Abstract

Aim

Postoperative patients with lung cancer have a high recurrence rate and poor prognosis; hence, we aimed to identify the factors affecting hope to help develop a care-oriented perspective focused on the levels of hope in postoperative patients with lung cancer.

Methods

In the study, we included postoperative patients with lung cancer and collected data for treatment-related symptoms, coping, and support-related factors as the primary variables. We used the Herth Hope Index, Quality of Life Questionnaire Lung Cancer Module (QLQ-LC13) of the European Organization for Research and Treatment of Cancer, Japanese version of the Coping Inventory for Stressful Situations (CISS), and Social Support Scale for Cancer Patients.

Results

For the 82 patients included in our study, 55% of the variance in the level of hope was explained using a model that included the following: (1) symptoms of dyspnea, sore mouth, and chest pain; (2) support, including satisfaction with postoperative symptom control by healthcare providers, satisfaction with the amount of information provided by healthcare providers, and the trust in nurses during treatment and recovery; and (3) task-oriented and social diversion coping behaviors.

Conclusion

As a result of this study, the support-related factors had no direct influence on hope, but they did have a significantly negative influence on treatment-related symptoms, with improved symptoms also having influencing hope.

Key words: Hope, lung cancer, Postoperative Patients , model

INTRODUCTION

The prevalence of lung cancer has been increasing worldwide (Worldwide Data, 2016), and it is now the leading cause of death in Japan (Ganjoho, 2016). Moreover, the prognosis for lung cancer is worse than that for cancers of other organs (Nonaka, 2011), and patients with non-small-cell lung cancer frequently suffer from severe depression at 1 year after radical surgery that can require psychosocial support (Uchitomi, 2003). Hope is a little-considered factor that may contribute to outcomes.

Hope is a psychosocial force that can give patients the strength to live with a positive attitude despite terrible loss or extreme difficulties (Herth, 1992). In this sense, it can be thought of as a constructive coping strategy from within humans that helps with facing adverse or stressful situations. For patients with cancer, hope is an important resource that has been shown to influence quality of life (Rustoen, Cooper, & Miaskowski., 2010), and the relationship between hope and coping is thought to be dynamic and reciprocal, with each factor supporting, and being supported by, the other (Folkman, 2010). Moreover, hope has been considered to be essential for psychological and physiological resilience to cancer experiences (Nowotny, 1988; Rustøen, Wiklund, Hanestad, & Moum, 1998; Herth, 2000), being able to give us the energy to continue living (Owen, 1989). It reflects the wish for a desirable future (Onishi, 1994) and the ability to think positively about the future through experiences or events (Hara, 2011).

This dynamic, personal force can provide the energy needed to overcome anxiety and fear and to protect self-esteem.

The concept of hope was advocated as an emotion (Lazarus, 1991; Rustoen, 1995). Since then, studies have found that hope can ease stress (Korner, 1970), be an effective coping strategy (Herth, 1989), enable self-transcendence to health and happiness (Haase, Britt, Coward, Leidy, & Penn, 1992), and help patients to cope with loss of time, uncertainty, and distress (Herth, 2002). After Herth (1992) and Nowtony (1988) created instruments to measure hope with, research on levels of hope was done by Ballard (1997), and intervention programs have been studied to raise levels of hope (Rustøen, Cooper, & Miaskowski, 2011; Tabrizi, Radfar, & Taei, 2016). By contrast, little research has been done on the factors influencing hope, and to date, there is no definitive opinion on this matter.Postoperative patients with lung cancer have high recurrence rates and poor prognoses, and many undergo treatment while experiencing both fear of an uncertain future (risk of recurrence or metastasis) and the negative effects of treatment on their daily lives. We believe that hope is an essential source of mental energy for many that can not only help them overcome their anxiety and fear during therapy but that can also help them live proactively and with self-esteem. However, further investigation of the factors influencing hope is required.

We aimed to identify the factors affecting hope to help develop a care-oriented perspective focused on the levels of hope in postoperative patients with lung cancer.

The hypothesized model

In this study, hope for postoperative patients with lung cancer was defined as the essential source of mental energy derived from wishful or positive emotions toward the future, which not only helps encourage and protect patients but also helps them to live. Based on previous studies by Folkman (2010), Herth (1989), Bando (2015), Uchitomi et al. (2003); and Liao et al, 2011), we developed a hypothetical model that included treatment-related symptoms, coping behaviors, and support-related factors as the three primary variables influencing hope.

