Original Article

Factors Related to Resilience, Anxiety/Depression, and Quality of Life in Patients with Colorectal Cancer Undergoing Chemotherapy in Japan

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ABSTRACT

Objective: This study clarifies the relationship between resilience and anxiety and depression, quality of life (QOL), and other related factors that influence colorectal cancer patients undergoing chemotherapy. **Methods:** This cross-sectional study focused on outpatients with colorectal cancer undergoing chemotherapy. A questionnaire including the Connor-Davidson Resilience Scale, Hospital Anxiety and Depression Scale, the MOS 12-item Short-Form Health Survey, and items based on a literature review was administered between August 2019 and August 2020. SPSS version 26 was used for data analysis. Correlation analysis and *t*-test were applied. In addition, Amos version 26 was used and structural equation modeling was applied to create a causal model. **Results:** A total of 121 participants (94.5%) were included in the study. The goodness of fit (GFI) of the causal model was GFI = 0.94, adjusted GFI = 0.906, comparative fit index = 0.997, and root mean square error of approximation = 0.011. Resilience had a negative effect on anxiety and depression and a positive effect on QOL. Depression had a negative effect on QOL. **Conclusions:** The results of this study indicate that resilience is a predictor of anxiety, depression, and QOL in colorectal cancer patients undergoing chemotherapy. Therefore, I believe that it is important to enhance resilience in order to maintain and improve patients' mental health and QOL. In addition, since resilience was affected by cancer metastasis and the presence of metastasis was a predictor of resilience, it is a challenge to explore interventions to enhance resilience, especially in patients with metastasis.

Key words: Anxiety, chemotherapy, colorectal cancer, depression, quality of life, resilience

Introduction

The prevalence of colorectal cancer is the third highest worldwide among all cancer types.[1] In Japan, its prevalence is the highest among all cancer types.[2] This occurrence rate of colorectal cancer has been increasing along with the rise in population and aging. The response rate to treatment for colorectal cancer has been improving along with the development of new anticancer drugs, and colorectal cancer can be cured with tumor resection and adjuvant chemotherapy, improving the 5-year survival rate.[3] Even if conditions of patients worsen and they suffer unresectable recurrent colorectal cancer, chemotherapy has

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further prolonged the survival rate.[4,5] These conditions have increased the length of treatment periods as well as the number of colorectal cancer patients undergoing chemotherapy.

It has been reported that patients with colorectal cancer, undergoing chemotherapy, experience peripheral neuropathy, a side effect known to be difficult to control[6] and face difficulties in adjusting their lifestyles to prevent worsening of symptoms due to side effects.[7] Previous studies found that patients with colorectal cancer, undergoing chemotherapy, experienced higher levels of anxiety and depression than those not administered for chemotherapy.[8,9] Studies have noted declining treatment adherence[10] and quality of life (QOL) in patients with stronger feelings of anxiety and depression.[11,12] This highlights the importance of reducing anxiety and depression among such patients for the continuance of treatment and maintenance or improvement of QOL.

Recent studies have shown that anxiety and depression are low in cancer patients with high resilience,[13,14] and that mental health is related to resilience. This suggests that resilience is an important concept for maintaining mental health in cancer patients. Resilience is the mental strength to return to the original state and is a factor when people face difficult situations in life. Resilience is considered to be acquired throughout life,[15] suggesting that resilience may be a key element in maintaining the mental health and QOL of patients with colorectal cancer undergoing chemotherapy.

Previous studies have shown the relationship between resilience and psychological distress,[13,16,17] resilience and QOL,[18,19] and resilience and social support[20,21] in cancer patients. However, no study has been found to clarify the relationship between cancer patients' resilience and anxiety and depression, QOL, and the factors that affect them. No studies on colorectal cancer have been conducted yet, except for those involving patients with terminal illnesses or permanent stomas.[22,23] It can be assumed that the number of colorectal cancer patients undergoing chemotherapy will increase; thus, it is important to explore support for maintaining their mental health and QOL. Therefore, the purpose of this study was to determine the relationship between resilience and anxiety and depression, QOL, and related factors in colorectal cancer patients undergoing chemotherapy.

