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Factors associated with the quality of work life among working breast cancer survivors

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ABSTRACT

Objective: In South Korea, the incidence and survival rate of breast cancer are high, and the return-to-work rate of breast cancer survivors continues to increase. However, there are various obstacles after returning to work, which can negatively affect long-term quality of life management. Therefore, the purpose of this study is to identify factors associated with the quality of work life, which is a priority factor in managing the quality of life.
Methods: Data were collected from 169 female breast cancer survivors and participants were selected from three different hospitals in the metropolitan city and snowball sampling was used in conjunction. The participants filled out questionnaires about a variety of factors that may associated with quality of work life (QWL); the data were analyzed using descriptive statistics, *t*-test, one-way ANOVA, Pearson's correlation coefficient, and multiple linear regression.
Results: All participants were women with an average age of 48.9 years after diagnosis of cancer, with 65.7% married. 46.2% of them were in Cancer stage 1, 65.7% had work experience over six years, and most of them were educated managerial workers, fixed duty. Multiple regression analysis indicated perceived health status, social support of superior and colleagues and spiritual well-being were positive predictors and cancer fatigue and distress were negative predictors of QWL, explaining 49.5% (adjusted R^2) ($F_{10,158} = 17{,}486$, $P < 0.001$).
Conclusions: For increasing the QWL of working breast cancer survivors, decreasing cancer fatigue and distress and increasing perceived health status, social support, and spiritual wellbeing can be considered. The findings can contribute for developing effective and systematic interventions that consider the identified predictors to enhance the QWL and successful returning to work and job retaining.

Introduction

The incidence of breast cancer in South Korea continues to rise compared to Europe and the United States, changes in diet and the increase in obesity are seen as factors contributing to rising incidences of breast cancer.[1] And government support for cancer screening seems to contribute to the early detection of breast cancer.[1] In fact, stomach, colon, thyroid, and lung cancer is on the decline in recent years; however, the incidences of women's breast cancer in South Korea have continued to rise since the 1999.[2,3]

In 2018, the age-standardized rate (i.e., the incidence of cancer per 100,000 people) of women with breast cancer in South Korea was 62.2 people.[2] And there were over 100,000 breast cancer survivors; five-year cancer relative survival rate was 93.3% and 10-year cancer relative survival rate was 88.2%.[2]

The characteristics of female breast cancer patients in South Korea are a low incidence age. Breast cancer occurs often in woman in their 40s and 50s; the active production age.[4] In addition, female breast cancer patients in their 40s and 50s have various roles even after treatment, including child rearing, household activities, work life, and social activities.[5] Although conflicts over workplace and family compatibility are common phenomena in Korean society, workplace female breast cancer survivors are burdened with the cancer treatment process, parenting, and household activities. South Korea has a Universal Health Insurance system that has a single insurer, NHIS. All citizens receive the same medical expenses by NHIS. From the day of cancer diagnosis, the cancer patient only needs to pay 5% of the total medical cost for inpatient care and outpatient care services related with cancer in hospital for five years. Despite national support for cancer treatment stable economic income sources are essential for continuous health care and quality of life improvement as the cancer survival period expands.[6]

Financial resources and abilities are limited for low-income people, making the impact of cancer more severe than for those with high-income and these economic factors can affect cancer survivors' health care and satisfaction of general life.[4]

The work-return rate by cancer survivors is 30.5% in Korea,[4] which is half that of the global average of 63.5% after acute cancer treatment.[7] The Korean government publishes statistical data on cancer every year,

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but there is no statistical data on the return-to-work rate of breast cancer survivors. Therefore, there are differences according to individual studies for example, in Hwang and Lee,[8] 26.4% of breast cancer survivors returned to work, and in Shim's study, 56.3%.[9]

After return to work, breast cancer survivors experience many obstacles such as physical and psychological demands, economic burdens, and social prejudice to adapt and maintain their work life.[5–9] Furthermore, job performance can be affected due to side effects of cancer treatment, which may lead to interpersonal crisis, diminishing self-esteem and confidence in workplace, thereby reducing workplace maintenance and increasing turnover. According to a survey study in South Korea, 47%–57% of the turnover is related to cancer diagnosis in cancer survivors at workplace; additionally, cancer survivors have a 47% lower reemployment rate than healthy people.[10]

To breast cancer survivors, a job means more than a stable source of income for treatment and health care, since the high psychological and emotional satisfaction as well as well-being acquired by working and accomplishing tasks enhances their overall subjective satisfaction of daily life.[11] Thus, to maintain health, restore self-esteem, and promote quality of life in breast cancer survivors, it is important to improve their quality of work life (QWL), which refers to the subjective satisfaction achieved from work and interpersonal relationships within a work environment.[12] QWL is an important concept for breast cancer survivors and healthy workers,[13] but it is an essential factor for breast cancer survivors who returned to work, to assess the quality of psychological stability, health care, and subjective satisfaction through work performance.[14]

Breast cancer survivors can experience cancer fatigue[15–17] and psychological distress[18,19] due to side effects of cancer treatment. Furthermore, lack of awareness of one's own health status,[20] lack of knowledge about cancer and emotional support from supervisors and colleagues at workplace[11] and loss of ultimate meaning of life, fear of death, and spiritual pain from the possible judgment for their sins,[21] all have a detrimental impact on their quality of work life.[22] Thus, identifying their needs for returning to work could contribute to a higher QWL that would also affect the general quality of life of breast cancer survivors.[22]

