



Research Article

Structural Equation Model of the Quality of Working Life among Cancer Survivors Returning to Work

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SUMMARY

Purpose: This study aimed to construct and validate a model of the quality of working life (QWL) among cancer survivors returning to work.**Methods:** A cross-sectional study was developed. Participants included 204 cancer survivors in the extended cancer survivor stage, 6 months after returning to work, who were treated at two tertiary hospital cancer centers. The data were analyzed with SPSS 22.0 and AMOS 20.0 for confirmatory factor analysis to assess the hypothesis fit and verify the hypothesis.**Results:** Factors affecting cancer survivors' quality of working life resulted in cancer stigma and social support (explanatory power was 43.1%) and the model showed acceptable goodness of fit. In the final model, cancer stigma had a significant direct effect on social support and indirect effect on organizational health, employee health, and QWL. Additionally, social support had significant direct effect on organizational health, employee health and QWL.**Conclusion:** Based on the results of this study, there is a need to develop strategies and effective intervention programs that can increase the support of supervisors and colleagues for improving overall quality of work life. Furthermore, the development of policies and intervention programs to reduce cancer stigma for the purpose of transforming perceptions through education and public relations which are indirect factors that affect the quality of work life, can contribute to improving the quality of work life for cancer survivors.© 2021 Korean Society of Nursing Science. Published by Elsevier BV. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Cancer is the number one cause of death worldwide, with a global yearly increase of 18.1 million and death rate of 9.6 million. In South Korea, 3.4% of the population has cancer, which means it afflicts one out of every 29 people [1]. Due to the recent development of early diagnosis and treatment technologies, cancer survival rates have also been continuously increasing, e.g., from 54.0% in 2005 to 70.6% in 2016, in the case of 5-year relative survival rate. In 2018, worldwide, the total number of people who were still alive within 5 years of a cancer diagnosis, called the 5-year prevalence, was estimated to be 43.8 million. This number is higher than that

noticed in Western countries [1,2]. Because of such an increase in the cancer prevalence rate, interest in the importance of cancer survivors' ability to work and return to work is emerging [2]. For cancer survivors, returning to work is a recovery process and an important part of their cure [3]. It is associated with recovery of normalcy and self-esteem, which affect survivors' quality of life, in addition to providing a sense of financial security by securing a source of income.

Despite the importance of employment and work in managing the return to a normal social life and the quality of life of cancer survivors, the rate of South Korean cancer survivors returning to work is only 30.5%, which is lower than that prevailing in overseas countries (63.5%) [4]. The reasons for this include not only an individual's health status but also prejudice and discrimination against the work competence of cancer patients, as well as the lack of resources, information, and emotional support from superiors and colleagues, and the lack of stable management systems in the organizational community [5]. These multiple factors impede survivors' successful return to work, leading to job

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changes and resulting in a reduction in overall quality of life by increasing cancer survivors' job stress [5]. Indeed, the job turnover rate in South Korea in 2014 due to cancer was 47.0–53.0%, and the possible non-retirement rate of cancer survivors was reported to be 47.0% lower than that of the general public [6]. Accordingly, improving quality of working life (QWL) is important for work readjustment and retention of cancer survivors returning to work [7].

There have been studies on the QWL of cancer survivors, such as those designed to develop measurement scales [3,7] and the studies of Jin and Lee [10] who identified job stress, workplace spirituality, and fatigue as influencing factors of the QWL of cancer survivors. The overall quantum of relevant studies, however, is insufficient. QWL refers to the satisfaction and sense of well-being in psychological and emotional dimensions experienced by an individual worker while working to achieve organizational goals, and it can be considered an integral part of overall quality of life [8]. The QWL of cancer survivors is expected to be low because their quality of life overall is lower than that of non-cancer patients. In particular, understanding the characteristics of organizational culture is important for the improvement of the QWL because the QWL of cancer survivors is mainly influenced by job stress caused by the characteristics of organizational culture [9,10]. The reason for this is that the characteristics of organizational culture, such as negative social perception related to cancer survivors returning to work, devaluation [3], prejudice, and discrimination [5] against the work competence of cancer patients, affect not only the quality of life but also the QWL of cancer patients [11]. Consequently, the characteristics of organizational culture should be considered in identifying the level of cancer patients' quality of life and relationships among the relevant variables.

In the Culture-Work-Health-Model (CWHM), the organizational culture is the main effect factor for the health of organization and employee and priority factor for improving the QWL. In a study on the structural model of QWL based on the CWHM, organizational culture, social support, organizational health, and employee health were found to be factors affecting QWL [12,13]. On the other hand, previous studies that were not based on the CWHM have reported that cancer survivors who returned to work experience cancer stigma, such as social isolation, alienation, criticism, feelings of guilt, a sense of shame, and self-condemnation, because of the negative organizational culture toward cancer patients [14,15] and the experience lowers their quality of life and makes them perceive their health status negatively [16]. On the other hand, social support from superiors and colleagues in an organization helps workers perceive their health positively [13,17] and contributes to the organization's ability to reach stability [13,18].

