

Certain bio-psychosocial–spiritual problems associated with dyspnea among advanced cancer patients in Taiwan

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Abstract

Purpose Dyspnea is a multidimensional phenomenon among advanced cancer patients. We aim to explore the association between bio-psychosocial–spiritual problems and dyspnea among advanced cancer patients in Taiwan.

Methods We retrospectively analyzed advanced cancer patients admitted to the hospice palliative ward in a tertiary hospital in Taiwan from 2002 to 2005. A total of 687 consecutive advanced cancer patients were enrolled. Physical, psychosocial, and spiritual problems for each patient were collected. Multiple logistic regression analyses were used to evaluate the association between dyspnea and other physical, psychosocial, and spiritual problems.

Results The top four primary sites of cancer among these patients are the liver/biliary tract (19.9%), lung (15.6%), colon/rectum (12.8%), and head/neck (9.9%). During admission period, 260 (37.8%) patients experienced dyspnea. For primary cancer types and metastatic locations, subjects with dyspnea tended to have lung cancer, lung metastasis, or brain metastasis. The clinical symptoms/signs related to dyspnea are pain, anorexia, constipation, nausea/vomiting, coughing, pleural effusion, edema, anxiety, and propriety preparation problem, that is, arranging one's will, feelings of isolation, fear of death, and survival. After further adjustments for potential confounders, subjects with problems of propriety preparation were found to be strongly associated with dyspnea. The adjusted odds ratio of having

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dyspnea caused by the problem of propriety preparation was 1.91 (95% confidence interval, 1.15–3.19).

Conclusions Advanced cancer patients with certain psychosocial and spiritual problems, such as, the problem of propriety preparation, fear of death, and anxiety, tended to have dyspnea. Among these factors, propriety preparation plays an important role among dyspnea patients. Advanced cancer patients with dyspnea have greater needs for propriety preparation.

Keywords Palliative care · Dyspnea · Propriety · Anxiety · Fear of death · Advanced cancer

Introduction

Dyspnea is a common and distressing symptom in advanced cancer patients. The prevalence of dyspnea increases as death approaches, with 50–70% of advanced cancer patients experiencing dyspnea [3, 5, 11, 12, 15, 16, 18, 19, 22, 26]. The symptoms usually become persistent, uncontrollable, and aggravated as the disease progresses. Previous studies have found that dyspnea troubles 56.6% of advanced cancer patients in Taiwan [4]. Respiratory diseases, cardiovascular diseases, anemia, metabolic abnormalities, and neuropsychiatric factors are the possible causes of dyspnea [1, 2, 9, 26]. In addition, dyspnea is a multidimensional phenomenon; its pathophysiology is not well understood [1, 8–10, 20, 21, 23, 26, 28, 29, 31].

Previous studies have found that anxiety is associated with dyspnea among advanced cancer patients [3, 5]. Another study reported that psychological distress, presence of organic causes, cough, and pain are significantly associated with dyspnea in advanced lung cancer patients [21]. Delgado-Guay et al. found that advanced cancer patients with depressive or anxious moods express higher frequency of dyspnea [10].

According to Weisman's description, good death is one in which a patient's suffering is reduced as much as possible and is accompanied by dignity [27]. Having good death is an important issue in Chinese culture. The problem of dyspnea among advanced cancer patients has strongly influenced the goal of having good death and has deeply bothered the medical staff and families [14]. Many factors, such as organic causes and psychosocial and spiritual factors, may alter dyspnea perception in advanced cancer patients, which have not been well studied in a Chinese population. Therefore, we aim to explore the association between bio-psychosocial–spiritual problems and dyspnea among advanced cancer patients in Taiwan.