Breast cancer survivors who returned to work can experience psychological burdens caused by artificial menopause.[23] Many breast cancer survivors can experience cancer fatigue,[15–17] estimates vary widely, but about over 30% of women with breast cancer report persistent fatigue up to 10 years after cancer treatment.[24] Fatigue includes physical and psychological characteristics as well as cultural and social factors which are a bit different from general fatigue such as lack of energy, lack of vitality, lethargy, fatigue, loss of power, and concentration.[25] Cancer-related fatigue can be defined as "Overwhelming and persistent fatigue, subjective state and reduced pharmacological ability and mental work that is not mitigated by rest".[26] Previous studies have reported that fatigue in breast cancer survivors is the primary criterion influencing their decision to return to normal life and work; it was associated with increased job stress, which can be accompanied by diminished QWL.[11,16,27] Therefore, exploring and implementing appropriate interventions to manage these fatigue-related functions are expected to contribute to breast cancer survivors' retention of their wok and increase in their QWL.[16]

Not just fatigue, approximately 30% of cancer survivors experience cancer distress such as embarrassment, sorrow, depression, anxiety, social isolation, and existential crises.[18,28] Especially, female breast cancer survivors experience higher distress level than other cancer survivors.[18,19] Only a few studies exist on the most common types of psychological distress in breast cancer survivors, namely anxiety, depression, and insomnia, all of which have an adverse impact on quality of life including the QWL.[18,25,29]

"Perceived health" of cancer survivors is a subjective evaluation of their overall health conditions. A previous study of cancer survivors reported above average (3.31 out of 5.00) "perceived health," including that of breast cancer survivors within five years after cancer diagnosis.[22] In previous study, perceived health status condition was associated with work performance, interpersonal confidence and QWL also.[20,30,31]

Compared to healthy women, breast cancer survivors are reported to experience significant mental health problems such as depression, anxiety, and hostility, which are associated with support from spouses, family members, and other social relationships.[19,32]

However, for breast cancer survivors who return to work, primary support from their supervisor and colleagues is crucial and positively predicts their QWL.[22] Women are more sensitive to social support than men, consideration regarding health, workload, and work environment provided by individual colleagues and supervisors as well as their organization are important predictors of QWL.[33]

Even after the completion of treatment, breast cancer survivors continue experiencing social and psychological problems, which takes a toll on their psychological and spiritual aspects of general life.[29] Consequently, survivors can become interested in spirituality and overcome challenges in daily living, including life crises and severe stress.[34] A high spiritual level for breast cancer survivors can contribute to a positive attitude toward life and, by extension, a sense of satisfaction.[31] However, research on the relationship between spiritual well-being and QWL in breast cancer survivors is very limited. A recent study on nurses who have survived cancer such as breast, ovarian, and uterine cancer observed that workplace spirituality which refers to discovering new meaning and values, achieving a sense of accomplishment, restoring self-esteem through work, and thus, experiencing satisfaction in the workplace is an important predictor of QWL.[16,17]

Till date, a few studies conducted on the return and maintenance of breast cancer survivors in South Korea have been qualitative studies exploring work lives.[11,23] Few studies have attempted to develop instruments to measure quality of work life for cancer survivors, and very few relevant quantitative studies have been conducted.[12,16,17,22]

This study is a unique survey study conducted in South Korea to confirm the relationship between the quality of work life and variables of female breast cancer survivors. Previous studies investigated the quality of life of female breast cancer survivors[27] and variables related to workplace life quality of cancer survivors.[16,22] It is necessary to manage female breast cancer survivors' quality of life, based on their physical, social, and psychological transformation over a long period. Therefore, this study approaches variables that can affect the quality of work life of breast cancer survivors returning to work from various directions to identify related factors, and the results are could available foundational data for developing intervention programs to create quality of work life and future restructured research.

Methods

Study design

This descriptive study used a nonexperimental, cross-sectional design. The criteria for selecting subjects for: (1) female breast cancer survivors, (2) after cancer diagnosis, they end acute treatment such as surgery, chemotherapy, and radiation therapy, and have returned to work for more than 6 months (3) They belong to workplaces with bosses and colleagues. Participants voluntarily agreed to participate in this study. The sample size was calculated by G*power 3.1 software program (Heinrich Hein University in Dusseldorf, Germany). If a medium effect size required for regression analysis was 0.15, with a power of 0.80 (1-β error probability), and significance level of $\alpha = 0.05$, at least 153 participants were required. Considering a dropout rate of 10%, 169 participants were considered a suitable sample for this study. A total of 175 questionnaires were distributed and 170 questionnaires were filled in and collected". After excluding one incomplete questionnaire, 169 questionnaires were included in the analysis.

Data collection

Data were collected from March 8 to April 30 in 2021. Eighty of the total participants were recruited from two tertiary hospitals and one

general hospital's outpatient ward located in a metropolitan D city; in addition, 89 participants were recruited through snowball sampling method (SSM). A researcher visited the nursing directors of three hospitals following relevant hospital procedures and obtained the permission from the hospitals for data collection. Sufficient explanation was given to participants about the purpose, measurements, risks, and benefits of this study, and the participants were asked for their informed consent. Participants received a questionnaire with an information sheet explaining that completing the questionnaire would take 30–40 min, that the collected data would be anonymized and would not be used for any purposes other than for those of this study, and that the participants could withdraw from the study at any time. Participants received a beverage card worth about US $9 for participation. This study was approved by an appropriate electronic institutional review board by the Korea National Institute for Bioethics Policy (Approval No. p01-202103-21-002) and the investigation conformed to principles outlined in the Declaration of Helsinki.