As discussed above, various factors such as cancer stigma—which is a feature of negative organizational culture toward cancer survivors—social support, and organizational and personal health status work complexly in the QWL of cancer survivors who have returned to work. Since previous studies, however, are fragmentary toward the QWL of cancer survivors and have limitations in identifying causal relationships among relevant factors [7,10] more research is needed to provide a theoretical basis that can improve QWL. Accordingly, the purpose of the present study was to establish and test a structural model of the QWL of cancer survivors who have returned to work using the main concepts of the CWHM as a theoretical basis and applying influencing factors of the QWL of cancer survivors found in previous studies. The findings of the present study will establish a theoretical basis for future studies on the QWL of cancer survivors and will provide valuable basic data for

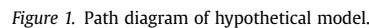
finding intervention methods and developing programs to improve QWL.

Conceptual framework

The conceptual framework was constructed based on Peterson and Wilson's (2002) CWHM and empirical studies on the effects of the QWL of cancer survivors. The conceptual framework was composed of organizational culture, management system, organizational health, employee health, and QWL, which are key concepts of the CWHM [19]. The paths of main concepts were presented that cancer stigma which were part of organizational culture had direct influence on social support received from supervisors and colleagues [20] and one-way paths in which cancer stigma directly affected the overall quality of working life of cancer survivors [11]. Social support affects the health of employees with cancer and organizations [13,21] because a greater amount of social support means a greater contribution to cancer survivors' job performance which are components of organizational health [18]. This present study also established social support to directly affect organizational and employee's health. In addition, social support had a direct influence path to QWL based on the report that social support for cancer survivors directly affects their quality of life in previous studies [21]. In the case of the concept of employee health and organizational health, the present study presented a direct influence path from employees and organizational health to QWL [22] because the balance through the interactions between employees and organizational health in the CWHM can improve QWL [9]. The subordinate concepts constituting the main concepts presented in the conceptual framework of the present study were selected based on the findings of previous studies. Cancer stigma is composed of negative experiences from surroundings, such as social isolation at work, detachment, discrimination and sense of guilt, attribution of the cancer to oneself, and the experience of insufficient medical support. These are risk factors for returning to work and for job retention [4,15] and they negatively affect cancer survivors' quality of life [11]. Social support includes emotional support that cancer survivors receive from superiors and colleagues, as well as help and informational support for job performance [23]. Organizational health consists of external health, such as productivity and environment and task performance suitability for achieving goals. Organizational health also includes internal health, such as vitality and community oriented [24] while employee health consists of perceived health status [25]. Last, the QWL of cancer survivors who return to work consists of the value of work, meaning of work, work perception, atmosphere of work environment, Understanding and recognition of organization for cancer survivors in the organization, and health-related problems [7].

Hypothesized model

The hypothesized model suggested in this study is depicted in Figure 1. When QWL was used as an endogenous variable; exogenous variables that directly affected QWL included cancer stigma, social support, organizational health, and employee health. Subsequently, organizational health was used as an endogenous variable. The exogenous variables that directly affect organizational health included social support and employee health, and cancer stigma on the other hand, had an indirect influence. When employee health was used as an endogenous variable, the exogenous variable that directly affected employee health was social support, while cancer stigma had an indirect influence. When social



purpose and intention of survey, all participants provided written informed consent before completing the questionnaires.

Measurements

There was a total of 23 items for the general characteristics of the participants, including sociodemographic (six items), occupation-related (seven items), cancer-related (seven items), and return-to-work-related (three items) characteristics. For all other instruments, use agreements were obtained from the original authors or authorized agencies of the instruments via email.

Cancer stigma

Cancer stigma was measured using the Korean version of the Cancer Stigma Scale (KCSS) developed by So et al. [5], which has a total of 24 items in six subdomains: social isolation, distancing or avoiding, discrimination, guilt, attribution, and lack of medical support, measured on a 4-point scale. Reliability, as measured by Cronbach's α , was 0.89 in the study of So et al. [5], and Cronbach's α for each subdomain in the present study was social isolation: .92; distancing or avoiding: .92; discrimination: .90; guilt: .77; attribution: .85; and lack of medical support: .49.

Social support

For social support, a total of eight items on a 5-point scale—four items for supervisor support and four items for colleague support—from the Social Support Questionnaires developed by House (1980) were used. In the study of House [30] reliability was not reported separately for supervisor support and colleague support, whereas Korean version scale reported the Cronbach's α for supervisor support and colleague support as .85 and .78 [31]. The Cronbach's α for supervisor support and colleague support in the present study were .85 and .79, respectively.