Research framework

The research framework adopted by the study is illustrated in Figure 1. This framework was created based on a systematic review conducted by the present researchers[24] and that by Eicher.[25] Resilience is defined to be related to anxiety/depression, and QOL, and anxiety and depression are related to QOL. As previous studies have reported that

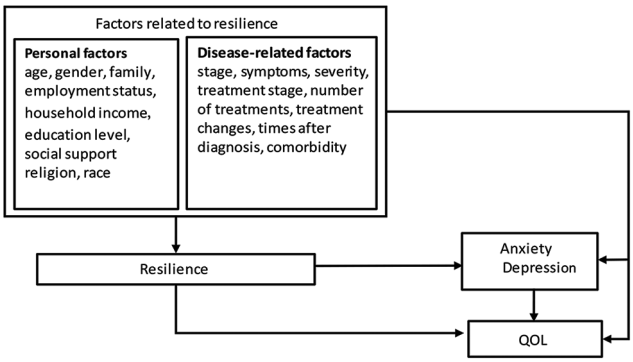

Figure 1: Research framework

personal factors and disease-related factors are related to resilience,[26,27] and that resilience is also related to anxiety and depression in patients with colorectal cancer,[28] resilience in this study is regarded also to be related to depression. Further, it has been reported that the QOL of patients with colorectal cancer is related to anxiety/depression,[29,30] age, and fatigue.[31] Thus, the present study considers that personal and disease-related factors are also related to QOL [Figure 1].

Hypothesis

1. High resilience in a colorectal cancer patient undergoing chemotherapy will cause lower anxiety and depression and a better QOL
2. The higher the anxiety and depression in the patient, the lower the QOL
3. Individual and disease-related factors affect patients' resilience, anxiety and depression, and QOL.

Methods

Research setting and population

This study is a cross-sectional study. Colorectal cancer patients undergoing outpatient chemotherapy at university hospitals and general hospitals in the Kinki region of Japan, who participated in the study, after signing their consent. Inclusion criteria for the subjects were as follows: persons of age 20 years or above, those who have been informed of the diagnosis of primary or recurrent colorectal cancer at least 6 weeks in advance, and those who have completed one course of chemotherapy before participation in the study. Patients who were only administered oral anticancer drugs, who were diagnosed to suffer from strong anxiety and depressive symptoms, have been diagnosed with mental illness, display cognitive decline, and those who were evaluated to be Performance Status 3 or higher of the Eastern Cooperative Oncology Group were excluded from the study.

Participant recruitment process

A convenient sampling method was used for this study. The researcher asked the physician in charge to select the patients – based on the inclusion and exclusion criteria – who visited the chemotherapy facility of the hospital during the study period. The researchers explained the outline of the study and ethical considerations to the selected patients in writing. Questionnaires were distributed to the patients who agreed to participate.

Sample size

For calculating the sample size, GPower 3.1 (Heinrich-Heine-Universitaet Duesseldorf, Duesseldorf, Germany) was used for the correlation coefficient, and previous studies for the covariance structure analysis. With the correlation coefficient, the calculation by a two-sided test, and effect size of 0.3, $\alpha = 0.05$, $1-\beta = 0.8$, yielded a sample size of 82.

For the performing structural equation modeling, a few studies have reported a sample size of 92,[32] whereas others have reported that at least 100 were required.[33-35] Based on these sizes, it was decided to set the sample size to 120 or more. Data were collected until the number of valid responses reached 120.