Instruments

The participants' general characteristics were collected using a self-reported questionnaires that contained 13 questions based on the results of previous studies.[12,14,16,17,22] It comprised five items related to socio-demographic factors (age, marital status, number of children, education level, and religion), five job-related items (occupational sector, work tenure, monthly net income, working type, working position), and three cancer-related items (cancer stage, the number of years that have passed after cancer diagnosis, the number of cancer treatments in progress).

Cancer fatigue

Functional Assessment of Chronic Illness Therapy—Fatigue (FACIT-F) developed by Yellen et al.[35] and Korean version was downloaded from web site (https://www.lifead-vance.com/products.html). FACIT-F scored the entire question by referring to the instructions on tools and calculation methods provided by the institution. This 13-item tool deals with cancer patients' feelings about fatigue, experience of fatigue, diet, sleep, and activity under four domains such as physical well-being, social/family well-being, emotional well-being, and functional well-being. Each item is rated on a five -point Likert scale, and a higher score indicates a higher level of cancer fatigue in the past week. The Cronbach's α was 0.95 in the study by Yellen et al.[35]

Distress

Distress was measured using the Distress Psychological Assessment Questionnaire developed by Kim et al.,[36] which is recommended by the Korean government for measuring distress in cancer patients in a health care setting. The six-item Distress Psychological Assessment Questionnaire consists of three subscales: insomnia (two items), depression (two items), and anxiety (two items). Each item is rated on an 11-point Likert scale, and a higher score indicates higher distress. Total scores of 0–3 indicate low distress, and total scores of 4–10 indicate high distress. The Distress Psychological Assessment Questionnaire has been validated by many studies in Korea and the Cronbach's α was 0.92 in the study by Kim et al.[36]

Perceived health status

The Health Self Rating Scale (HSRS) was developed by Lawston[37] and translated and modified into Korean by Lee.[38] The HSRS consists of two subscales: current health status (two items) and health status compared to others (one item). Each of the three items is rated on a five-point Likert scale, and a higher score indicates a higher perceived health status. The Cronbach's α was 0.76 in Lee's study.[38]

Social support

The Social Support Questionnaire was developed by House[39] and translated and modified into Korean by Ko.[40] It consists of two subscales: support from a supervisor (four items) and support from a colleague (four items). Each of the eight items is rated on a five-point Likert scale, and a higher score indicates greater social support. The Cronbach's α was 0.85 for support from a supervisor and 0.78 for support from a colleague by Son and Ko's study.[40]

Spiritual well-being

The Spiritual Well-Being Scale (SWB-K), which was developed by Palouzian and Elison and Korean version was downloaded from Life ADVANCE website (https://www.lifeadvance.com/products.html) and used for measuring the spiritual well-being for breast cancer survivors. The 20-item scale comprises two subscales: existential well-being (10 items) and religious well-being (10 items). Each item is rated on a six-point Likert scale, and a higher score indicates higher spiritual well-being. The Cronbach's α of the SWB-K was 0.94 in the study by Kim.[41]

Quality of work life

The Quality of Working Life Questionnaire for Cancer Survivors (QWLQ–CS), which was developed by de Jong et al.[14] and translated and modified into Korean by Jin and Lee.[16] The 23-item questionnaire consists of five subscales: meaning of work (four items), perceptions of the work situation (five items), atmosphere in the work environment (five items), understanding and recognition in the organization (five items), and problems due to the health situation (four items). Each item is rated on a six-point Likert scale, and a higher score indicates higher QWL.

Data analysis

Data analyses were performed using SPSS version 19.0 for Windows. To ensure accuracy, after data entry, the entire data set was double-checked by comparing it with the questionnaires. Participants' general characteristics were analyzed using mean, standard deviation, percentage, and frequency. The differences in QWL, according to general characteristics, were analyzed using independent *t* test and one-way ANOVA. To analyze the correlations among the major variables, such as cancer fatigue, distress, perceived health status, social support, spiritual well-being, and QWL, Pearson's correlation coefficient was used. Further, a multiple stepwise regression analysis was performed using the major variables and general characteristics, illustrating significant differences in the QWL. All statistical tests were two-tailed, and the significance level was set to a standard of $\alpha < 0.05$.

Results

General characteristics of participants and difference in QWL

The general characteristics of the 169 participants are shown in Table 1. All participants were female breast cancer survivors. The mean age was 48.9 years (± 7.27). QWL differed significantly according to education level ($F = 10.58$, $P < 0.001$) and salary ($F = 3.38$, $P = 0.020$). Scheffé test resulted among the educational level of participants, high school graduation group was lower of QWL compared to other groups and there was no significant difference between monthly income levels of participants.

Table 1
General characteristics of participants and differences according to QWL ($n = 169$).