Organizational health

For organizational health, the Organizational Health Questionnaire (OHQ) developed for Korean employees by Kim and Yu [24]

was used. The OHQ is composed of a total of 31 items in four subdomains: environment fit (eight items), work way fit (nine items), vitality (eight items), and community oriented (four items) on a 5-point scale. In the study of Kim and Yu [24], Cronbach's α were environment fit: .88; work way fit: .94; vitality: .94; and community oriented: .91. Cronbach's α in the present study were environment fit: .92; work way fit: .93; vitality: .90; and community oriented: .91.

Employee health

For the health of cancer survivors who have returned to work, perceived health status was measured using the Self-Report Health Scale (SRHS) developed by Lawston et al. [32]. The scale consists of a total of three items (two items on current health status and one item on health status compared to that of others), measured on a 5-point scale. Cronbach's α in the study of Lawston et al. was .76 [32] and Cronbach's α in the present study was .87.

Quality of Working Life

QWL was measured using the Quality of Working Life Questionnaire for Cancer Survivors (QWLQ-CS) developed by de Jong et al. [7], which has a total of 23 items in five subdomains: meaning of work (four items), perception of work (five items), atmosphere of work environment (five items), understanding and recognition of organization (five items), and problems of health situation (four items), measured on a 6-point scale. Cronbach's α in the study of de Jong et al. [7] was .91. In Korean version of QWLQ-CS, Cronbach's α was .89 [10]. Cronbach's α of each subdomain in the present study was meaning of work: .94; perception of work: .98; atmosphere of work environment: .91; understanding and recognition of organization: .86; and problems of health situation: .91.

Data Collection

Data were collected from February 12 to March 31, 2019. A researcher visited the directors of nursing at each hospital to obtain permission for the data collection. Data were collected from outpatients who met the inclusion criteria. The risks and benefits of taking part in the study, background of the study, and measures taken to preserve confidentiality were explained to each participant. Participants were then asked for their informed consent. Afterward, they were given sufficient time, approximately 30–40 minutes, to answer a questionnaire.

Data Analysis

Data were analyzed using SPSS 22.0 and AMOS 20.0 for Windows (IBM Corp., Armonk, NY, USA). General characteristics of participants and normal distribution of the data were analyzed using descriptive statistics, including frequencies, percentage, means, standard deviations, skewness, and kurtosis. Missing values were estimated using the expectation maximization methods in SPSS, the reliability of the instruments was evaluated using Cronbach's α . A confirmatory factor analysis (CFA) was performed to verify the validity of each variable. Structural equation model (SEM) testing is a two-step approach that was used to perform a measurement model analysis that indicated the relationship between the factors and variables in Step 1, and the structure model linking the factors shown in the hypothetical model set by the researcher was verified in Step 2. To verify the validity of the potential variables in the measurement model, a CFA was performed, and the adequacy of the hypothetical model was evaluated using Amos version 20.0. To evaluate the goodness of fit of the model, the

following fit indices and criteria were used: χ^2 , normed χ^2 , Root mean-Square Residual (RMR), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Root Mean Square Error Approximation (RMSEA), Standardized Root Mean-Square Residual (SRMR), Comparative Fit Index (CFI), and Tucker–Lewis Index (TLI). The significance of the pathway of the SEM was analyzed using the regression weight standard error (SE), standardized estimated (β), critical ratio (CR), and p value, and explanatory power was calculated using Squared Multiple Correlation (SMC). The significance for the structural model path was identified using the regression weight, Standard Error (SE), Standardized estimate (one path was identified), and p values, and the explanatory power of the endogenous variable was calculated using Squared Multiple Correlation (SMC). The significance of the effects of the independent variables on the dependent variables was verified by applying the bootstrapping method.

Results

General characteristics of participants

The demographic, cancer-related, job-related, and return-to-work-related characteristics of the participants are presented in Table 1. Of the 204 participants, the average age was 50.3 ± 7.58 years, 151 (74.0%) were married and 98 (48.1%) were university graduates. With regard to occupational sector, service and sales were 89 (43.6%), followed by health and social work 65 (31.9%) and education and public sector were 29 (14.2%). The average length of working years 11.7 ± 9.39 years, most participants had fixed working type (77.6%) and clerks by work position (54.9%). The cancer diagnosis of participants, breast cancer was the most common (47.5%), followed by thyroid cancer (18.6%) and gastrointestinal cancer (14.2%). The periods of sick leave by cancer treatments, most participants were below 6 months (36.3%), followed by over 1 year (24%) and both treatment and work (22.1%), the majority of participants returned to same workplace (63.7%).