Research instrument

Resilience

The Japanese version of the Connor-Davidson Resilience Scale (CD-RISC) was used for this study. The CD-RISC consists of 25 items with four-point scale questions, assigning 0 for "not applicable at all" to 4 for "almost always applicable," with the maximum total score being 100 points. A higher score is considered to express better resilience. The reliability and validity of CD-RISC have been established with a Cronbach's alpha coefficient of 0.93 and an intraclass correlation coefficient of 0.86.[36]

Anxiety and depression

The Japanese version of the Hospital Anxiety and Depression Scale (HADS) was also used. The HADS was developed by Zigmond and Snaith to measure anxiety and depression in patients with physical symptoms.[37] The reliability and validity of HADS have been established for Japanese outpatients of gastroenterology clinics. The HADS consisted of 14 items (7 items for anxiety and 7 items for depression); the scores of all the items were then summed. The Cronbach's alpha coefficients were 0.8 or higher for anxiety and 0.7 or higher for depression.[38]

Quality of life

The QOL was measured with the Japanese version of the MOS 12-item Short-Form Health Survey (SF-12),[39,40] covering three areas, "physical health," "mental health," and "role-social health," as well as an inquiry of the health status of the past month. The higher the score, the better the QOL. As there is a national standard value established for the SF-12 and it is possible to convert this from the raw MOS score, the present study used the national standard value. The reliability by the parallel test method was 0.88–0.91.

Related factors

Factors identified through literature as being related to resilience were classified into personal and disease-related factors. While the former included age, gender, living with family, with a spouse, with children, financial difficulties, educational background, type of social support (mental, evaluation, instrument, and information),[41] and self-disclosure of cancer, the latter included the cancer stage, metastasis, length of time after the diagnosis of cancer, physical symptoms, details of the physical symptoms, comorbidities, and surgical treatment.

Date management and analysis

The data were analyzed using SPSS version 26 (International Business Machines Corporation, New York, USA). Correlation coefficients were calculated to identify the relationships between the resilience of patients with colorectal cancer undergoing chemotherapy and the reported scores of anxiety and depression and QOL. Furthermore, *t*-tests were utilized to interpret the relationship between patient resilience, anxiety and depression, and QOL as dependent variables and personal factors and disease-related factors as independent variables. In order to identify the relationship between patient resilience, anxiety and depression, QOL, and personal and disease-related factors that showed significant trends through *t*-test and ANOVA, a causal model using Amos version 26 (International Business Machines Corporation, New York, USA) was created; the analysis utilized structural equation modeling.

Ethical approval

This study was approved by the Ethics Committee of Osaka Medical College (Approval No. Nurse-126 [2743]) and the Ethical Review Board established at the Saiju Moriguchi-Keijinkai Hospital. The participants were informed of the research plan and provided with assurances that their participation was voluntary and that their personal information would be kept confidential during and after the project. Participants provided written informed consent.

Results

Participant characteristics

The researchers handed out questionnaires to a total of 128 patients, of which 7 did not respond; thus, 121 responses

were analyzed (94.5%). The demographic characteristics of the participants were as follows: the mean age was 63.8 years (standard deviation [SD]: 10.7), 71 were male (58.7%) and 50 were female (41.3%), and 29 patients (24.0%) had no metastasis and 92 (76.0%) had metastasis [Table 1].

Relationship between resilience and anxiety/depression and quality of life

The mean score for CD-RISC was 60.7 (SD: 16.4). Other mean values are shown in Table 2.

The correlations between resilience, anxiety and depression, and the QOL subscales of physical health, mental health, and role-social health were as follows: resilience and anxiety ($r = -0.224$, $P < 0.05$) and depression ($r = -0.340$, $P < 0.01$) had significant negative correlations, and higher resilience scores were associated with lower anxiety and depression scores. In addition, resilience and QOL had a significant positive correlation only for the subscale mental health ($r = 0.459$, $P < 0.01$), and higher resilience scores were also higher mental health scores.