Treatment-related symptoms. Only those symptoms specific to lung cancer or its treatment were included (e.g., dyspnea, coughing, and chest pain). Most symptoms disappear within 3 months of surgery, but these can persist for up to 6 months after surgery, during functional recovery (Bando, 2015). Pain was selected because hope has been reported to be low among patients with both cancer and pain (Lin, 2003).

Coping. Recognized coping behaviors include task-, emotion-, and avoidance-oriented coping. Hope interacts dynamically with coping, and each supports the other (Folkman, 2010). Because patients with lung cancer reportedly prefer emotion-oriented coping during chemotherapy (Fatma et al., 2011), we assumed that postoperative patients with lung cancer would also use some form of coping strategy.

Support-related factors. Irrespective of treatment status, patients with lung cancer are reported to need physical and psychological support, care, and information (Liao, 2011). Care-based support was based on satisfaction with postoperative symptom control and information provided by healthcare providers, as well as trust in doctors and nurses during treatment and recovery. In the present study, support from healthcare workers and other forms of social support were combined in the concept of "support".

METHODS

Sample size

The criteria for determining the sample size for statistical analysis were as follows: a two-tailed significance level of 0.05, a medium effect size of 0.3, and a statistical power of 0.8(Mizumoto et al., 2008; Tsushima, 2012). The sample size was predetermined by using a power analysis in Gpower3.1, and it was determined that 82 participants were appropriate for analysis in this study (Tsushima, 2012).

Participants

Postoperative patients with lung cancer were included if they met the following criteria: (1) they were diagnosed with lung cancer at our university hospital, which is a hub hospital for cancer treatment; (2) they were informed directly of the diagnosis of lung cancer by the attending doctor; (3) they were fully informed about the lung cancer surgery and postoperative therapy by the attending doctor, and agreed to receive lung cancer therapy; (4) they had a stable psychological status with no history of severe anxiety or

other mental illness; and (5) they underwent surgery within 3–6 months before the study. Patients with cognitive impairments were also excluded.

Data collection

First, patients who met the inclusion criteria were referred to our research team by doctors in the outpatient department. Then, an investigator obtained consent for the patients to participate, after which the questionnaire and return envelope were provided.

The study was conducted as a self-administered, anonymous, questionnaire survey, and completed questionnaires were received by mail.

Measures

Permissions were obtained to use all reported scales in this study.

Hope. The participants' levels of hope were measured using the Herth Hope Index (HHI) (Herth, 1992). The reliability and validity of the HHI have been established (Herth, 1992; Yamaki & Yamazaki, 2005). The instrument, which takes approximately 5 minutes to complete, is an abridged 12-item version of the Herth Hope Scale (Herth, 1991), and is the most frequently used version in the clinical setting. Each statement requires a response on a Likert-type scale ranging from 1 to 4 points, as follows: 1 = "strongly disagree," 2 = "disagree," 3 = "agree," and 4 = "strongly agree." The total possible score, therefore, ranges from 12 to 48 points, with the level of hope increasing with the total score. The

Cronbach's α for the overall scale is 0.84. Although the HHI was originally developed in English, it has been translated into various languages.

Sociodemographic characteristics. We enquired about the following: sex, age, marital status, employment status, living status (alone or with family/housemate), type of cancer, satisfaction with the decision to undergo surgery (rated using a 5-point Likert scale), type of surgery, time elapsed after surgery, treatment status (medical treatment when completing the questionnaire), and usage status of analgesic drugs.

Treatment-related symptoms. Symptoms associated with treatment for lung cancer were measured using the Quality of Life Questionnaire Lung Cancer Module (QLQ-LC13) of the European Organization for Research and Treatment of Cancer (Bergman, Aaronson, Ahmedzai, Kaasa, & Sullivan, 1994). The QLQ-LC13 consists of 13 items and is designed to assess symptoms or adverse effects that are specific to lung cancer, its treatment, or analgesic use. Each question is answered on a 4-point Likert-type scale ranging from "not at all" to "very much." The QLQ-LC13 can be completed in approximately 3 minutes. The symptoms assessed by the QLQ-LC13 are the same as those on the QLQ-C30 scale (Cocks K, 2007)Coping. Coping was assessed using the Japanese version of the Coping Inventory for Stressful Situations (CISS), which measures coping styles over about 10 minutes (Endler, 2012). The Cronbach's α is stated as 0.83–0.89. The CISS determines the preferred coping style of an individual when in stressful situations, and the result can be used to adjust their stress coping behaviors; for example,