Descriptive statistics of measured variables

The mean, standard deviation, and internal consistency reliability of each of the subscales were calculated in SPSS and are reported in Table 2. Since normality of collected samples are usually tested using SEM for an analysis that uses the Maximum Likelihood Estimate (MLE), the test was performed. The results indicated that normality was ensured because the absolute values of all skewness and kurtosis were 2 or less and 3 or less, respectively.

Confirmatory factor analysis was conducted using maximum likelihood, and variables with a factor loading of 0.5 or less, which were “lack of medical support” of cancer stigma and “problem of health situation” of the quality of work life, were removed. Cronbach's α coefficients values of this study were .77 or higher for all measuring instruments and in the case of the “What is your current state of health?” that is general health condition oneself was selected as a representative item based on the previous study [33].

Analysis of Structural Equation Model

Validity of measurement model

The model was assessed using maximum likelihood to test the normality of the data. The results showed that the data were normally distributed with the absolute values of skewness and kurtosis under one. In addition, the reliability and validity of the measurement model were tested using confirmatory factor analysis. The analysis of the goodness of fit of the measurement model theoretically established showed that $\chi^2(p) = 199.60$ ($p < .001$),

Table 1 General Characteristics of Participants (N = 204).

Characteristics		Categories	N (%)
Sociodemographic factors	Gender	Men	35 (17.2)
		Women	169 (82.8)
	Age (years)	≤30	14 (7.0)
		40s	75 (37.0)
		50s	92 (45.0)
		60s	23 (11.0)
	Marital status	Unmarried	42 (20.6)
		Married	151 (74.0)
		Others (divorced, widowed, etc.)	11 (5.4)
	Number of children	None	52 (25.5)
		1	26 (12.7)
		2	107 (52.5)
		≥3	19 (9.3)
	Educational level	≤High school	69 (33.8)
		College	98 (48.1)
		Graduate school	37 (18.1)
Religion	Yes	152 (74.5)	
	No	52 (25.5)	
Occupation-related factors	Occupational sector	Education and public sector	29 (14.2)
		Health and social work	65 (31.9)
		Service and sales	89 (43.6)
		Productive work	21 (10.3)
	Working years	≤10	117 (57.4)
		11~20	55 (26.9)
		21~30	23 (11.3)
		≥30	9 (4.4)
	Working type	Shift	48 (23.5)
		Fixed	36 (66.7)
		Others	20 (9.8)
	Work position	Clerks	112 (54.9)
		Managers	62 (30.4)
		Others	30 (14.7)
	Monthly income (10,000 won)	≤150	42 (20.6)
		150~250	68 (33.3)
		250~350	46 (22.5)
	Main source of income in family	Yes	89 (43.6)
		No	115 (56.4)
Cancer-related factors	Types of diagnosed cancers	Breast Cancer	97 (47.5)
		Thyroid Cancer	38 (18.6)
		Gynecological Cancer	15 (7.4)
		Gastrointestinal Cancer	29 (14.2)
		Others	25 (12.3)
	Stage	I	104 (50.9)
		II	71 (34.8)
		Over III	29 (14.3)
	Periods after cancer diagnosis from 2019	1	3 (1.5)
		2	62 (30.4)
		3	30 (14.7)
		4	38 (18.6)
		5	71 (34.8)
	The number of types of cancer treatments (past history) ^a	1	67 (32.8)
		2	61 (30.0)
		3	55 (26.9)
	The number of types of cancer treatments in progress (at present)	over 4	21 (10.3)
		None	99 (48.5)
		1	98 (48.0)
Return-to-work-related factors	Periods of sick leave	2	7 (3.5)
		Both treatment and work	45 (22.1)
		≤6 months	74 (36.3)
		6months~12 months	36 (17.6)
	Return to same workplace	≥12 months	49 (24.0)
		Yes	130 (63.7)
No	74 (36.3)		

^a The number of types of cancer treatments such as surgery, chemotherapy, radiotherapy, and others (past history).

GFI = .89, AGFI = .84, CFI = .94, TLI = .92, RMR = .03, SRMR = .06, and RMSEA = .06, in which all goodness of fit indices, except for $\chi^2(p)$ and the GFI index, satisfied the criteria, confirming the goodness of fit of the measurement model.

Convergent validity was the level of consistency among the variables when measuring latent variables; each latent variable is greater than recommended cutoff .70 which satisfied the convergent validity. The construct reliability of all latent variables in the

present study was .70 or higher, the convergent validity was confirmed. And discriminant validity requires low correlation between the measurement values obtained when different concepts are measured, the AVE values of this study were greater than the square of the correlation coefficients (r) of all factors, discriminant validity between the factors was confirmed in the present study. Nomological validity assesses the consistency between the direction of the hypothetical relationships between the latent variables

Table 2 Descriptive Statistics and Factor Loading of Confirmatory Factor Analysis (N = 204).