Factors related to resilience, anxiety/depression, and quality of life

Tables 3 and 4 show the results of the *t*-test as factors related to resilience, anxiety and depression, and QOL. Resilience was shown to be related to education level ($P = 0.046$), metastasis ($P = 0.041$), and surgery ($P = 0.047$). Anxiety was related to financial difficulties ($P = 0.004$), self-disclosure of cancer ($P = 0.021$), poor concentration ($P < 0.001$), and pain ($P = 0.048$). Depression was related to gender ($P = 0.005$), education level ($P = 0.010$), financial difficulties ($P = 0.001$), number of types of social support ($P = 0.015$), and fatigue ($P < 0.001$). Physical health, a subscale of QOL, was significantly related to fatigue ($P = 0.004$) and pain ($P = 0.003$). Mental health was substantially dependent on education level ($P = 0.006$) and poor appetite ($P = 0.018$). Furthermore, role-social health was related to financial difficulties ($P = 0.008$) and poor appetite ($P = 0.010$).

Creation of a causal model

Based on the correlation of resilience with anxiety and depression and QOL, as well as the results of the *t*-tests [Tables 3 and 4], a causal model was created using the factors that exhibited relationships [Figure 2].

The goodness of fit (GFI) of the model was GFI = 0.94, adjusted GFI = 0.906, comparative fit index = 0.997, and root mean square error of approximation = 0.011. Significant differences were found in all pass coefficients [Table 5]. Resilience had a negative effect on anxiety ($\beta = -0.18$, $P = 0.032$) and depression ($\beta = -0.16$, $P = 0.024$). It also had a positive effect on mental health ($\beta = 0.32$, $P < 0.001$).

Table 1: Demographics and Clinical information of the participants ($n = 121$)

Demogaraphics	*n*	%
Age (years)		
Average 68.8 (SD10.72) 35-83		
<65	58	52.0
≧65	63	48.0
Gender		
Male	71	58.7
Female	50	41.3
Education		
High school or lower	56	46.3
Undergraduate or higher	65	53.7
Financial situation at home		
Not trouble	76	62.8
In trouble	45	37.2
Employment		
Employed	62	51.2
Unemployed	59	48.8
Living together		
Yes	102	47.9
No	19	45.6
Social Support		
Mental support		
Yes	111	92.0
No	10	8.0
Evaluation support		
Yes	113	93.0
No	8	7.0
Instrument support		
Yes	107	88.0
No	14	12.0
Information support		
Yes	85	70.0
No	36	30.0
Self-disclosure		
Yes	94	78.0
No	27	22.0
Clinical Information		
Stage		
I	0	0.0
II	11	9.1
III	18	14.9
IV	92	76.0
Performance status		
0	69	57.0
1	52	43.0
Time since diagnosis		
2-12 months	51	42.0
13-24 months	32	27.0
25 months or longer	38	31.0
Urinary incontinence		
Yes	94	78.0
No	27	22.0
Constipation		
Yes	66	55.0
No	55	45.0

Anxiety had a positive effect on depression (β = 0.48, P < 0.001). Depression had a negative effect on physical health (β = −0.18, P = 0.04), mental health (β = −0.41, P < 0.001), and role-social health (β = −0.28, P = 0.001).

Influencing factors included in the model were cancer metastasis, gender, number of types of social support, self-disclosure of having cancer, fatigue, and poor concentration.

Resilience was negatively affected by cancer metastasis (β = −0.19, P = 0.038), and resilience scores were lower when metastasis was present. Anxiety was negatively affected by self-disclosure of cancer (β = −0.20, P = 0.015) and positively affected by poor concentration (β = 0.32, P < 0.001). Anxiety scores were significantly lower when cancer self-disclosure was possible and significantly higher when poor concentration was present. Depression was influenced by gender, number of types of support, and fatigue (fatigue). Males had significantly higher depression scores than females (β = −0.22, P = 0.001). The presence of more types of social support in terms of instrumental/emotional/informational/evaluative support had a negative impact on depression (β = −0.17, P = 0.016). In addition, fatigue had a positive effect on depression (β = 0.17, P = 0.016), and depression scores were significantly higher when fatigue was present.