Variables	Categories	n (%)	Mean ± SD	t/F	P	Scheffé
Age (years)	< 40	17 (10.1)	4.30 ± 0.53	0.25	0.860	
	40–49	73 (43.2)	4.32 ± 0.63			
	50–59	69 (40.8)	4.41 ± 0.74			
	≥ 60	10 (5.9)	4.44 ± 1.12			
Marital status	Unmarried	47 (27.8)	4.44 ± 0.57	0.92	0.402	
	Married	111 (65.7)	4.35 ± 0.75			
	Others (divorce, widow, farewell, separation)	11 (6.5)	4.13 ± 0.63			
No. of children	None	54 (32.0)	4.48 ± 0.57	11.57	0.328	
	1	23 (13.6)	4.21 ± 0.62			
	2	75 (44.4)	4.36 ± 0.83			
	3	17 (10.1)	4.21 ± 0.46			
Education level	High school[a]	42 (24.9)	3.99 ± 0.80	10.58	< 0.001	a < b, c[a]
	College[b]	95 (56.2)	4.42 ± 0.63			
	Graduate school[c]	32 (18.9)	4.68 ± 0.54			
Religion	None	39 (23.1)	4.39 ± 0.67	0.24	0.869	
	Catholic	61 (36.1)	4.35 ± 0.72			
	Protestant	35 (20.7)	4.28 ± 0.78			
	Buddhism	34 (20.1)	4.40 ± 0.68			
Occupation sector	Education	31 (18.3)	4.52 ± 0.63	2.63	0.052	
	Medical, social service	60 (35.5)	4.49 ± 0.54			
	Sales, clerical work	73 (43.2)	4.19 ± 0.79			
	Manufacturing job	5 (3.0)	4.34 ± 1.02			
Work tenure (years)	< 6	58 (34.3)	4.18 ± 0.77	2.56	0.057	
	6–10	44 (26.0)	4.40 ± 0.76			
	11–20	44 (26.0)	4.55 ± 0.56			
	≥ 21	23 (13.6)	4.41 ± 0.55			
Individual monthly net income (10,000 won)	< 150	34 (20.1)	4.23 ± 0.69	3.38	0.020	[b]
	150–249	66 (39.1)	4.23 ± 0.75			
	250–349	31 (18.3)	4.45 ± 0.62			
	≥ 350	38 (22.5)	4.63 ± 0.61			
Working type	Shift duty	36 (21.3)	4.17 ± 0.60	−1.89	0.061	
	Fixed duty	133 (78.7)	4.41 ± 0.71			
Working position	Staff	95 (56.2)	4.32 ± 0.72	−0.95	0.344	
	Manager	74 (43.8)	4.42 ± 0.66			
Cancer stage	Stage 1	78 (46.2)	4.37 ± 0.74	0.27	0.762	
	Stage 2	66 (39.1)	4.39 ± 5.89			
	Stage 3	25 (14.8)	4.27 ± 0.85			
No. of years that have passed after cancer diagnosis (at the time of the survey)	1	8 (4.7)	3.89 ± 0.61	1.34	0.259	
	2	47 (27.8)	4.29 ± 0.72			
	3	26 (15.4)	4.45 ± 0.69			
	4	30 (17.8)	4.46 ± 0.68			
	5	58 (34.3)	4.36 ± 0.70			
No. of cancer treatments in progress (radiation therapy, targeted therapy hormone therapy)	None	56 (33.1)	4.44 ± 0.67	1.04	0.681	
	≤ 2	113 (66.9)	4.32 ± 0.71			

SD: Standard deviation; QWL: quality of work life.
[a] As a Post-hoc after ANOVA test (Scheffé) represents the significant difference of QWL by each education group. a = QWL mean of highschool group, b = QWL mean of college group, b = QWL mean of graduate school group; QWL level of college (b) and graduate school (c) group are higher than highschool group (a).
[b] There were no significant differences of QWL among occupation sectors' groups and monthly income groups on Scheffé test.

Descriptive statistics of main variables

The study parameters are presented as mean and standard deviation (Table 2). The participants had a mean cancer fatigue score of 2.31 ± 0.64 (out of 5), distress score of 3.19 ± 1.95 (out of 10), perceived health status score of 3.31 ± 0.64 (out of 5), social support score of 3.36 ± 0.58 (out of 5), spiritual well-being score of 4.22 ± 1.15 (out of 6), and QWL score of 4.36 ± 0.70 (out of 6).

Correlation between quality of working life and main variables

Table 3 shows the correlations between the main study parameters. QWL was moderately negatively correlated with cancer fatigue ($r = -0.49$) and distress ($r = -0.36$), and was moderately positively correlated with perceived health status ($r = 0.41$), social support ($r = 0.40$), and spiritual well-being ($r = 0.35$).

Multiple regression analysis of QWL with associated factors

There are two significant variables (education level and monthly income) from the univariate analyses and scores of cancer fatigue, distress, perceived health status, social support and spiritual well-being were put into the multiple stepwise regression model of QWL. All seven variables were included in the model. The Durbin–Watson statistic was close to 2.00 at 2.09, confirming the absence of autocorrelation. Further, the correlations among the main variables were below 0.80, confirming independence of the variables. Tolerance was 0.10 or higher at 0.10–0.80, and the variance inflation factor was below 10, at 1.19–1.77, confirming the absence of multi collinearity. Residual analysis confirmed the satisfaction of equal variance with a standardized residual range of −2.98–2.03 and the model was significant (Adjust $R^2 = 0.495$, $F_{10,158} = 17.486$, $P < 0.001$).[42] As shown in Table 4, perceived health status, social support and spiritual well-being were positively associated with QWL,

Table 2
Descriptive statistics of main variables ($n = 169$).