Latent variables	Measurement variable	Scale Ranges	Mean $\pm$ SD	Cronbach's α	Skewness	Kurtosis	Standardized estimate(β)	S. E	C.R. (p)	CR	AVE
Cancer Stigma	Total	1–4	1.88 $\pm$ 0.50							0.95	.81
	Social isolation		1.65 $\pm$ 0.59	.92	0.32	–1.08	0.87				
	Distancing or avoiding		1.66 $\pm$ 0.56	.92	0.19	–0.94	0.90	0.06	17.54*		
	Discrimination		1.98 $\pm$ 0.71	.90	0.08	–0.99	0.89	0.07	17.04*		
	Guilty		2.12 $\pm$ 0.63	.77	0.03	–0.10	0.59	0.08	9.27*		
	Attribution		1.98 $\pm$ 0.65	.85	0.18	–0.62	0.66	0.08	10.78*		
Social support	Total	1–5	3.31 $\pm$ 0.57							0.72	.62
	Supervisor support		3.22 $\pm$ 0.74	.85	–0.14	–0.20	0.60				
	Colleague support		3.39 $\pm$ 0.66	.79	–0.27	–0.12	0.55	0.15	5.46*		
Organizational health	Total	1–5	3.41 $\pm$ 0.52							0.95	.83
	Environment fit		3.36 $\pm$ 0.62	.92	0.06	1.18	0.78				
	Work way fit		3.35 $\pm$ 0.62	.93	–0.43	0.72	0.90	0.09	13.07*		
	Vitality		3.35 $\pm$ 0.58	.90	–0.48	0.88	0.79	0.08	11.72*		
	Community oriented		3.61 $\pm$ 0.56	.91	–0.50	0.77	0.70	0.08	10.05*		
Employee Health	Perceived Health status	1–5	3.31 $\pm$ 0.65	.87	–0.13	0.17	0.63			0.80	.80
Quality of work life	Total	1–6	4.27 $\pm$ 0.70							0.86	.62
	Meaning of work		4.52 $\pm$ 1.01	.91	–0.75	0.24	0.68				
	Perception of work		4.52 $\pm$ 0.91	.85	–0.75	0.91	0.76	0.08	12.86**		
	Atmosphere of work environment		4.52 $\pm$ 0.92	.91	–0.67	0.46	0.95	0.12	10.52**		
	Understanding and recognition of organization		4.14 $\pm$ 0.98	.86	–0.25	–0.12	0.69	0.11	9.05**		

* $p < .05$, ** $p < .001$.

Note. SD = standard deviation.

and the direction obtained from the actual data; nomological validity in the present study was confirmed because the correlation was found to be in the predicted direction.

Validity of path model

The final goodness-of-fit statistics of hypothetical model, the path model was as follows: $\chi^2 = 211.58$ ($p < .001$), $\chi^2/df = 2.23$, GIF = .89, AGFI = .84, CFI = .93, TLI = .92, RMR = .04, SRMR = .06, RMSEA = .80 (Table 3). Among them, χ^2 and the GFI indices did not fit the criteria; because the χ^2 values are very sensitive to the sample size and the complexity of the model, and the null hypothesis (H_0) is strict, other goodness-of-fit indices, in addition to the χ^2 value, should also be considered. In the present study, the χ^2 index can be supplemented because the Q (χ^2/df) index, which is less sensitive to the sample size, and the TLI, which can complement the limitation of χ^2 , fit the criteria. In addition, since the GFI index is highly affected by the sample size and simplicity, the AGFI and CFI are considered together. In the present study, the hypothetical model was confirmed as the final structural model without modification because all goodness-of-fit indices, except for the χ^2 and GFI indices, satisfied the recommended criteria.

The direct influence path from cancer stigma to the QWL in the hypothetical model of which the goodness of fit was confirmed in the present study was rejected (Figure 1). Accordingly, an alternative model was established excluding the direct influence path from cancer stigma to the QWL, and the analysis of the goodness of fit indices of the two models showed that the indices met the criteria. The comparison of goodness of fit between hypothetical and alternative models using the χ^2 test was non-significant. The goodness of fit of the hypothetical model was considered to be good, however, since the SRMR of the hypothetical model was .06, it was slightly lower than that of the alternative model (.07) and closer to zero (Table 3). Therefore, the present study selected the hypothetical model as the final model, and the paths of the measurement variables are presented in Figure 1.

Table 3 Fitness of Hypothetical Model and Alternative Model (N = 204).

