived social support and quality of life in Malaysian breast cancer patients: a 1-year prospective study. Health Qual Life Outcome. 2013;15:205.
11. Kroenke CH, Kuhnsdorzy LD, Schernhammer ES, Holmes MD, Kawachi I. Social networks, social support, and survival after breast cancer diagnosis. J Clin Oncol. 2020;28(7):1105–1111.
12. Zimet GD, Dahlem NW, Zimet SG, et al. The multidimensional scale of perceived social support. J Pers Assess. 1988;52(1):30.
13. Dambly JM, Tapera I, Chiwaridzo M, Tadayenhamndu C, Nuhuzvi C. Psychometric evaluation of the Shona version of the multidimensional scale of perceived social support scale (MSPSS-Shona) in adult informal caregivers of patients with cancer in Harare, Zimbabwe. Malawi Med J. 2017;29(2):89–96.
14. Dambly JM, Corten I, Chiwaridzo M, et al. A systematic review of the psychometric properties of the cross-cultural translations and adaptations of the Multidimensional Perceived Social Support Scale (MSPSS). Health Qual Life Outcome. 2018;16(1):80.
15. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. J Mark Res. 1981;18(1):39–50.
16. Clark LA, Watson D. Constructing validity: basic issues in objective scale development. Psychol. 1995;7(3):309–319.
17. Akhtar A, Rahman A, Husain M, Chaudhry IB, Duddu V, Husain N. Multidimensional scale of perceived social support: psychometric properties in a South Asian population. J Obstet Gynaecol Res. 2010;36(4):845–851.
18. Kline RB. Principles and Practice of Structural Equation Modeling. New York: Guildford Publications; 2011.
19. Wongkasarn N, Wongkasaran T. A revised Thai multi-dimensional scale of perceived social support. Span J Psychol. 2012;15(3):1503–1509.
20. Zimet GD, Powell SS, Folley GK, et al. Psychometric characteristics of the multidimensional scale of perceived social support. J Pers Assess. 1990;55(3-4):610–617.
21. Gustavson-Lilius M, Julkunen J, Hietanen P. Quality of life in cancer patients: the role of optimism, hopelessness, and partner support. Qual Life Res. 2017;16(1):75–87.
22. Manns S, Badr H, Zaidi T, Nelson C, Kissane D. Cancer-related communication, relationship intimacy, and psychological distress among couples coping with localized prostate cancer. J Cancer Survivorship. 2010;4(1):74–85.
23. Kim J, Jang M. Stress, social support, and sexual adjustment in married female patients with breast cancer in Korea. Asia Pac J Oncol Nusr. 2020;7(1):28–35.
24. Vermeir WM, Bakker RM, Kenter GG, Stiggellboum AM, Ter Kuile MM. Cervical cancer survivors’ and partners’ experiences with sexual dysfunction and psychosocial support. Support Care Cancer. 2016;24(4):1679–1687.
25. Gustavsson-Lilius M, Julkunen J, Hietanen P. Quality of life in cancer patients: the role of optimism, hopelessness, and partner support. Qual Life Res. 2007;16(1):75–87.
26. Meng Vao L, Yi-Long Y, Liu L, Wang L. Effects of social support, hope and resilience on quality of life among Chinese bladder cancer patients: a cross-sectional study. Health Qual Life Outcome. 2016;14(73).
27. Kline RB. Principles and Practice of Structural Equation Modeling. New York: Guildford Publications; 2011.