Table 2: Descriptive statistics for Resilience, anxiety/depression, and QOL (n = 121)

	CD-RISC	HADS		SF-12		
	Resilience	Anxiety	Depression	Physical health	Mental health	Role-social health
Average	60.70	4.60	5.32	45.90	52.90	45.90
SD	16.40	2.90	3.40	10.70	8.90	8.60
Min	14.00	0.00	0.00	8.80	28.70	22.10
Max	100.00	15.00	17.00	64.30	77.40	67.00

Resilience average score: 80.7 points (general peaple); CD-RISC: Connor-Davidson Resilience Scale; HADS: Hospital Anxiety & Depression Scale; SF-12: The MOS 12 Item Short-Form Health Survey; HADS 0-7: No anxiety or depression, 8 -10: Anxiety or depression suspected; 11 or higher: Clear diagnosis of anxiety or depression; QOL average score: Physical health 53.86, mental health 51.60, Role-social health 50.44

Table 3: Personal factors related to resilience, anxiety/depression, and QOL

Factors	n	CD-RISC		HADS				SF-12					
		Resilience	P	Anxiety	P	Depression	P	Physical health	P	Mental health	P	Role/social health	P
Age (years)													
<65	58	58.36	0.136	4.47	0.698	5.48	0.771	45.05	0.030	52.34	0.493	45.07	0.294
≧65	63	62.83		4.67		5.30		40.83		53.46		46.71	
Gender													
Male	71	59.38	0.300	4.67	0.675	6.11	0.005	42.64	0.792	52.12	0.239	45.79	0.841
Female	50	62.54		4.44		4.36		43.16		54.07		46.11	
Education level													
Vocational school, junior college or higher	56	63.89	0.046	4.13	0.116	4.54	0.010	44.30	0.164	55.29	0.006	46.14	0.799
High school or lower	65	57.92		4.96		6.12		41.61		50.89		45.74	
Financial difficulties													
Yes	45	57.31	0.082	5.56	0.004	6.73	0.001	40.18	0.034	50.56	0.038	43.28	0.008
No	76	62.68		3.99		4.59		44.44		54.32		47.49	
Marital status													
Married	84	61.24	0.580	4.67	0.593	5.23	0.432	43.43	0.377	52.36	0.218	45.77	0.765
Single	37	59.43		4.36		5.76		41.55		54.20		46.28	
Living with family													
Yes	102	61.07	0.555	4.70	0.269	5.18	0.113	43.24	0.365	52.79	0.710	45.55	0.268
No	19	58.63		3.89		6.53		40.80		53.63		47.93	
Child (ren)													
Yes	96	61.26	0.454	4.35	0.105	5.08	0.053	43.23	0.451	53.20	0.505	46.59	0.095
No	25	58.48		5.41		6.56		41.41		51.86		43.38	
Employment													
Yes	62	62.95	0.121	4.46	0.653	5.05	0.262	44.11	0.188	54.28	0.086	45.47	0.552
No	59	58.31		4.69		5.75		41.54		51.49		46.40	
Self-disclosure													
Yes	94	61.71	0.201	4.25	0.021	4.97	0.011	42.96	0.841	53.59	0.126	45.91	0.978
No	27	57.11		5.70		6.85		42.49		50.60		45.97	
Number of types of support available													
0-1	9	55.00	0.379	4.11	0.183	7.78	0.015	40.38	0.444	53.51	0.129	46.91	0.937
2-3	33	59.00		5.36		6.12		41.39		50.25		45.78	
4	79	62.04		4.29		4.81		43.75		53.97		45.88	

CD-RISC: Connor-Davidson Resilience Scale; HADS: Hospital Anxiety & Depression Scale; SF-12: The MOS 12 Item Short-Form Health Survey

Table 4: Disease-related factors related to resilience, anxiety/depression, and QOL ($n=121$)

