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Mediating Effect of Illness Perception on Psychological Distress in Patients With Newly Diagnosed Gastric Cancer

Based on the Common-Sense Model of Self-regulation

KEY WORDS

Cross-sectional study
 Psychological distress
 Self-regulation
 Social support
 Stomach neoplasm
 Symptom assessment

Background: A cancer diagnosis is a life-threatening event, but studies on psychological distress in patients with cancer after diagnosis are relatively limited, particularly those in early-stage cancer. **Objectives:** On the basis of Leventhal's common-sense model of self-regulation, this study examined the mediating effects of illness perception on psychological distress and identified the factors influencing illness perception in patients with newly diagnosed gastric cancer. **Methods:** A cross-sectional survey was conducted, and a mediation analysis was performed to determine the role of illness perception in the relationship between social support, the presence of physical symptoms, satisfaction with patient education, and psychological distress. **Results:** Participants were 184 patients with recently diagnosed early gastric cancer who are waiting for surgery in a tertiary hospital in Seoul, Korea. The population had a moderate level of psychological distress. Social support, physical symptoms, and satisfaction with patient education significantly influenced illness perception ($\beta = -0.14, P = .048$; $\beta = 0.18, P = .015$; $\beta = -0.17, P = .019$, respectively), and illness perception had a full mediation effect between these 3 variables and psychological distress ($\beta = 0.66, P < .001$). **Conclusion:** Healthcare providers need to focus on patients' psychological distress following a diagnosis of cancer because this distress could be easily overlooked in clinical settings, even in patients with early-stage cancer. **Implication for Practice:** Healthcare providers might alleviate patients' psychological distress by improving unrealistic illness perceptions, alleviating physical symptoms, and providing clear and sufficient patient education in patients with cancer after diagnosis.

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Gastric cancer is the fifth most common cancer worldwide and the most frequently diagnosed cancer in South Korea.¹ Gastric cancer can be classified as early gastric cancer (EGC) and advanced gastric cancer on the basis of the layer of invasion. The National Cancer Screening Program in South Korea provides people above 40 years old an upper endoscopy every 2 years for free.^{1,2} These early screenings have resulted in 80% of the diagnosed cases being EGC in South Korea.³

A cancer diagnosis is a life-threatening event. Psychological distress after a cancer diagnosis is reported to be the highest in the cancer care continuum,^{4,5} and about 30 to 40% of cases are reported to need clinical intervention. Studies have reported that high psychological distress at the time of diagnosis predicts distress during or after treatment,^{5,6} which could cause fatigue, sleep disturbance, pain, and even higher mortality in patients.^{7,8}

However, few studies have focused on psychological distress among people with early-stage cancer. This might be because levels of psychological distress in patients with early-stage cancer are known to be relatively lower than that in patients with advanced cancer.^{9,10} However, that does not indicate that these patients do not suffer from psychological distress. Patients with EGC might experience psychological distress after diagnosis because of its unexpectedness because the manifestation of symptoms is quite rare.¹¹ Other reasons for distress include surgery, which is the primary treatment for EGC,¹² waiting times for surgery, and worries about potential dramatic changes in dietary habits and physical symptoms after surgery.¹¹

Illness perception is a personal understanding or cognitive representation of a person's health condition,^{13,14} which could affect health outcomes such as psychological distress, quality of life, and patients' health behaviors.^{15,16} Its attributes include perceived severity of the illness (consequence), expected duration of an illness (timeline), expected responsiveness to treatment (controllability), perception of associated symptoms (identity), and beliefs about the factors causing the illness (cause).¹⁷ The common-sense model (CSM) of self-regulation assumes that when people receive stimuli (eg, medical diagnosis or physical symptoms), they form an illness perception. People's past experiences with illness and sociocultural contexts such as support from families and healthcare professionals (HCPs) are also suggested as factors affecting illness perceptions.^{13,14} Therefore, it could be a useful framework for explaining psychological distress, particularly in patients after cancer diagnosis (stimuli).