by reducing dependence on one coping style or by increasing the use of another. The CISS comprises three primary scales (task-oriented, emotion-oriented, and avoidance-oriented coping) and two subscales (distraction and social diversion). Each item is rated on a 5-point scale, with higher scores indicating greater use of a coping style.Support-related factors. In this research, support was assessed by five items related to healthcare and to five domains related specifically to social support. The following five healthcare-related factors were rated with 5-point Likert scales: (1) satisfaction with the control of postoperative symptoms by healthcare providers, (2) confidence in the decision to undergo surgery, (3) satisfaction with the amount of information provided by healthcare providers, (4) trust in doctor during treatment, and (5) trust in nurses during treatment and recovery. Factors related to social support were also measured by the Social Support-related Factors Scale for Cancer Patients (Cronbach's α 0.96–0.97) (Miyashita and Hisada, 2004), which assesses five sources of social support: spouse, family, other patients, doctors, and nurses. The frequency of receiving each type of social support is rated on a 4-point scale ranging from "very frequently" to "never," and scores can range from 10 to 40 points. A higher score for a source indicated that the respondent frequently received support from that source.

Statistical analyses

Descriptive statistics were used to analyze the background data and clinical characteristics of the participants. The normality of the distribution was determined using

the Shapiro–Wilk test. Mean values were compared using the Mann–Whitney U test and the Kruskal–Wallis test, and the relationships between the variables were analyzed by Spearman's rank correlation coefficients. For all analyses, the P-values were two-tailed, the level of significance was set at 5%, and they were performed using IBM SPSS 22 for Windows and Amos 19.Variables with significant relationships in the univariate and correlation analyses of other studies were used as independent variables in a multiple regression analysis. Hope was used as the dependent variable. A proto-model was tested based on the results of the univariate, correlation, and multiple regression analyses, and the model's goodness of fit was calculated by covariance structure analysis. The proto-model was then modified, based on the relationships between the variables, to improve the goodness of fit. The goodness of fit criteria were ≥0.9 for the goodness of fit index (GFI), adjusted GFI (AGFI), and comparative fit index (CFI), but ≤0.05 for the root mean square error of approximation (RMSEA). A standardized root mean square residual was used.

Ethical considerations

This study was approved by the ethical review board of our hospital (no.1719), and participants were only enrolled in the study after obtaining their written informed consent. The following information was given to participants, orally or in writing, during individual discussions on informed consent: (1) that their privacy would be protected; (2) that choosing participating or not participating would not affect their treatment; (3) that

they would not be identifiable in the study's results; (4) that the participant may stop participating at any time, at their own discretion; and (5) we provided details of how the results will be published.

RESULTS

Participant characteristics

Table 1 shows the background data for the participants. Of the 103 patients who were invited to participate, informed consent was obtained from 100 and survey responses were obtained from 92 (response rate of 92%). After excluding responses with data missing from an entire scale, the number of valid responses was 89 (valid response rate of 96.7%). When responses included missing data from one of the scales, the data for that scale were eliminated, but the remaining data for other scales were still included in the analysis. The mean age of the sample was 66.0 ± 8.0 years, and 80 participants (89.9%) were married.

INSERT TABLE 1 HERE

Postoperative patients with lung cancer and factors influencing hope

The mean HHI score of the participants was 35.2 ± 5.7. The median value of the HHI was used as a cutoff value for hope, and we compared treatment-related symptoms, coping behaviors, and support-related factors between participants with high and low levels of hope. The results of the univariate and correlation analyses are shown in Table 1, showing

that there were no significant differences in the sociodemographic data between these groups. Regarding treatment-associated symptoms, the most frequent complaint was coughing, followed by chest pain and dyspnea. When symptoms were compared between the groups with high and low levels of hope, a significant difference was observed for sore mouth ($P = 0.010$) (Table 2).

INSERT TABLE 2 HERE

Task-oriented coping had the lowest score among the coping behaviors. When the groups with high and low levels of hope were compared, a significant difference was observed in the task-oriented coping ($P = 0.044$) and the social diversion ($P = 0.002$) factors (Table 3).

INSERT TABLE 3 HERE

Regarding factors related to support by healthcare providers, comparison showed a significant difference in satisfaction with the control of postoperative symptoms ($P = 0.057$), in satisfaction with the amount of information provided ($P = 0.018$), and in trust in the nurses during treatment and recovery ($P = 0.001$) (Table 4). For the factors related to social support, the participants answered that they most frequently received support from their family (excluding their spouse). When the groups with high and low levels of hope were compared, a significant difference was observed for social support from the family ($P = 0.003$) and from doctors ($P = 0.021$) (Table 5).