Factors	*n*	CD-RISC		HADS				SF-12					
		Resilience	*P*	Anxiety	*P*	Depression	*P*	Physical health	*P*	Menta healthl	*P*	Role-social health	*P*
Metastasis													
Yes	92	58.98	0.041	4.69	0.439	5.76	0.032	42.15	0.201	52.25	0.140	45.63	0.499
No	29	66.10		4.21		4.21		45.08		55.06		46.87	
Surgery													
Yes	81	58.60	0.047	4.66	0.648	5.57	0.412	42.94	0.906	52.59	0.556	45.58	0.524
No	40	64.90		4.40		5.03		42.69		53.61		46.64	
Comorbidity													
Yes	53	60.81	0.941	4.82	0.416	5.68	0.409	41.23	0.142	52.19	0.430	46.89	0.277
No	68	60.59		4.38		5.16		44.12		53.49		45.18	
Number of regimen changes													
0	70	60.86	0.985	4.42	0.627	5.10	0.468	43.34	0.343	53.95	0.327	46.10	0.847
1	32	60.25		5.00		6.00		40.63		51.29		46.18	
2 or more	19	60.79		4.42		5.42		44.82		51.89		44.88	
Symptoms													
Poor appetite													
Yes	64	58.48	0.119	5.06	0.048	5.94	0.060	41.18	0.068	51.12	0.018	44.04	0.010
No	57	63.16		4.02		4.77		44.74		54.95		48.04	
Nausea													
Yes	46	59.04	0.392	5.11	0.112	5.80	0.295	41.56	0.301	50.34	0.012	44.22	0.085
No	75	61.69		4.24		5.13		43.65		54.51		46.98	
Hair loss													
Yes	39	59.92	0.726	4.34	0.546	5.15	0.603	39.81	0.030	53.56	0.588	46.41	0.671
No	82	61.05		4.68		5.50		44.30		52.62		45.70	
Peripheral neuropathy													
Yes	84	60.42	0.787	4.67	0.593	5.60	0.316	41.76	0.090	52.66	0.630	45.24	0.185
No	37	61.30		4.36		4.92		45.35		53.52		47.48	
Poor concentration													
Yes	58	59.41	0.412	5.54	<0.001	6.36	0.002	40.67	0.031	50.33	0.002	43.93	0.013
No	63	61.86		3.68		4.49		44.86		55.31		47.76	
Pain													
Yes	76	58.74	0.090	4.97	0.048	5.93	0.021	40.63	0.003	51.23	0.006	46.02	0.880
No	45	63.98		3.89		4.47		46.62		55.78		45.77	
Fatigue													
Yes	93	58.44	0.006	4.95	0.009	5.98	<0.001	41.34	0.004	51.31	<0.001	45.29	0.137
No	28	68.14		3.33		3.43		47.88		58.27		48.04	
Abdominal fullness													
Yes	63	59.76	0.521	4.83	0.320	6.00	0.039	40.94	0.040	51.25	0.031	45.97	0.951
No	58	61.69		4.30		4.72		44.93		54.74		45.88	
Diarrhea													
Yes	80	60.43	0.808	4.59	0.923	5.55	0.468	42.78	0.910	52.55	0.523	45.00	0.098
No	41	61.20		4.54		5.07		43.01		53.65		47.73	

CD-RISC: Connor-Davidson Resilience Scale; HADS: Hospital Anxiety & Depression Scale; SF-12: The MOS 12 Item Short-Form Health Survey

Discussion

This study clarified the causal relationship between resilience and anxiety and depression and QOL in colorectal cancer patients undergoing chemotherapy. It also developed a causal model that included individual and disease-related factors affecting the three main variables (i.e., resilience, anxiety/depression, and QOL).