Studies that explained the relationship between illness perception and psychological distress have been conducted in various cancer populations other than those with gastric cancer. One study reported that illness perception explained about 30% of the variance in cancer-related distress, anxiety, and depression in patients with newly diagnosed breast cancer.¹⁸ The result was also supported by other studies on patients with bladder cancer¹⁹ and head and neck cancer.²⁰ Another study in patients with breast cancer demonstrated that illness perception at the time of diagnosis had predicted psychological distress after 6 months.²¹

However, these studies did not use the CSM as a research framework but only borrowed the concept of illness perception and used it as one of the independent variables to predict health outcomes in a multiple linear regression model. This might limit

the understanding of illness perception as a mediating variable as proposed in CSM. Moreover, given the role of illness perception in patients with cancer, it is necessary to identify its associated factors. Only 2 studies on patients with breast cancer²² and gastrointestinal cancer²³ examined the factors of illness perception, and age was the only significant factor in both studies. However, age cannot be intervened by HCPs, and further studies investigating modifiable factors of illness perception are needed.

This study investigated the associated factors of illness perception in patients with EGC. By borrowing key variables and paths from the CSM and only adding the variable "patient satisfaction with education from HCPs" on the basis of prior studies,^{12,24} our study evaluated the relationships between the presence of physical symptoms, social support, satisfaction with education from HCPs, and psychological distress. Moreover, it examined the mediating effect of illness perception on psychological distress in newly diagnosed gastric cancer.

■ Methods

Design

Using the CSM as a framework, this study adopted a cross-sectional survey design to identify the interrelationships between psychological distress variables in patients with newly diagnosed gastric cancer.

Sample

The sample comprised 184 patients with newly diagnosed gastric cancer at a university hospital in Seoul, South Korea. In this study, patients with newly diagnosed gastric cancer were operationally defined as those who had received a gastric cancer diagnosis but had not initiated their primary treatment or gastrectomy. The participants were selected using convenience sampling on the basis of the following inclusion criteria: (1) age older than 19 years, (2) first cancer diagnosis, (3) EGC diagnosis, and (4) awareness of diagnosis. The exclusion criterion was a concurrent diagnosis of other types of cancer because this might exacerbate their psychological distress and could be a confounder. The researcher tried to contact 189 eligible patients but could not meet 5 of them.

Measurements

DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

Demographic characteristics comprised sex, age, marital status, educational level, and employment. After reviewing electronic medical records, the following clinical characteristics were obtained: comorbidities, family history of cancer (yes/no), duration between diagnosis and surgery, and reasons for undergoing screening (national cancer screening without symptoms/private health screening without symptoms/owing to physical symptoms), and presence of symptom before the diagnosis (yes/no).

PSYCHOLOGICAL DISTRESS

Psychological distress was measured using a linear analog self-assessment scale.²⁵ The instrument comprised anxiety, depression,

anger, fatigue, confusion, and vigor (interpreted as energy). For each item, the score was measured using a 10-cm horizontal line anchored by “not at all” and “extremely” at either end. The participants were asked to mark the point on each line that best described their state during the period between the diagnosis and surgery. Subsequently, the score for each item was determined by measuring the distance (mm) between the “not at all” anchor and the patient's mark, providing a range of scores from 0 to 100. The total score was the sum of each item's score, ranging from 0 to 600. The instrument's test-retest reliability was 0.70 in the original study, and Cronbach's α was 0.88 in this study.

ILLNESS PERCEPTION

Illness perception was measured using the Brief Illness Perception Questionnaire. This instrument uses a single-item scale comprising consequences, timeline, personal control, treatment control, identity, emotions, concern, and comprehensibility.²⁶ Each item is scored on a 0 to 10 response scale, and a reverse calculation is conducted for personal control, treatment control, and comprehensibility. The instrument's test-retest reliability ranged from 0.42 to 0.73 in the original study, and Cronbach's α was 0.71 in this study.

SOCIAL SUPPORT

Social support was measured using the Multidimensional Scale of Perceived Social Support,²⁷ which was translated into Korean by Lee.²⁸ This instrument comprises the subscales of family (4 items), friends (4 items), and significant others (4 items), which denotes HCPs in this study. The original instrument is scored on a 7-point Likert scale, whereas the Korean version was modified to a 5-point Likert scale, with 1 denoting “highly disagree” and 5 denoting “highly agree.” The subscale scores are the means of the item scores. In the original study and in this study, Cronbach's α ranged from 0.85 to 0.91 and 0.78 to 0.92, respectively.