INSERT TABLE 4 AND 5 HERE

Goodness of fit of the hope model for postoperative patients with lung cancer

Using hope as the dependent variable, a univariate analysis was performed for the three primary symptoms that persist for 6 months after surgery (coughing, dyspnea, and pain in the chest) (Bando, 2015). Then, a multiple linear regression analysis was performed by the forced entry method, with the independent variables being those for which a significant difference was observed between the groups with high and low levels of hope. The coefficient of determination (R^2) was 0.487 (adjusted $R^2 = 0.414$) when we used the following as independent variables: four treatment-associated symptoms (dyspnea, coughing, chest pain, and sore mouth); four support-related factors (satisfaction with the information provided, trust in nurses during treatment and recovery, family-based social support, and doctor-based social support); and two coping factors (task-oriented and social diversion coping) (Table 6).

INSERT TABLE 6 HERE

Based on these initial results, a proto-model of the factors influencing hope was developed, including treatment-related symptoms, coping behaviors, and support-related factors as primary variables. In this proto-model, we could not draw valid paths from treatment-related symptoms and support-related factors to hope, and the model did not meet the goodness of fit criteria (Figure 1). With regard support, the result of the present study

showed that, levels of hope increased with an increase in the scores on the following factors: "satisfaction with the control of postoperative symptoms by health care providers," "satisfaction with the amount of information provided by health care providers," and "trust in nurses during treatment and recovery." The level of hope in patients with cancer had a stronger correlation with the degree to which the pain affected the patient's daily life than with the severity of the pain itself (Lin et al, 2003).Postoperative lung cancer patients need to use mental energy to cope with physical and mental recovery. Thus, providing sufficient care to control postoperative symptoms can help the patients maintain their levels of hope. Thus, the proto-model was modified based on the relationship between treatment-related symptoms and support-related factors. We removed one treatment-related symptom (coughing) and two support-related factors (family- and doctor-based social support), and added the factor "satisfaction with postoperative symptom control by healthcare providers." As a result, the revised model included three treatment-associated symptoms (dyspnea, sore mouth, and pain in the chest), three support-related factors (satisfaction with the control of postoperative symptoms by healthcare providers, satisfaction with the amount of information provided by healthcare providers, and trust in nurses during treatment and recovery), and two coping behaviors (task-oriented coping and social diversion). The goodness of fit of this modified model was then calculated by covariance structure analysis, producing a GFI of 0.936, an AGFI of 0.874, a CFI of 0.997, and an RMSEA of 0.017, which met the set criteria. In this model, all path coefficients were significant except for those from the support-related

factors to hope and from the support-related factors to coping behaviors. Thus, three symptom-related, three support-related, and two coping behaviors were included in the final model (χ^2 = 24.685, df. = 23, P = 0.367) (Figure 2).

INSERT FIGURES 1 AND 2 HERE

When selecting the final model, it was modified for the importance of the effect of treatment-related symptoms and support-related factors on the levels of hope to identify factors significant to patient care in post-surgical lung cancer patients. Dyspnea, sore mouth, and chest pain all negatively influenced hope ($\beta = -0.360$, P = 0.039). By contrast, the support-related factors (satisfaction with control of postoperative symptoms, satisfaction with the amount of information provided, and the trust in nurses) had no direct influence on hope. However, these factors did have a negative influence on the symptoms associated with treatment ($\beta = -0.580$, P = 0.000). Improvement of treatment-related symptoms influenced hope, while task-oriented and social diversion positively influenced hope (β = 0.570, P = 0.005). Moreover, coping behaviors had a greater influence on hope (estimated value = 0.570) compared with treatment-related symptoms (estimated value = −0.356).

DISCUSSION

In this study, we created a model of factors influencing hope among patients after surgery for lung cancer, with treatment-related symptoms, coping style, and support-related factors used as the primary variables. We also evaluated the effects of treatment-associated symptoms and support-related factors on levels of hope.

The symptoms observed most frequently after lung cancer surgery or most often associated with additional treatment were the target in our symptom assessment. The correlation between treatment-related symptoms and hope indicated that dyspnea, sore mouth, and chest pain had the most negative influence. This finding provides additional evidence in favor of controlling symptoms through appropriate support for patients who are receiving treatment. Indeed, the support-related factors themselves had no direct influence on hope, but did have a significant negative influence on treatment-related symptoms. Improvement in such symptoms also had a significant influence on hope, which represents a new finding. From a care-oriented perspective, relieving the symptoms associated with treatment by providing appropriate support is important when hope is used at the core of patient care. This result justifies using a foresight-oriented approach, beginning early in treatment when the level of energy to live as a cancer survivor is high.