Variables	Items	Cronbach's α	Mean ± SD	Range	
				Possible	Actual
Cancer fatigue	13	0.89	2.31 ± 0.64	1.00–5.00	1.00–4.15
Distress	6	0.92	3.19 ± 1.95	0.00–10.0	0.00–8.33
Perceived health status	3	0.88	3.31 ± 0.64	1.00–5.00	2.00–5.00
Social support	8	0.82	3.36 ± 0.58	1.00–5.00	1.25–4.75
Spiritual well-being	20	0.96	4.22 ± 1.15	1.00–6.00	1.85–6.00
QWL	23	0.91	4.36 ± 0.70	1.00–6.00	2.63–5.85

QWL: quality of work life.

while cancer fatigue, distress were negatively associated. And among education level of participants, QWL of high school graduated group was lower than college and graduate school group and was negatively associated with QWL.

Discussion

In this study, the value of main variables was resulted as a moderate or higher score. The mean of QWL score was 4.36 ± 0.70, similar to the score (4.39) reported using the same instrument in the study by Jinet et al.,[16] but lower than that (4.84) in a Dutch study by de Jong et al.[14] Such variances may be attributable not only to the differences in individual, organizational, and social perceptions about cancer survivors' return to work in different countries, but also to the workplaces, national systems, and policies that assist their return to work. For example, the differences in return-to-work support programs, medical subsidies, and health management systems for cancer survivors, which vary from country-to-county, seem to influence the QWL of cancer survivors.[14] The Korean government created the "Comprehensive Support Center for Cancer Survivors" in late 2017 to comprehensively assess the physical, mental, and social welfare challenges experienced by cancer survivors after treatment and provide domain-specific support services, but this system is still in an inchoate stage.[2] The current study is unique in that it only included female breast cancer survivors who returned to work; hence, the findings reflect the specific characteristics of these survivors, necessitating further comparative analysis with additional replication studies.

In this study, cancer fatigue and distress negatively correlated with QWL which were similar to previous findings.[16] Similar to previous study results, perceived health status,[20,31] social support,[22] and spiritual well-being[34] have positive correlation with QWL.

As the results suggested, social support, cancer fatigue, distress, perceived health status, spiritual well-being and educational level are significant predictors of QWL.

In this study, cancer fatigue is a significant predictor to QWL in breast cancer survivors like a previous study.[16,29] In previous studies, breast cancer has been reported to have a combination of cancer treatments such as surgery, chemotherapy, radiation, targeted therapy, and hormone therapy, resulting in fatigue, cognitive decline, and various physical side effects.[31] This is related to an increase in job stress and a decrease in the QWL of breast cancer survivors even after returning to work.[31] Thus, to improve the QWL, it needs to develop the effective health intervention programs that can reduce cancer fatigue in the workplaces. And it is essential to assess the workers' cancer fatigue, foster an appropriate work environment, and implement support measures in organization.

Psychological distress (i.e., depression, anxiety, and insomnia) is found as another predictor of QWL in working breast cancer survivors. Even there are few studies that have used the same variables, this is similar to previous results that identified depression, anxiety, and insomnia symptoms as the predictors of poor quality of life of breast cancer patients.[28,29] Most breast cancer survivors experience moderate or severe distress even after the completion of treatment due to persistent physical symptoms, fear, and anxiety about recurrence and metastasis.[39] In particular, most survivors have a high level of distress due to the nature of the cancer[19,43] and returning to work contributes to increasing the distress, as cancer survivors, whose physical and cognitive functions are deteriorated due to the aftereffects of cancer treatment can experience negative emotions such as discrimination and prejudice in the process of re-adaptation after returning to work.[11,19]

If psychological distress persists, their job satisfaction can be diminished and QWL is degraded.[19] Distress must be managed properly, as it critically impacts the QWL of breast cancer survivors who return to work. To do this, understanding the features of distress in this population is essential; However, Kim et al.'s distress instrument that was used in this study was developed for all cancer patients and has limitations in reflecting the characteristics of breast cancer survivors experiencing higher distress than other cancers.[39] Therefore, a distress measurement tool should be developed that reflects the characteristics of breast cancer patients.

Social support at workplace was also identified as a predictor of QWL among breast cancer survivors who returned to work, similar to results of prior study[22] and partially in line with past results showing that support from supervisors and colleagues predict overall quality of life.[44] Breast

Table 3
Correlation between QWL and main variables ($n = 169$).

Variables	QWL	Cancer fatigue	Perceived health status	Distress	Social support	Spiritual well-being
QWL	1					
Cancer fatique	−0.49*	1				
Perceived health status	0.41*	−0.59*	1			
Distress	−0.36*	0.48*	−0.38*	1		
Social support	0.40*	−0.05	0.13	−0.08	1	
Spiritual well-being	0.35*	−0.06	0.02	−0.07	0.32*	1

QWL: quality of work life.
Significance level: *$P < 0.001$.

Table 4
Multiple stepwise regression analysis of QWL with associated factors ($n = 169$).