PHYSICAL SYMPTOMS

On the basis of the literature on gastric cancer,^{29,30} we generated a list of 11 possible symptoms in patients with gastric cancer, including heartburn, indigestion, abdominal distension, gastric reflux, weight loss, epigastric pain, anorexia, lack of energy, abdominal pain, nausea, and vomiting. The participants were asked to refer to this list and report all the symptoms experienced within the 2 weeks preceding the survey.

SATISFACTION WITH PATIENT EDUCATION

Participants were asked to rate their overall satisfaction level with HCPs' provision of patient education after a gastric cancer diagnosis at the outpatient clinic, its treatment options, and treatment trajectory. This rating was a scale of 1 to 5, with 1 denoting “not satisfied at all” and 5 denoting “highly satisfied.”

Data Collection

The data were collected on the day they were admitted to the ward for surgery. After the researcher visited the eligible patients

and explained the study, those who agreed to participate completed the informed consent. The patients were asked to complete a self-reported questionnaire regarding psychological distress, illness perception, social support, satisfaction with patient education provided by HCPs, and demographic and clinical data. The questionnaire took approximately 10 minutes to complete. The physician in the research team referred the eligible patients to the researcher, and the data collection period spanned from October 2018 to March 2019.

Data Analysis

The data were analyzed with SPSS version 25. Descriptive statistics of percentage, mean, and standard deviation were used to describe participants' demographic and clinical characteristics, psychological distress, illness perception, social support, and satisfaction with patient education. A bivariate analysis was conducted using the independent *t* test or χ^2 test to compare the categorical variables in participants' characteristics with illness perception and using Pearson's correlations to analyze the relationships between the variables. Multiple linear regression was conducted to identify associated factors of illness perception, and the 3-step model of mediation analysis of Baron and Kenny³¹ evaluated the mediation effect of illness perception on psychological distress. Statistical significance was set at $P < .05$.

Ethical Considerations

The study was approved by the institutional review board of Yonsei University Hospital in Seoul, South Korea (IRB no. 4-2018-0860). The researcher informed the patients about anonymity, confidentiality, expected benefits and possible harms, and their right to withdraw from the study at any time. The only patients who agreed to participate completed a written informed consent, and their anonymity was assured until the end of the study.

Results

Demographic and Clinical Characteristics of the Participants

More than half of the participants were male (57.6%), and the mean age was 56.9 ± 11.9 years (mean \pm standard deviation). Most of the participants were married (87.0%) and unemployed (63.6%), possessed more than a high school degree (79.9%), and did not have a family history of cancer (60.9%). Hypertension was the most frequently reported comorbidity (35.3%), followed by diabetes mellitus (17.4%), coronary artery disease (11.0%), and other diseases, including hepatitis B, fatty liver disease, kidney disease, old tuberculosis, and gout. The average duration between diagnosis and surgery was more than 3 weeks (25.4 ± 15.2 days). The EGC of more than half of the participants was diagnosed via the National Cancer Screening Program (56.5%), and 78% did not experience any physical symptom before the diagnosis (Table 1).

Psychological Distress, Illness Perception, Physical Symptoms, and Social Support

The mean score of psychological distress was 282.2 ± 138.7 , and the highest form of distress was reported to be confusion, followed by anxiety, depression, lack of vigor, anger, and fatigue. The mean score of illness perception was 36.6 ± 10.0 , and the highest-ranked item was consequences, followed by concern, emotions, comprehensibility, personal control, timeline, identity, and treatment control. Nearly 70% of the participants reported having experienced physical symptoms in the past 2 weeks, and the most common symptom was heartburn, whereas vomiting was the least reported. The social support scale's mean score was 3.8 ± 0.7 ; the highest- and lowest-scored dimensions were family and HCPs, respectively (Table 2).

Factors Influencing Illness Perception

After the bivariate analysis, the variables that significantly correlated with illness perception satisfaction with patient education ($r = -0.21, P = .003$), social support ($r = -0.09, P = .02$), and physical symptoms ($r = 0.19, P = .010$) (Table 3). Among demographic and clinical characteristics, only duration between diagnosis and surgery was significantly related to illness perception ($r = 0.15, P = .042$). After entering these variables in the multiple linear regression model, the significant factors influencing illness perceptions were social support ($\beta = -2.0, P = .048$), physical symptoms ($\beta = 3.7, P = .013$), and satisfaction with patient education ($\beta = -1.70, P = .017$) (Table 4, step 1). The variance inflation

factor ranged from 1.01 to 1.05, which indicates no issue of multicollinearity (not shown in the table).