	$\chi^2(p)$	χ^2/df	GFI	AGFI	CFI	TLI	RMR	SRMR	RMSEA
Hypothetical model	211.58 (<.001)	2.23	.89	.84	.93	.92	.04	.06	.08
Alternative model	211.67 (<.001)	2.20	.89	.84	.93	.92	.04	.07	.08
Acceptable range	$p > .05$	<3.00	$\geq .90$	$\geq .80$	$> .90$	$> .90$	$\leq .05$	$< .08$	$\leq .08$

Effect analysis of path model

Influence paths among the concepts in the path model of the quality of work life of cancer survivors returning to work established with the measurement variables such as cancer stigma, social support, organizational health, workers' health, and the quality of work life based on the CWHM are as follows (Figure 1). Cancer stigma had significant influence on social support ($\beta = -0.34$, $p < .001$). Social support was found to have an influence on organizational health ($\beta = 0.59$, $p < .001$), employee health ($\beta = 0.46$, $p < .001$) and QWL ($\beta = 0.43$, $p = .025$).

Next, Table 4 shows the standardized direct, indirect and total effects of variables. Social support was found to have a direct effect on QWL and cancer stigma had an indirect effect on QWL ($\beta = -0.21$, $p = .005$). Furthermore, social support had direct effect on organizational health and employee health. Cancer stigma had an indirect effect on organizational health ($\beta = -0.23$, $p = .005$) and employee health ($\beta = -0.16$, $p = .008$) also. Employee health, however, was found to have no significant influence effect on organizational health and QWL. Organizational health was also found to have no significant effect influence on QWL. Consequently, consequently, the direct effect of social support ($\beta = 0.43$, $p = .025$) and the indirect effect of cancer stigma ($\beta = -0.21$, $p = .005$) were found to have an influence on QWL. The variables that affect QWL, which was the final endogenous variable, explained 41.3% of the variance and seven out of the 10 hypotheses were statistically significant.

Discussion

Main contributions

The QWL score (4.27 out of 6 points) of cancer survivors returning to work in the present study was lower than scores in previous studies, 4.39 points [10] and 4.84 points [7]. The reason may be attributable to the fact that the subjects in the present study were in the extended survivorship stage (2–5 years) as described by

Table 4 Parameter Estimation Results of the Structural Model (N = 204).

Endogenous Variable	Exogenous Variable	Direct effect(β)	Indirect effect(β)	Total effect(β)	SMC	Hypothesis	
						D	I
Social Support	Cancer Stigma	-.34***		-.34***	.113	A	
	Employee Health	.46***		.46***	.211	A	
Organizational Health	Cancer Stigma		-.16*	-.16*			A
	Social Support	.59***	.08	.67*	.471	A	R
	Employee Health	.18		.18		R	
	Cancer Stigma		-.23*	-.23*		R	A
Quality of Work Life	Cancer Stigma	-.02	-.21*	-.23*	.413	R	A
	Social Support	.43*	.18	.61*		A	R
	Employee Health	.13	.03	.16		R	R
	Organizational Health	.17		.17		R	

* $p < .05$, ** $p < .01$, *** $p < .001$.

Note. A = adoption; D = direct effect; I = indirect effect; R = rejection; SMC = Squared multiple correlation.

Mullan [27], unlike previous studies, and the quality of life in that survivorship stage appears to have been revealed [34]. It appears that the QWL of the cancer survivors in the extended survivorship stage was also lower than the QWL in previous studies as the level of their psychological stress was found to be higher than that of survivors in the acute and permanent stages. Consequently, this finding indicates that cancer survivorship stages should be considered first as disease-related characteristics when conducting research and establishing policies related to the QWL of cancer survivors in the future.

Social support for cancer survivors who returned to work was found to be a key variable that has a direct positive effect on the QWL. The finding is similar to the findings of previous studies [33,35]. That used similar items and reported a direct positive effect of social support on the QWL of non-cancer patients. In addition, the findings of a previous study which emphasized that the support from superiors and colleagues is the actual social support system for cancer survivors, can be considered to support the findings of the present study [18]. Health management of cancer survivors who returned to work, employer's attention and consideration of the work environment [36] and positive perception and support from superiors and colleagues in the direct relationship network are important factors for the improvement of the QWL. Accordingly, mutual support among organizational members to strengthen social support that have positive influence on the work readjustment and improvement in job performance of cancer survivors, and the development of education and programs to increase the sense of fellowship are necessary [37]. In addition, the effect of integrated social support including the support of family, medical staff, and friends, which were identified as valuable social support system for cancer survivors who returned to work, on their health has to be investigated in future studies.