Relationship between resilience and anxiety/depression, and quality of life, and factors affecting resilience

The results of this study showed that resilience negatively affected anxiety and depression, and depression negatively affected QOL in colorectal cancer patients undergoing chemotherapy. As shown in Figure 2, the causal relationship between resilience and anxiety and depression and QOL

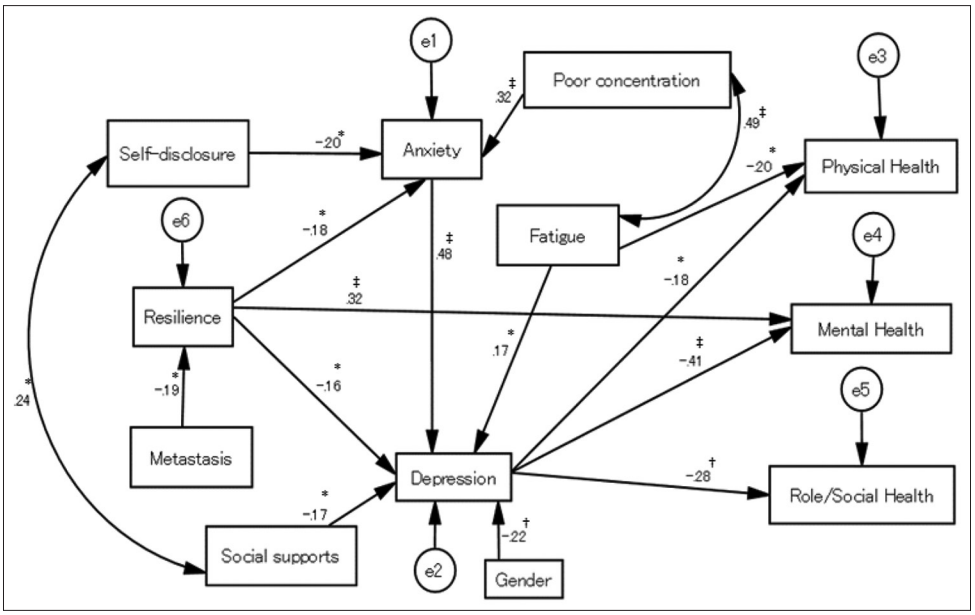

Figure 2: Resilience model for patients with colorectal cancer undergoing chemotherapy. χ^2 = 50.706, df = 50, goodness of fit = 0.94, adjusted goodness of fit = 0.906, comparative fit index = 0.997, root mean square error of approximation = 0.011. Arrows indicate the direction of influence. *P < 0.05, †P < 0.01, ‡P < 0.001. e1–e6: Error variable

Table 5: Path factor of the specified model (Fig. 3)

			Non-standardized coefficients	Standardized cofficients	Standard errors	*P*
Resilience	<---	Metastasis	-7.125	-0.186	3.439	0.038
Anxiety	<---	Self-disclosure	1.395	-0.202	0.572	0.015
Anxiety	<---	Resilience	-0.031	-0.178	0.015	0.032
Anxiety	<---	Poor concentration	1.824	0.317	0.477	‡
Depression	<---	Resilience	-0.032	-0.159	0.014	0.024
Depression	<---	Anxiety	0.548	0.481	0.082	‡
Depression	<---	Gender	-1.477	-0.222	0.461	0.001
Depression	<---	Social support	-0.872	-0.167	0.363	0.016
Depression	<---	Fatigue	1.309	0.169	0.545	0.016
Mental Health	<---	Depression	-1.094	-0.411	0.204	‡
Role-social Health	<---	Depression	-0.734	-0.283	0.227	0.001
Physical Health	<---	Depression	-0.599	-0.184	0.291	0.04
Mental Health	<---	Resilience	0.172	0.324	0.041	‡
Physical Health	<---	Fatigue	-5.004	-0.198	2.262	0.027

**P<0.05, †P<0.01, ‡P<0.001

was identified, and resilience was found to be a predictor of mental health on the anxiety and depression and QOL subscales. Therefore, it can be said that resilience plays an important role as a predictor of mental health and QOL in colorectal cancer patients undergoing chemotherapy. Moreover, since previous studies have only reported that resilience is a predictor of anxiety, depression, and QOL in patients with illnesses such as breast, lung, or gastric cancer,[21,42-44] the findings of this study are unique. These findings suggest that it is important to enhance resilience in order to improve and maintain the mental health and QOL of colorectal cancer patients undergoing chemotherapy.