Mediation Analysis of Psychological Distress

Baron and Kenny suggested 3 steps for mediation analysis.³¹ The first step examines the relationship between the independent and mediating variables. As mentioned previously, social support, symptom, and satisfaction variables (independent variables) all significantly affected illness perception (mediating variable). In the second step, the relationship between 3 independent variables and psychological distress was tested, and among those, only the symptom variable was significant ($\beta = 51.0, P = .019$). In the final step, when social support, symptoms, satisfaction variables (independent variables), and illness perception (mediating variable) were all controlled, only illness perception significantly influenced psychological distress ($\beta = 9.14, P < .001$). This indicates complete mediation of illness perception (Table 4) (Figure).³¹

Discussion

The main findings of this study were as follows. First, a moderate level of psychological distress was reported in patients with EGC after diagnosis. Second, illness perception was the key determinant of psychological distress. Third, the factors affecting illness perception were physical symptoms, social support, and satisfaction with patient education; illness perception mediated the relationship between these factors and psychological distress.

 **Table 1 • Characteristics of Participants (N = 184)**

Variables	Categories	n (%)	M ± SD
Sex	Male	106 (57.6)	56.9 ± 11.9
	Female	78 (42.4)	
Age, y			
Marital status	Married	160 (87.0)	25.4 ± 15.2
	Not married	24 (13.0)	
Education	<High school	37 (20.1)	
	≥High school	147 (79.9)	
Employment	Employed	67 (36.4)	
	Unemployed	117 (63.6)	
Family history of cancer	No	112 (60.9)	
	Yes	72 (39.1)	
Comorbidities ^a	No	104 (56.5)	
	Yes	80 (43.5)	
	HTN	65 (35.3)	
	DM	32 (17.4)	
	CAD	19 (11.0)	
	Others	14 (7.6)	
Duration between Dx and surgery, d			
Reasons for screening	National cancer screening	104 (56.5)	
	Physical symptoms	41 (22.3)	
	Private health screening	39 (21.2)	
Presence of symptoms before Dx	No	143 (77.7)	
	Yes	41 (22.3)	

Abbreviations: CAD, coronary artery disease; DM, diabetes mellitus; Dx, diagnosis; HTN, hypertension; M, mean; SD, standard deviation.

^aMultiple responses are possible.

Table 2 • Descriptive Statistics of the Variables (N = 184)

Variables	M ± SD or n (%)
Psychological distress	282.2 ± 138.7
Confusion	56.4 ± 30.2
Anxiety	54.4 ± 29.6
Depression	48.0 ± 29.2
Vigor	44.4 ± 27.7
Anger	39.6 ± 29.2
Fatigue	39.4 ± 28.4
Illness perception	36.6 ± 10.0
Consequences	6.9 ± 2.7
Emotions	6.4 ± 3.0
Concern	6.4 ± 3.1
Comprehensibility	5.9 ± 2.4
Personal control	4.5 ± 2.7
Timeline	3.3 ± 2.8
Identity	1.9 ± 2.1
Treatment control	1.3 ± 1.8
Social support	3.8 ± 0.7
Family	4.6 ± 0.5
Friends	3.8 ± 1.0
Significant others (HCP)	2.8 ± 1.3
Physical symptoms	
No	61 (33.2)
Yes ^a	123 (66.8)
Heartburn	62 (33.7)
Indigestion	54 (29.3)
Abdominal distension	38 (20.7)
Gastric reflux	32 (17.4)
Weight loss	31 (16.8)
Epigastric pain	27 (14.7)
Anorexia	25 (13.6)
Lack of energy	22 (12.0)
Abdominal pain	21 (11.4)
Nausea	15 (8.2)
Vomiting	4 (2.2)
Satisfaction with patient education	4.0 ± 1.0

Abbreviations: HCP, healthcare provider; M, mean; SD, standard deviation.
^aMultiple responses are possible.

The participants were experiencing a moderate level of psychological distress. A direct comparison with other patient groups was difficult because different instruments were used, and limited studies have reported a precise level of distress. The finding might indicate that people with early-stage cancer also perceive cancer diagnosis as quite threatening, despite the high 5-year survival rate among South Korean patients with EGC being 99.5%.³ One study reported that the stage of cancer did not predict

psychological distress in patients with breast cancer,³² and another revealed that the psychological distress level between patients with metastatic and nonmetastatic cancers was not significantly different.³³ Moreover, these participants reported confusion as the highest form of distress. This might be because they did not experience any symptoms before diagnosis and their EGC was mostly diagnosed via a routine health screening. Hence, in healthcare settings, psychological distress in patients with early-stage cancer or cancer with a favorable prognosis should not be neglected.