The direct effect of cancer stigma, which is the measurement variable of organizational culture, to the QWL was rejected, but the negative effect of indirect and total effect was similar to the findings of previous studies [13,33,35]. That is, the higher the level of cancer stigma experienced by cancer survivors who returned to work, the lower the support that patients perceive from their superiors and colleagues, and the QWL will eventually decrease. It can be seen as reflecting work-centered culture which is the characteristics of organizational culture in South Korea [15]. There are presenteeism which one cannot be absent from work even for illness [33] and prejudice and stigmatization by organizational members against cancer and cancer survivors [4]. Accordingly, it is necessary to develop and apply integrated palliative care programs that reflect the characteristics of cancer stigma that affect the psychological, physical, and social aspects of cancer survivors [38], include post-traumatic growth [39], resilience [39] and self-efficacy [21] which

the influence was proven in previous studies. Furthermore, repeated and extended research is necessary in future studies to compare and analyze stigma experienced by workers with chronic illnesses such as cancer and even healthy workers since stigma is found in organizational culture such as discrimination, prejudice, and isolation that can be experienced even by employees who are not afflicted with cancer, and can be reflected on the over-all organizational health status. In addition, cancer stigma was found to have an indirect influence on the health of the organization and workers with social support acting as a moderator. This finding is partially similar to the results of previous studies which found that workplace discrimination, i.e., stigma, experienced by workers influences turnover intention, which reflects organizational health [12,40]. In addition, the finding is supported by previous studies that reported a significant statistical correlation between cancer stigma and workers' health [16] and workers' health level increases in a healthy and positive organizational culture [9]. Although cancer stigma affects the employee health and organizational health, it can be controlled by perception of social support such as superiors and colleagues. This is because the negative organizational culture, cancer stigma is delivered through the superiors and colleagues to employees and community. Therefore, it is necessary that the development and application of education and promotion programs for improving of perception of cancer survivors who returning work.

Social support is shown to have a positive direct influence on workers' health, which is similar to the findings of previous studies that used similar measurement items [33,35] but different from the findings of LaRocco et al. [41] who reported that the support of family and friends is more related to personal health problems than the support from superiors and colleagues [41]. Accordingly, replication studies using measurement instruments, which include the support of family and friends, are necessary. The direct positive effect of social support on organizational health is similar to the findings of a previous study which reported that organizations with a high level of support from superiors and colleagues positively assess organizational environment and work atmosphere, which can be considered as organizational health [41]. The OHQ used in the present study to measure organizational health is an integrated scale that reflects both external and internal wellbeing, and it can be used to develop intervention programs to build healthy organizational culture by comparing and analyzing internal and external organizational health status according to the support from superiors and colleagues [24].

In summary of these findings, the higher the cancer stigma experienced by cancer survivors who returned to work, the lower the cancer survivors' perception of support from superiors and colleagues. Such low social support can ultimately be considered to

decrease the QWL, which is a subjective satisfaction experienced from the physical and human environment at work. In addition, because cancer stigma, which reflects organizational culture, is conveyed to cancer survivors through superiors and colleagues, and it negatively affects organizational and workers' health, the findings of the present study can contribute to the establishment of practical policies for successful return to work and the development of effective intervention strategies and programs to strengthen social support and to alleviate cancer stigma through approaches from various dimensions for the improvement of the QWL of cancer survivors who returned to work.

Discussion on the unsupported hypotheses

A direct effect from cancer stigma to QWL that has not been attempted in previous studies, was attempted and set up for QWL in the present study was based on CWHM. However, it was rejected, which is a different outcome from previous studies that were able to confirm significant causal relationships between cancer stigma and the quality of life. It is a concept in the overall quality of life that includes the QWL, but it is subjective and a specific satisfaction as experienced by the individual employees, it can be different concept from the overall quality of life. In addition, organizational culture is delivered to individual workers through organizational management system according to CWHM, the QWL of cancer survivors also appears to be positively or negatively influenced by supervisors and colleagues who the direct connection network of workers who are cancer survivors rather than the direct effect of organizational culture. Therefore, extended research that includes not only the QWL of cancer survivors but also the overall quality of life is suggested for future studies.

The present study confirmed significant negative indirect effect and total effects of cancer stigma on the QWL with social support acting as a moderator, and the finding is similar to that of previous studies [13,33]. In addition, the hypothetical paths of the positive effects of employee health on organizational health and the QWL were rejected in the present study. This finding is different from that of previous studies [13,33] that confirmed the path in which the employee health measured with one item as the present study influences organizational health and the QWL. The reason may be due to different measurement instruments from previous studies, which determined paths between employee health, organizational health, and the QWL variables. Another reason may be due to Self-Report Health Scale (SRHS) which measured workers' health, used only one item: "What is your current state of health?" [32]. Although SRHS is commonly used for cancer patients [42], it has limitations in reflecting the health status of cancer survivors with diverse and complex health problems for extended survivorship which appears to have affected the results [39]. In addition, it may be due to differences in subjects from previous studies. Since cancer is a chronic disease that continues to be influential in every aspect of life even after treatment is terminated [22,27], the self-rated health level of cancer survivors who returned to work is considered to be different from that of previous studies of non-cancer patients. Therefore, the future studies should apply the measurement instrument that including the health status of cancer survivors in extended survivorship who experience fear, anxiety, fear of recurrence, and the uncertainty of health [39].