Variables	Non-standardized β coefficient		Standardized β coefficient	t	P
	β	SE	β		
Social support	0.307	0.074	0.255	4.160	<0.001
Cancer fatigue	−0.303	0.079	−0.279	−3.812	<0.001
Distress	−0.053	0.023	−0.148	−2.292	0.023
Perceived health status	0.168	0.077	0.155	2.193	0.030
Spiritual well-being	0.151	0.038	0.248	3.991	<0.001
D. edu.high school	−0.290	0.136	−0.180	−2.14	0.034
D. edu.college	−0.035	0.110	−0.025	−0.317	0.752
D. income.< 150	−0.213	0.134	−0.123	−1.593	0.113
D. income.150−249	−0.133	0.110	−0.093	−1.209	0.228
D. income.250−349	0.166	0.128	0.092	1.298	0.196
$R^2 = 0.525$, Adjusted $R^2 = 0.495$ $F_{10,158} = 17{,}486$, $P < 0.001$					

Standard value of dummy variable of monthly income was ≥ 350 (KW).
D: Dummy variable; standard value of dummy variable of education was graduate school.

cancer survivors who return to work seem to have high needs for social support[24] and often require emotional and social assistance with practical problems such as returning to normal life and work, during the five-year survival period after cancer diagnosis.

It could be important to develop education and support programs and support programs to promote personal attention and organizational support and change perceptions about cancer survivors who return to work. Previous studies have reported an array of social support resources, including spouses, family, health care providers, significant acquaintances, and religious organizations, predict the quality of life in breast cancer survivors.[45] And even they deal with the social support such as supervisor and colleagues' support among cancer survivors, it was associated with quality of life also.[44] Thus far, there have not been many studies examining the relationship between social support (supervisors' and colleagues' support) and the quality of work life among cancer survivors in South Korea, within organizations. Therefore, it is necessary to replicate and conduct more in-depth studies including these social support resources to comparatively analyze our results.[32]

The results regarding perceived health status are supported partially by previous studies that have identified it as a predictor of quality of life of breast cancer survivors,[30,32] gynecologic cancer,[20] and all other cancers.[31] Perceived health status seems to be an important determinant of QWL,[13] it needs to assess cancer survivors' perceived health and implementation of effective health management programs in organization.

Finally, spiritual well-being was identified as a positive predictor of QWL in breast cancer survivors. It could not be compared with existing data, as no existing studies have used the same parameters. However, this is partially supported by previous results, confirming that spiritual well-being of breast cancer patients influences their quality of life.[46] Furthermore, taking into account that spiritual well-being can drive survivors to overcome physical, psychological, and social adversities related to cancer and to adopt a positive attitude toward life by discovering life's meaning and values beyond oneself,[34] our results are in line with past findings that workplace spirituality is an important predictor of QWL.[16] Therefore, implementing spiritual care interventions, such as meditation, praying, counselling, and self-transcendence can contribute to improving the spiritual well-being and QWL and reducing job stress in the workplace.[46] To actually implement these programs in the work environment, generating awareness on the importance of spiritual well-being as well as colleagues' and employers' active support will be needed.

In this study, participants' low educational level was a negative predictor to QWL. Especially, high school graduation group's QWL was lower than other groups. Therefore, consideration for their education level is needed when planning and applying programs for breast cancer survivors returning to work.

Meanwhile, in this study, most of the breast cancer survivors were highly educated managerial workers, and more than 50% of the subjects belonged to 4–5 years after diagnosis category. Physical, psychological, social, and spiritual conditions and quality of workplace are expected to differ depending on the occupational characteristics and diagnosis period of cancer survivors, so future studies need repetitive studies considering occupational characteristics and cancer progression stages.

Limitations and strengths

Since the participants were recruited from a single region, this study's results cannot be generalized to the entire working breast cancer survivor population. Subsequent studies should recruit participants from other regions and countries to examine breast cancer survivors' QWL and its predictors.

And the SSM was an effective method that was partially used to approach participants who did not want to reveal that they were cancer survivors during the coronavirus disease 2019 (COVID-19) pandemic. However, this may be another limitation of this study. SSM has a sampling bias and margin of error since participants referred us to other individuals with similar traits. Therefore, it is difficult to generalize this study's results. Future studies may be able to increase the representation of SSM by sufficiently planning the sampling process and goal, initiating parallel snowball networks, and using quota sampling.[47]

Furthermore, long-term longitudinal studies that examine changes and predictors of QWL over time in breast cancer survivors should be conducted to address the shortcomings of a cross-sectional study. In case of breast cancer, the overall quality of life, including the concept of QWL, varies according to the stage of survival.[48] In this study, a beverage coupon was offered to participants as an incentive after the survey. This has a limitation that the use of inappropriate incentives may lead to biased group of respondents' surveys, which may result in the inability to obtain actionable data.

Despite these limitations, this study is the first quantitative study conducted in Korea that identifies the predictors of QWL in breast cancer survivors and also first to investigate the spiritual well-being and its association with QWL in South Korea. The results provide foundational data for researchers developing interventions to boost the QWL of breast cancer survivors, health care providers who support and treat them, and government and organizational policymakers who devise policies for cancer survivors who return to work.

Conclusions

This study aimed to present foundational data for developing interventions to enhance the QWL of breast cancer survivors by identifying its associations. The perceived health status, social support, spiritual well-being, and cancer fatigue were positive predictors of QWL and distress was a negative predictor of QWL. These findings would contribute to developing and implementing effective and systematic interventions to enhance the QWL of breast cancer survivors, contribute to their successful return to and continuation of work, and ultimately increase their overall quality of life.

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Declaration of competing interest

None declared.