Illness perception played a vital role in predicting patients' psychological distress. This finding is in accordance with previous studies on patients with breast cancer, head and neck cancer, and colorectal cancer.^{18–21,23,34} One study reported that patients' illness perception did not change considerably for 6 months after diagnosis of breast cancer.²¹ Therefore, HCPs need to evaluate patients' perception of cancer immediately after diagnosis and, if necessary, to provide patient education to correct misperceptions about the illness.

Physical symptoms, social support, and satisfaction with patient education were found to be the influencing factors of illness perception, which can all be modified or addressed. In addition, illness perception mediated the relationship between these variables and psychological distress: physical symptom was partially mediated, and social support and satisfaction with patient education were fully mediated by illness perception.

Regarding physical symptoms, some studies have demonstrated that cancer survivors tend to interpret physical symptoms as a sign of the progression of cancer^{35,36}; hence, it might affect patients' illness perception and amplify their psychological distress even before the treatment. An interesting finding was the dramatic increase in participants' reporting symptoms. Only 20% had physical symptoms at the time of diagnosis; however, at the time of data collection after being admitted for surgery, 70% answered that they had experienced more than 1 symptom within 2 weeks. This demonstrates that the proportion of patients with symptoms nearly tripled in approximately 3 to 4 weeks. This may be attributed to the patients' late awareness of symptoms after diagnosis,^{37,38} owing to its nonspecificity.²⁹ Another possible explanation might be a reflection of people's high levels of stress after diagnosis, which could be manifested as physical symptoms.³⁹ Therefore, to alleviate people's illness perception and psychological distress, it is critical for HCPs to pay close attention to the management of patients' previous symptoms and the assessment of newly emerging symptoms after diagnosis.

Although social support is already a well-known associated factor of psychological distress in patients with cancer,^{6,40,41} this

Table 3 • Correlations Among Variables (N = 184)

Variables	Pearson's Correlation Coefficients, <i>r</i> (<i>P</i>)			
	Psychological Distress	Illness Perception	Satisfaction With Education	Social Support
Illness perception	0.66 (<.001)	—	—	—
Satisfaction with education	-0.08 (.281)	-0.21 (.003)	—	—
Social support	-0.09 (.233)	-0.17 (.02)	0.20 (.007)	—
Physical symptoms	0.18 (.016)	0.19 (.010)	0.10 (.162)	-0.02 (.793)

Table 4 • Mediation Analysis of Illness Perception (N = 184)

Steps	Dependent Variable	Independent Variables	Standardized β Coefficients (P)	t
Step 1	Illness perception	Social support	-0.14 (.048)	-1.95
		Symptoms	0.18 (.015)	2.46
		Satisfaction with patient education	-0.17 (.019)	-2.37
Step 2	Psychological distress	Social support	-0.08 (.267)	-1.11
		Symptoms	0.17 (.019)	2.37
		Satisfaction with patient education	-0.05 (.542)	-0.61
Step 3	Psychological distress	Social support	0.01 (.856)	0.18
		Symptoms	-0.06 (.315)	-1.01
		Satisfaction with patient education	0.07 (.244)	1.17
		Illness perception	0.66 (<.001)	11.21

study demonstrated that it affected psychological distress only via illness perception. This might be explained by the fact that the social support instrument we used only focused on measuring its emotional aspects, whereas its concept also encompasses instrumental and informational aspects.⁴⁰ Leaving the measurement issue aside, further studies need to explore how family members and close friends could improve patients' perception of cancer.

Satisfaction with HCPs' overall patient education significantly predicted psychological distress via illness perception. The instrument was not validated and was composed of a single question, so it should be interpreted with caution. Nonetheless, the result is in accordance with a study with thyroid cancer patients,⁴² which demonstrated that information support affected illness perception but was indirectly associated with psychological distress. Particularly after a cancer diagnosis, patients are provided with a vast amount of health information about cancer, treatment, and its process. The provision of patient education could be one of the biggest modifiable factors in improving illness perception and reducing psychological distress. In this respect, HCPs' roles in providing tailored and clear patient education are highlighted.