Next, we evaluated the effect of coping on levels of hope, identifying that task-oriented coping and social diversion positively affected hope. These coping behaviors also had a greater influence on levels of hope when compared with the treatment-related symptoms. This supports previous studies in which hope was found to be a key factor in

patients' abilities to deal with difficulties (Sanatani, Schreier, & Stitt, 2008). Reinforcing these coping behaviors may provide the strength needed to maintain their energy to live as cancer survivors while undergoing treatment, and may motivate them to live with a positive attitude. Nurses routinely make close observations of minute changes in a patient's speech, behavior, or mental status, and will report changes to a doctor on behalf of the patient and his/her family. In turn, nurses often provide patients with supplemental explanations about matters that are hard to understand, enabling the patient to make informed decisions and concentrate on treatment (Kobayashi, Takai, & Ishihara, 2000). Patient care that instills hope in patients about the future will expand their awareness (Mayeroff, 1987). Compared with patients in a state of despair and apathy, those with a "fighting spirit" have been reported to have a longer survival time (Pettingale et al., 1985). In the present study, the factors influencing the levels of hope of postoperative patients with lung cancer were identified. The findings obtained in the present study can be used to develop practical interventions for patient care. Based on these findings, we obtained an important perspective on patient support-related factors that influences both patients' QOL and their survival. Thus, we gained a practical perspective beyond survival and the cure rates to help patients live their lives with satisfaction as cancer survivors. Based on these results, we need to develop a nursing support-related factors program that raises the level of hope of postoperative patients with lung cancer who have a high recurrent rate

and poor prognosis, and sustains their mental energy, beginning in the early phase of treatment.

Limitations

This questionnaire survey was conducted in a limited geographical region, which prevents generalization of the results. Moreover, the present study used a single cross-sectional design, and changes in treatment status or life events may have influenced the results. However, we showed that hope correlated with treatment-related symptoms, coping behaviors, and support-related factors, with hope as the core of patient care. These findings are meaningful to the study of dynamic nursing approaches.

CONCLUSION

In this study, 55% of the variance in the level of hope among postoperative patients with lung cancer was explained by a model based on three core factors. These factors were as follows: (1) treatment-related symptoms, including dyspnea, sore mouth, and chest pain; (2) support-related factors, including satisfaction with control of postoperative symptoms and the amount of information provided by healthcare providers, as well as trust in nurses during treatment and recovery; and (3) coping behaviors, including task focus and social diversion. Notably, the support-related factors had no direct influence on hope, but they

did have a significantly negative influence on treatment-related symptoms, with improved symptoms also having influencing hope.

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AUTHOR'S CONTRIBUTIONS

T.B., C.O., and Y.I. contributed to the conception and design of this study; T.B. carried out the statistical analysis. T.B. drafted the manuscript, and C.O. and Y.I critically reviewed the manuscript and supervised the study process. All authors have read and approved the final manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest that could influence the results or their interpretation.

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Table 1 Sociodemographic Characteristics by Herth Hope Index Scores (n = 89)

			Herth Hope Index (HHI)		
	n	%	Mean	SD	P-value
Hope					
Herth Hope Index Score	89		35.2	5.7	
Gender					0.217[a)]
Male	52	58.4			
Female	37	41.6			
Age (years)			66.0	8.0	0.902[b)] (r = 0.013)
Marital status					0.635[c)]
Married	80	89.9			
Single	1	1.1			
Widowed	8	9.0			
Work					0.271[a)]
Full-/part-time	38	42.7			
Unemployed	51	57.3			
Cohabitation					0.423[a)]
With family	79	88.8			
Alone	10	11.2			
Type of disease					0.856[a)]
Lung cancer	73	82.0			
Metastatic pulmonary tumor	16	18.0			
The degree of confidence in the decision to undergo surgery	89		4.5	0.6	0.113[b)] (r = 0.292)
Type of surgery (All thoracoscopic surgeries)					0.599[c)]
Pneumonectomy	0	0.0			
Lobectomy	74	83.2			
Segmentectomy	2	2.2			
Partial resection	13	14.6			
Number of postoperative days			127.4	36.6	0.489[b)](r = -0.074)
Additional postoperative treatment					0.103[c)]
None	47	52.8			
Under treatment	33	37.1			
Have a plan	9	10.1			
Use of analgesics (As-needed use of NSAIDs)					0.771[a)]
Yes	15	16.9			
No	74	83.1			

a) Mann–Whitney *U* test; b) Spearman's rank correlation; c) Kruskal–Wallis test

Table 2. Treatment-related symptoms based on high and low scores on the Herth Hope Index(n=89)