Furthermore, the path from organizational health to the QWL was non-significant in the present study, which is different from the results of previous studies, which found that organizational health was the key factor for the QWL in studies on the structural model of the QWL [13,33]. The reason is that the present study used OHQ to measure organizational health instead of single items such as presenteeism [13,33] and turnover intention [12] which were

found to be the influencing factors of workers' health and the QWL in previous studies. The OHQ is a general organizational health measurement tool developed for healthy workers, and the tool appears to be limited in reflecting characteristics such as value, meaning, and commitment to the changed organization after cancer diagnosis of cancer survivors who returned to work. That is because cancer survivors who returned to work experience changes in the meaning of work and workplace, and changes in values that put themselves as the top priority over work and workplace [2]. Consequently, replicated and expanded studies that use variables such as presenteeism, absence from work, changing jobs, and increased sick leave that can reflect the interest and support of the organization for the health status of cancer survivors who returned to work are necessary in the future.

Research strength and limitation

The present study is the first study that attempted to build a theoretical framework and model of the QWL of cancer survivors who returned to work based on the Culture-Work-Health-Model (CWHM) and has various significances in the field of nursing.

In terms of nursing theories and research, the significance lies in testing the CWHM, which has previously been tested on healthy workers, but now tested on cancer survivors who returned to work and whose social interest and participation are increasing, and establishing a comprehensive model that includes the characteristics of the work environment and human relationship of cancer survivors such as cancer stigma and support from superiors and colleagues. The present study also has its significance in contributing to the expansion of knowledge in the field of nursing in that it prepared a theoretical foundation that can strengthen the grounds of CWHM theory and is also applicable to the QWL of workers with chronic illness such as cancers, in addition to providing basic data to various studies related to cancer patients in the country who are returning to work, which are still in a nascent stage.

In terms of nursing practice, the results of this study will contribute to developing effective approach strategies and intervention programs for cancer survivors' successful return to work. Furthermore, it would be applied in the management of cancer rehabilitation and the quality of life through the return of cancer survivors to workplace and their work, which tends to increase continuously.

The limitations of the present study are as follows.

In this study, we developed a structural equation model of the quality of working life among cancer survivors returning to work. Contrary to the culture-work-health model (CWHM) proposed by Peterson and Wilson [19] and the model used in this study revealed that cancer stigma indirectly affects the quality of working life of cancer survivors. Social support mediates the relationship between cancer stigma and quality of working life by reducing negative stigma toward cancer survivors. In turn, this improves the survivors' quality of working life. The participants of this study were cancer survivors in an extended survival stage, during which their health conditions began to stabilize. As such, the results cannot be generalized to other cancer patients, such as those in different survival stage. This study also found that employee health did not directly affect quality of working life. However, depending on the survival phase of the individual, employee health may have varying degrees of influence. Future studies must thus compare quality of working life models for cancer survivors in different survival and treatment phases to reveal the factors that directly or indirectly affect quality of working life. Moreover, the employee health assessment tools used in this study have limited efficacy for cancer survivors with complex health conditions. The effects of health on quality of working life must be reevaluated with a tool that can

effectively assess the complicated health conditions of cancer survivors. Furthermore, the findings of the present study are difficult to generalize to the entire community of cancer survivors who returned to work because the present study was conducted without taking into account the different types of cancer. The present study was a cross-sectional study that investigated the phenomena of the sample from the population in the same period and has limitations in clearly identifying causal relationships among variables included in the model.

Conclusion

The present study identified cancer stigma and social support as statistically significant variables for the QWL of cancer survivors who have returned to work, of which, social support was found to have greater explanatory power, and these variables explained 43.1% of QWL. On the other hand, paths in which employee health influenced organizational health and organizational and employee health influenced QWL were statistically non-significant, resulting in a rejection of the research hypothesis. Therefore, cancer stigma and support from superiors and colleagues, which were determined to be important factors with direct and indirect influences on the QWL of cancer survivors who have returned to work, may contribute to the exploration and search for measures to improve their QWL. Specifically, they can be used as basic data for preparing promotion and education programs at organizational and social levels, programs to strengthen the sense of a bond with superiors and colleagues—which are social support resources in the organization—and preparation of measures that can increase the self-efficacy and resilience of cancer survivors to reduce cancer stigma and strengthen the support system of superiors and colleagues. Ultimately, not only their QWL but also their overall quality of life will be influenced by this.

Author contributions

All authors participated in designing the study. J.J.H. carried out statistical analysis and wrote the manuscript. L.E.J. supervised the statistical design, interpretation results and wrote the manuscript.

Conflict of interest

All the authors report no conflicts of interest relevant to this article.

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