References

1. National Cancer Center. *Breast Cancer Screening Recommendations* [Internet]. Gyeonggi: National Cancer Center; 2015 [cited 2021 March 10]. Available from: https://www.cancer.go.kr/lay1//bbs/S1T261C264/B/36/view.do?article_seq=19688&cpage=&rows=&condition=&keyword=&rn=3.
2. National Cancer Information Center. Cancer Incidence Rate in 2018. Available online: https://ncc.re.kr/cancerStatsView.ncc?bbsnum=538&searchKey=total&searchValue=&pageNum=1 (accessed on 1 March 2020).
3. Ministry of Health and Welfare. *Cancer Registration Statistics* [Internet]; 2019. Sejong: Author [cited 2021, March 25]. Available from: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2770.
4. Korean Breast Cancer Society. *Breast Cancer Facts & Figures 2019* [Internet]; 2019. Seoul: Author [cited 2020 June 11]. Available from: http://www.kbcs.or.kr/journal/file/200416.pdf.
5. Han SJ, Kim HW, Kim MR. Unmet needs for job maintenance of breast cancer survivors. *J Korean Acad Fundam Nurs*. 2020;27:298–309.
6. Chae W, Kim J, Park S, Park EC, Jang SI. The financial burden associated with medical costs among childhood cancer patients and their families related to their socioeconomic status: the perspective of National Health Insurance Service. *Int J Environ Res Public Health*. 2020;17(17):6020. https://doi.org/10.3390/ijerph17176020.
7. Park JH, Park EC, Park JH, Kim SG, Lee SY. Job loss and re-employment of cancer patients in Korean employees: a nationwide retrospective cohort study. *J Clin Oncol*. 2008;26(8):1302–1309.
8. Hwang EK, Lee MS. Factors influencing quality of life in patients with breast cancer on hormone therapy. *J Korean Acad Nurs*. 2014;44:108–117. https://doi.org/10.4040/jkan.2014.44.1.108.
9. Shim HY, Lee CW, Yu ES, Park BY, Yang EJ. Cancer survivors and returning to work perspectives from occupational health physicians in Korea. *J Korean Med Sci*. 2019;34:e98. https://doi.org/10.3346/jkms.2019.34.19e98.
10. Park JH. The strategy of employment of cancer survivors. *Korean Soc Occup Environ Res*; 2014:128–130. Available online: http://www.dbpia.co.kr/Article/NODE06238122. http://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE06238122 (cited 2021 March 10).
11. Kim MH, Kim JS, Kim HN. Return-to-work experiences among nurses after receiving cancer treatment. *J Korea Acad Industr Coop Soc*. 2016;17:215–225. https://doi.org/10.5762/kais.2016.17.6.215.
12. de Jong M, Tamminga SJ, Frings-Dresen MH, de Boer AG. Quality of working life of cancer survivors: associations with health-and work-related variables. *Support Care Cancer*. 2017;25:1475–1484. https://doi.org/10.5762/kais.2016.17.6.215.11.
13. Kim M, Ryu E. Structural equation modeling of quality of work life in clinical nurses based on the culture-work-health model. *J Korean Acad Nurs*. 2015;45:879–889. https://doi.org/10.4040/jkan.2015.45.6.879.
14. de Jong M, Tamminga SJ, Van Es RJ, Frings-Dresen MH, de Boer AG. The quality of working life questionnaire for cancer survivors (QWLQ-CS): factorial structure, internal consistency, construct validity and reproducibility. *BMC Health Serv Res*. 2018;18:66–79. https://doi.org/10.1186/s12885-017-3966-1.
15. Curt GA, Breitbart W, Cella D, et al. Impact of cancer-related fatigue on the lives of patients: new findings from the fatigue coalition. *Oncol*. 2000;5:353–360. https://doi.org/10.1634/theoncologist.5-5-353.
16. Jin JH, Lee EJ. Factors influencing quality of working life of cancer survivors after return to the workplace. *Korean J Occup Health Nurs*. 2018;27:203–214. https://doi.org/10.5807/kjohn.2018.27.4.203.
17. Jin JH, Lee EJ. Factors affecting quality of work life in a sample of cancer survivor female nurses. *Medicina*. 2020;56:721–736. https://doi.org/10.3390/medicina56120721.
18. Bae JH. *Impact of Supportive Care Needs and Family Support on Quality of Life of Advanced Cancer Patients in Chemotherapy* [master's thesis]. Seoul: Seoul National University; 2015. Korea.
19. Yang KM, Chae MJ, So HS. Stigma and distress among cancer patients: the mediating effect of self-blame. *Korean J Adult Nurs*. 2018;30:89–97. https://doi.org/10.7475/kjan.2018.30.1.89.
20. Park JS, Oh YJ. Factors influencing on quality of life in gynecological cancer patients. *Korean J Adult Nurs*. 2012;24:52–63. https://doi.org/10.7475/kjan.2012.24.1.52.
21. Lee BS, Kim KM. The conceptual analysis of spirituality. *J Korean Acad Adult Nurs*. 1998;10:460–468. http://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE01550309.
22. Jin JH, Lee EJ. Structural equation model of the quality of working life among cancer survivors returning to work. *Asian Nurs Res*. 2021;15:37–46. https://doi.org/10.1016/j.anr.2020.10.002.