	Herth Hope Index Scale				
	All participants n=89	**Low group n=40**	**High group n=49**	**Low group vs**	**High group**
Variable	**mean(SD)**			**P-value**	
Dyspnea	19.9(16.8)	21.9(16.4)	18.1(17.1)		0.219
Coughing	30.0(22.5)	31.7(21.3)	28.6(23.6)		0.460
Haemoptysis	2.2(8.4)	0.8(5.3)	3.4(10.2)		0.152
Sore mouth	9.0(16.5)	14.2(19.8)	4.8(11.8)		0.010*
Dysphagia	10.5(17.8)	13.3(18.2)	8.2(17.4)		0.097
Peripheral neuropathy	9.7(17.6)	12.5(18.0)	7.5(17.0)		0.097
Alopecia	4.5(16.0)	5.8(18.3)	3.4(14.0)		0.318
Pain in chest	20.6(17.0)	23.3(17.2)	18.4(16.8)		0.192
Pain in arm or shoulder pain	15.0(18.8)	18.3(18.4)	12.2(18.9)		0.083
Pain in other parts	16.5(18.2)	17.5(18.5)	15.6(18.1)		0.630

*The median was used as a cut offcutoff for the high and low Herth Hope Index (HHI) scores.

The Mann-–Whitney U test was used for comparisons between the high and low HHI score groups. SD,standard deviation.

Table 3. Coping behaviors according by high and low scores on the Herth Hope Index (n=89)

	Herth Hope Index Scale			
	All participants	**Low group**	**High group**	**Low group vs High group**
Variable	**n**	**n**	**n**	**P-value**
	mean(SD)			
Task-oriented coping	40.3(10.6) n=86	36.4(8.7) n=39	43.4(11.1) n=47	0.002*
Emotion-oriented coping	45.9(11.0) n=87	47.3(11.5) n=39	44.8(10.6) n=48	0.330
Avoidance-oriented coping	46.0(10.4) n=86	44.0(9.4) n=39	47.6(11.0) n=47	0.147
Distraction	45.3(11.2) n=87	44.0(10.8) n=39	46.4(11.5) n=48	0.405
Social diversion	45.3(11.4) n=87	42.3(10.7) n=40	47.8(11.4) n=47	0.044*

*The median was used as a cutoff for high and low Herth Hope Index (HHI) scores. The Mann–Whitney U test was used for comparisons between high and low HHI score groups. SD,standard deviation.

Table 4. Support received from health care personnel by high and low scores on the Herth Hope Index(n=89)

	Herth Hope Index Scale				
	All participants n=89	**Low group n=40**	**High group n=49**	**Low group vs**	**High group**
Variable	**mean(SD)**			**P-value**	
Satisfaction with the control of postoperative symptoms by healthcare providers	4.2(0.8)	4.0(0.9)	4.3(0.7)		0.057
Confidence in the decision to undergo surgery	4.5(0.6)	4.5(0.6)	4.5(0.6)		0.696
Satisfaction with the amount of information provided by healthcare providers	4.2(0.9)	4.0(0.9)	4.4(0.8)		0.018*
Trust in doctors during treatment	4.6(0.7)	4.4(0.8)	4.7(0.5)		0.122
Trust in nurses during treatment and recovery	4.4(0.6)	4.2(0.5)	4.6(0.5)		0.001*

*The median was used as a cutoff for high and low Herth Hope Index (HHI) scores. The Mann–Whitney U test was used for comparisons between high and low HHI score groups.

SD,standard deviation.

Table 5. Support received from health care personnel by high and low scores on the Herth Hope Index(n=89)

	Herth Hope Index Scale			
	All participants	**Low group**	**High group**	**Low group vs High group**
	n	**n**	**n**	
Variable	**mean(SD)**			**P-value**
Social support from				
Spouse	28.5(9.4)	29.1(7.8)	27.9(10.5)	0.974
	83	37	46	
Family	29.0(6.6)	26.4(6.9)	31.2(5.6)	0.003*
	83	37	46	
Other patients	17.4(8.6)	15.4(19.0)	7.5(9.2)	0.142
	84	38	46	
Doctors	28.5(6.8)	26.7(6.9)	30.0(6.4)	0.021*
	83	37	46	
Nurses	25.7(8.3)	24.6(7.5)	26.6(8.8)	0.154
	84	38	46	

*The median was used as a cutoff for high and low Herth Hope Index (HHI) scores. The Mann–Whitney U test was used for comparisons between high and low HHI score groups.SD,standard deviation.