A limitation of this study was that, as mentioned previously, the instrument used to measure satisfaction with patient education was not sufficiently validated, and it consisted of only 1 question because we could not find an appropriate instrument that was translated into Korean. An insufficiently validated questionnaire could limit its measurement potential; hence, using a validated and reliable questionnaire is recommended in future studies.

Furthermore, patient recruitment and data collection took place on the day they were admitted to the ward, 1 day before surgery. We acknowledge that the data collection could have been a confounding factor of psychological distress because of the high anxiety that patients might have because of surgery. However, researchers have agreed that this is the only appropriate timing for capturing the distress they have experienced after diagnosis and before treatment because there could be other various confounding variables affecting distress or illness perception during or post immediate treatment. Although the researcher had contacted the patients 5 to 6 hours after the admission when they had finished their preoperative preparation, it is important for researchers to carefully consider the best timing for patients in a vulnerable condition after a cancer diagnosis. Moreover, the study targeted only approximately 200 patients in a single hospital, and researchers need to be cautious in generalizing the findings to other patient groups or clinical settings.

■ Conclusion

This study demonstrated that people with EGC experience a relatively high level of psychological distress. Physical symptoms, social support, and satisfaction with patient education all influence psychological distress via illness perception, and these variables directly impact illness perception. To the best of our knowledge, this is the first study that used CSM as a conceptual framework to investigate psychological distress and associated factors of illness perception in patients with newly diagnosed gastric cancer.

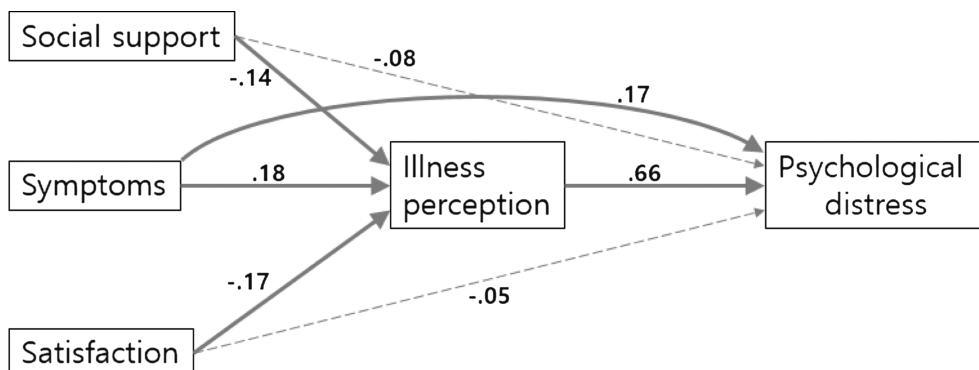


Figure ■ Mediation model of illness perception. Solid line indicates significant path; dotted line indicates insignificant path.

Using a theoretical framework, the researchers could implement a systematic approach to better understand the relationships between variables that influence psychological distress in patients with newly diagnosed gastric cancer.

Concerning the study's implications, the findings demonstrate that HCPs need to understand the psychological distress that patients might experience after a cancer diagnosis, even in cancer with a favorable prognosis. Because early cancer screening is one of the top priorities of healthcare systems worldwide, the proportion of patients with early-stage cancer will likely continue to increase.^{43–45} Healthcare professionals could assess psychological distress and illness perception after patients' cancer diagnosis using simple instruments such as the National Comprehensive Cancer Network Distress Thermometer or Brief Illness Perception Questionnaire. Doing so could increase the chances of detecting patients who need intervention. Another way to manage these issues is to train nurses who directly meet patients after diagnosis (eg, coordinating or navigating nurses) to provide emotional care to psychologically distressed patients.

Given the limited number of studies in the area, it was difficult to compare the results with similar studies on psychological distress in patients with newly diagnosed cancer. This study calls for more research on psychological distress and illness perception in other patients with newly diagnosed cancer to expand the understanding of this phenomenon. The study's findings could enhance HCPs' understanding of psychological distress in patients with newly diagnosed cancer and could guide them in designing a nursing intervention to minimize it in this population. A thorough understanding of influencing factors of illness perception can provide clinical implications for developing targeted interventions to improve the patients' illness perception after a cancer diagnosis.

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