23. Kim MR, Kim HW, Han SJ. Review of workplace life among breast cancer survivors in Korea. *J Humanit Soc Sci*. 2019;21:505–520. https://doi.org/10.22143/hss21.10.5.36, 10.
24. Bower JE, Ganz PA, Desmond KA, et al. Fatigue in long-term breast carcinoma survivors: a longitudinal investigation. *Cancer*. 2006;106(4):751–758.
25. Bardwell WA, Ancoli-Israel A. Breast cancer and fatigue. *Sleep Med Clin*. 2008;3:61–71. https://doi.org/10.1016/j.jsmc.2007.10.011, 2008.
26. Cella D, Peterman A, Passik S, et al. Progress toward guidelines for the management of fatigue. *Oncology (Williston Park)*. 1998;12:369–377.
27. Han SJ, Kim HW, Yoon DS, Kim MR. Quality of life and supportive care needs of back-to-work breast cancer survivors. *Korean J Adult Nurs*. 2019;31:552–561. https://doi.org/10.7475/kjan.2019.31.5.552.
28. Nho JH, Kim SR, Park MH, Kwon SS. Symptom clusters and quality of life in breast cancer survivors after cancer treatment in a tertiary hospital in Korea? *Eur J Cancer Care*. 2018;27:e12919. https://doi.org/10.1111/ecc.12919.
29. Byun HS, Kim GD. Impacts of fatigue, pain, anxiety, and depression on the quality of life in patients with breast cancer. *Asian Oncol Nurs*. 2012;12:27–34. https://doi.org/10.5388/aon.2012.12.1.27.
30. Kwon EJ. *Distress and Quality of Life After Completion of Cancer Treatment in Breast Cancer Patients*. Unpublished master's thesis. Seoul: Seoul National University. Seoul, Korea; 2009.
31. Kang SJ. Factors influencing quality of life among cancer survivors: using KNHANES 2010-2014. *J Korean Content Assoc*. 2016;16:628–637. https://doi.org/10.5392/jkca.2016.16.09.628.
32. Kim YS, Tae YS. The influencing factors on quality of life among breast cancer survivors. *Asian Oncol Nurs*. 2011;11:221–228. https://doi.org/10.5388/jkon.2011.11.3.221.
33. Neff LA, Karney BR. Gender differences in social support: a question of skill or responsiveness? *J Pers Soc Psychol*. 2005;88:79–90. https://doi.org/10.1037/0022-3514.88.1.79.
34. So HY, Min HS. Spiritual wellbeing and life attitude of breast cancer patients. *Korean J Rehabil Nurs*. 2006;9:5–14. Available online: https://www.koreascience.or.kr/article/JAKO200625952569585.pdf.
35. Yellen SB, Cella DF, Webster K, Blendowski C, Kaplan E. Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. *J Pain Symptom Manag*. 1997;13:63–74. https://doi.org/10.1016/s0885-3924(96)00274-6.
36. National Cancer Information Center. *Recommendations for Distress Management in Cancer Patients*; 2009. Available online: http://www.cancer.go.kr/ebook/6/PC/6.html. Accessed February 20, 2021.
37. Lawston MP, Moss M, Fulcomer M, Kleban MH. A research and service oriented multilevel assessment instrument. *J Gerontol*. 1982;37:91–99.
38. Lee JY. *A Structural Model for Health Promotion Behavior and the Quality of Life of Patients with Ischemic Heart Disease*. Doctoral dissertation. Seoul: Kyung Hee University; 2006.
39. House JS. *Occupational Stress and the Mental and Physical Health of Factory Workers*. Ann Arbor, MI: Institute for Social Research of University of Michigan; 1980:71.
40. Son KA, Ko JW. The moderating effect of social support on the relations between teachers' job stress and job satisfaction, and organizational commitment. *J Educ Adm*. 2007;25:73–94. Available online: http://scholar.dkyobobook.co.kr/searchDetail.laf?barcode=4010021482563&vendorGb=01&academyCd=35.
41. Kim MY. *The Relationship Between Spiritual Well-being, Hope, and Uncertainty in Cancer Patients Treated with Chemotherapy*. Unpublished master thesis. Daegu: Keimyung University; 2012.
42. Freund RJ, Wilson WJ, Sa P. *Regression Analysis*. Elsevier; 2006.
43. Kwon EJ, Lee MS. Distress and quality of life in breast cancer survivors in Korea. *Asian Oncol Nurs*. 2012;12:289–296. https://doi.org/10.5388/aon.2012.12.4.289.
44. Joo YS, Kim H. Effects of spiritual nursing intervention on spiritual well-being and anxiety in elders with cancer. *J Korean Gerontol Nurs*. 2020;22:95–104. https://doi.org/10.17079/jkgn.2020.22.2.95.

45. Torp S, Nielsen RA, Gudbergsson SB, Dahl AA. Worksite adjustments and work ability among employed cancer survivors Support Care. *Cancer*. 2012;20:2149–2156. https://doi.org/10.1007/s00520-011-1325-3.
46. Edmondson D, Park CL, Blank TO, Fenster JR, Mills MA. Deconstructing spiritual wellbeing: existential well-being and HRQOL in cancer survivors. *Psycho Oncol*. 2008;17:161–169. https://doi.org/10.1002/pon.1197.
47. Cohen N, Arieli T. Field research in conflict environments: methodological challenges and snowball sampling. *J Peace Res*. 2011;48(4):423–435. https://doi.org/10.1177/0022343311405698.
48. Holzner B, Kemmler G, Kopp M, et al. Quality of life in breast cancer patients: not enough attention for long-term survivors? *Psychosomatics*. 2001;42:117–123. https://doi.org/10.1176/appi.psy.42.2.117.