Table 6. Factors that explained hope in postoperative patients with lung cancer (n = 89)

Item/scales	B	SE B	β	P-value
Dyspnea	-0.02	0.03	-0.06	0.58
Coughing	-0.02	0.02	-0.06	0.55
Sore mouth	-0.06	0.03	-0.19	0.07
Pain in chest	-0.02		0.07	0.48
Satisfaction with the amount of information provided by health care providers	-0.08	0.80	-0.01	0.93
Trust in nurses during treatment and recovery	2.78	1.18	0.28	0.02
Task-oriented coping style	0.26	0.05	0.47	0.00
Social diversion	0.04	0.05	0.07	0.43
Social support from family	0.20	0.09	0.23	0.02
Social support from doctors	-0.10	0.09	-0.11	0.28
R^2	0.487			
Adjust R^2	0.414			

B = unstandardized coefficient; SE B = standard error of unstandardized coefficient; β = standardized coefficient. A multiple regression analysis was used with hope (in postoperative patients with lung cancer) as the criterion variable.

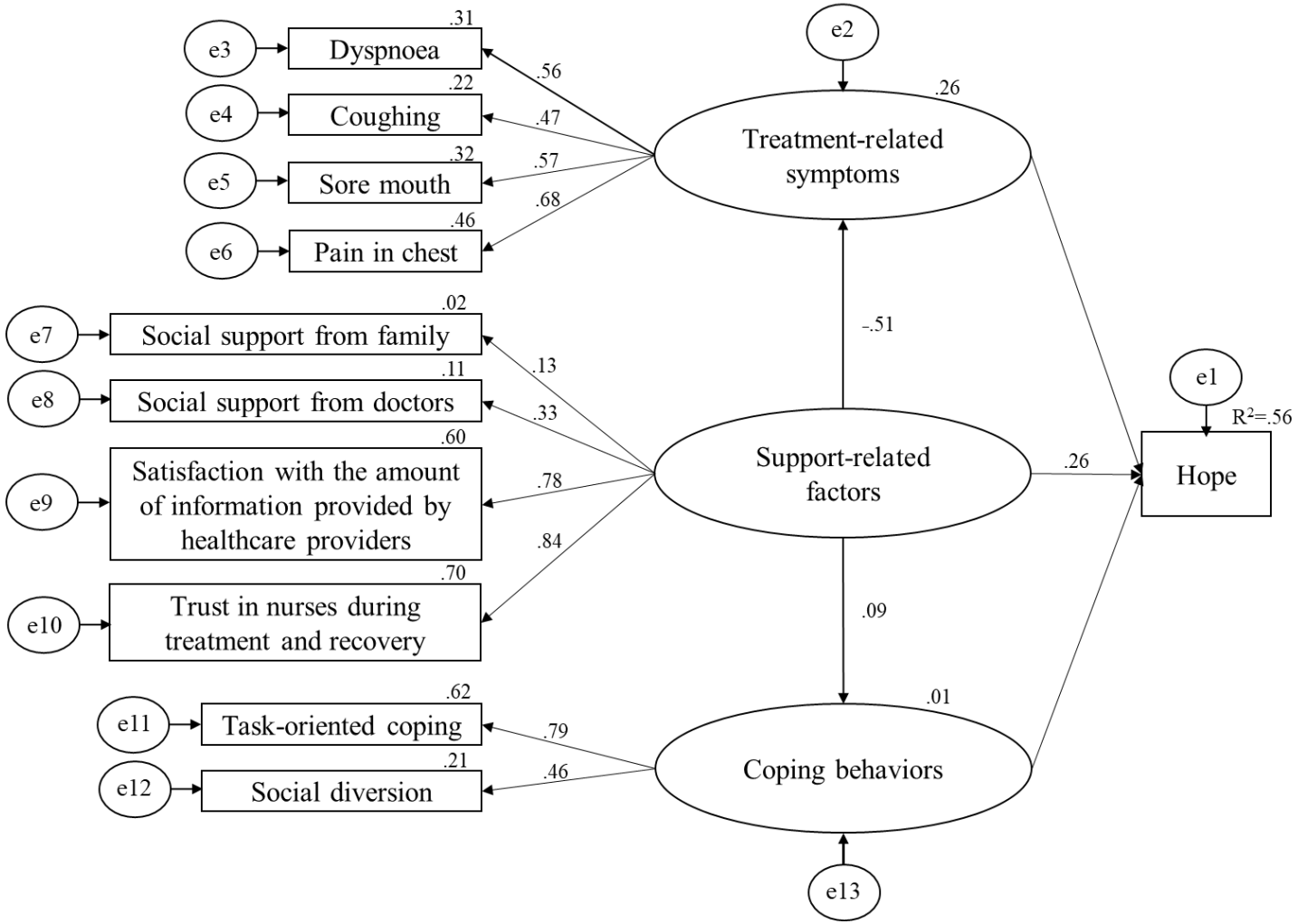

Figure 1. The initial model for four symptom-related and four support-related factors

All numbers are standardized coefficients. Ellipses represent latent variables, squares represent observed variables, and error variables are identified by "e." Model goodness of fit was as follows: goodness of fit index = 0.858, adjusted goodness of fit index = 0.766, comparative fit index = 0.815, root mean square error of approximation = 0.101, P = 0.001. n=82.