The mean resilience score of the participants in this study was 60.7 (SD: 16.4). Previous studies reported that resilience scores of the general population, when CD-RISC was used, was 80.7,[36] and a meta-analysis of resilience scores using CD-RISC for cancer patients was 72.0.[24]

Resilience of the participants in this study was negatively affected by the presence of metastases. Cancer patients with metastasis have to undergo chemotherapy for a long period of time, until treatment is successful, which negatively affects their motivation to seek treatment. Moreover, patients with metastatic cancer experience high levels of physical and mental distress due to the prolonged side effects and symptoms associated with the disease and continued chemotherapy.[45,46] On the other hand, patients undergoing adjuvant chemotherapy combined with surgery perceive the treatment positively. For this reason, I believe

that differences in the pathology and course of treatment affected the resilience. Therefore, nurses are required to anticipate and intervene in the treatment of patients with colorectal cancer who have metastases and are undergoing chemotherapy. Therefore, by focusing on patients with metastatic colorectal cancer undergoing chemotherapy and clarifying the relationship between resilience and anxieties, depression, and quality of life, as well as the factors that influence these relationships, we can identify predictors that are characteristic of patients with metastatic colorectal cancer and suggest specific assistance. I believe that this study will be useful in identifying predictive factors characteristic of patients with metastatic colorectal cancer and in suggesting specific assistance.

Factors affecting anxiety/depression and quality of life

The anxiety of the participants in this study was negatively affected by self-disclosure of cancer and the findings of this study are unique. Self-disclosure of cancer helps them gain new support, reduce loneliness, and feel closer to acquaintance by sharing their experience with cancer diagnosis and treatment.[47] Therefore, this study's findings suggest that cancer patients can mitigate their anxiety by self-disclosure of cancer. In addition, anxiety was positively affected by poor concentration, which is known to be caused by chemo brain and fatigue, which are side effects of chemotherapy.[48] Patients' perception of changes between, before, and after treatment, for example, taking longer to do household chores, compared to before led to increased anxiety.

The participants' depression was affected by the number of types of social support and fatigue. In previous studies, the amount of social support was found to have a negative effect on depression in breast cancer patients.[49]

In this study, regarding social support, which includes the four functions of instrumental/emotional/informational/evaluative support, it was found that patients who had more of these functions had lower depression. Therefore, not only the amount of support but also the social support from various aspects is important for reducing depression. Previous studies have reported that fatigue is more strongly associated with depression than other physical symptoms.[50] In the present study, fatigue was found to have a positive effect on depression. However, it had a negative effect on physical health, a subscale of q QOL. Since fatigue is considered to be one of the most difficult physical symptoms to control, managing it is the key to preventing or reducing depression and improving physical health.[51]

Strengths and limitations

Resilience, anxiety and depression, and QOL are affected differently by cancer type and treatment method. Therefore, limiting the number of subjects and treatment methods in this study allowed an analysis of the relevant factors suited to the subjects and provided suggestions for detailed assistance. In addition, the inclusion of general as well as university hospitals to the target facilities supplemented the generalization of the results. However, the limitation of this study is that the sample size is smaller than other quantitative studies.

Conclusions

This study shows that resilience in colorectal cancer patients undergoing chemotherapy helps alleviate anxiety and depression and improve QOL. This study identified predictors of resilience, anxiety and depression, and QOL. To prevent or reduce anxiety and depression and maintain QOL in colorectal cancer patients undergoing chemotherapy, it is important to provide support to enhance resilience. It is also necessary to assess patients' metastasis, self-disclosure of cancer, types of social support, and physical symptoms before receiving chemotherapy. Subsequently, it is also important to explore the interventions that help increase the resilience of such patients.

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Conflicts of interest

There are no conflicts of interest.

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