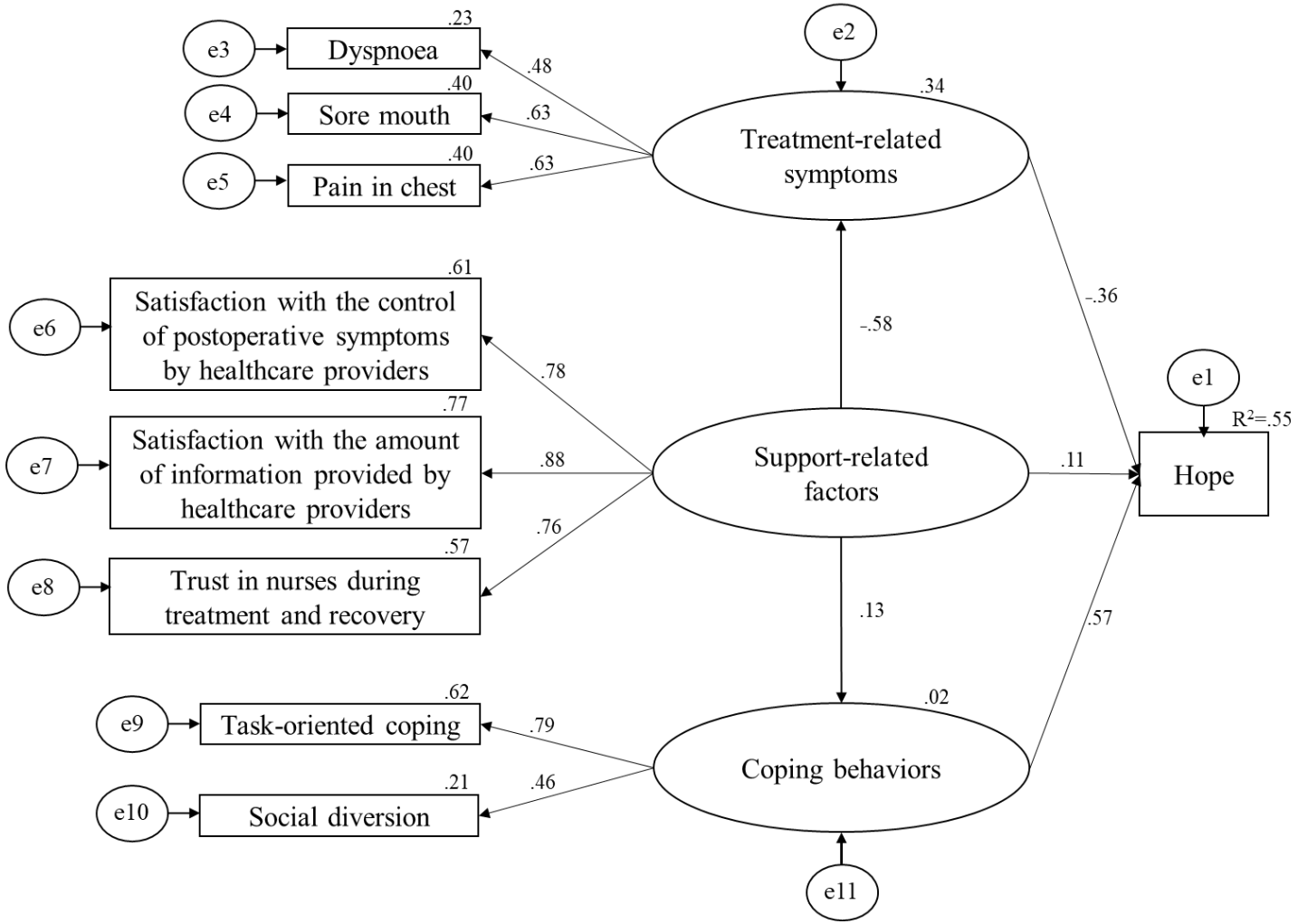

Figure 2. The final model for three symptom-related and three support-related factors

All numbers are standardized coefficients. Ellipses represent latent variables, squares represent observed variables, and error variables are identified by "e." Model goodness of fit was as follows: goodness of fit index = 0.936, adjusted goodness of fit index = 0.874, comparative fit index = 0.997, root mean square error of approximation = 0.017, P = 0.430.n=82.