Patients and methods

Patients and palliative care setting

In this cross-sectional study, we retrospectively analyzed advanced cancer patients admitted to the Hospice Palliative Care Unit in a tertiary hospital in Taiwan from September 2002 to September 2005. The inclusion criteria include patients aged 20 years and older, patients admitted to the Hospice Palliative Care Unit of the China Medical University Hospital for the first time, and with a level of consciousness clear enough (alert or lethargic consciousness) to report symptoms in Mandarin or Taiwanese upon admission. The participants were receiving care provided by a multidisciplinary team consisting of physicians, nurses, psychologists, social workers, clinical Buddhist chaplains, and volunteers. A total of 687 patients were enrolled in this study. Survival was divided into tertiles (I, 1–7 days; II, 8–25 days; III, >25 days). Among 687 individuals, only one patient's survival could not be confirmed. The study was approved by the ethics committee of the China Medical University Hospital.

Instruments

The assessment tool used was the Symptom Reporting and Clinical Evaluation Forms, which was modified from a previous study and designed by experienced specialists [4, 5, 7, 25]. Upon admission, the measurements of the physical, psychosocial, and spiritual problems of the patients were recorded by the main care-staff members who assessed and recorded the presence or absence of these problems according to patients' report and clinical evaluation. The recorded physical, psychosocial, and spiritual problems of each patient were discussed and confirmed by a multidisciplinary team consisting of physicians, nurses, psychologists, social workers, clinical Buddhist chaplains, and volunteers in a team meeting. Team meetings were held once a week. Data used for this study include routine records, such as demographic data (i.e., age, gender, and primary site of cancer) and the Symptom Reporting and Clinical Evaluation Forms of the patients at the time of admission. Physical problems include pain, fatigue, anorexia, dyspnea, cachexia, consciousness change, constipation, nausea/vomiting, ascites, cough, pleural effusion, insomnia, jaundice, tumor wound, edema, dysphagia, bleeding, body weight loss, paralysis, lymph edema, incontinence of urine or stool/catheter insertion, pressure ulcers, hallucination, and diarrhea. Psychosocial and spiritual problems include poor awareness of diagnosis; depression; anxiety; emotional distress; problem of propriety preparation, that is, arranging one's will; problems of communication, poor

relationship with families; feelings of isolation; certain family members persisting with their own opinion; unable to make a decision; divarication; problems of bequest management; fear of death; inability to reconcile with the disease; agony; feelings of helplessness, hopelessness, or emptiness; blaming God and man; suicide ideation, guilty conscience; and problems with feelings of gratitude or resentment.

Statistical analysis

Descriptive statistics was summarized as frequencies and percentages for categorical variables; mean and standard deviation (SD) was used for other continuous variables. The Student's *t* test and Chi-square test were used as indicated. Multivariate logistic regression analyses were used to estimate the adjusted odds ratios (ORs) and their 95% confidence intervals for the presence of dyspnea in

relation to other factors. All statistical tests were two sided at the 0.05 significance level. These statistical analyses were performed using the PC version of the SPSS statistical software (13th version, SPSS Inc., Chicago, IL, USA).

Results

Characteristics of the study population

The demographic characteristics of 687 consecutive patients between genders are summarized in Table 1. Among them, 381(55.5%) were men. The mean (SD) age and length of stay were 63.0 (14.4) years and 11.2 (10.5) days, respectively. The top three primary sites of cancer were the liver/biliary tract (19.9%), lung (15.6%), and colon/rectum (12.8%) (Table 1).

Table 1 Baseline characteristics of advanced cancer patients by gender

Variables	Total (N=687)	Women (N=306)	Men (N=381)	<i>p</i>
Age (years) ^a	63.0 (14.4)	62.1 (14.3)	63.7 (14.4)	0.147
Length of admission (days) ^a	11.2 (10.5)	11.4 (10.7)	11.1 (10.3)	0.641
Primary sites of cancer ^b				<0.001
Liver/biliary tract	137 (19.9)	50 (16.3)	87 (22.8)	
Lung	107 (15.6)	42 (13.7)	65 (17.1)	
Colon/rectum	88 (12.8)	37 (12.1)	51 (13.4)	
Head/neck	68 (9.9)	7 (2.3)	61 (16.0)	
Cervix/uterus/ovary	65 (9.5)	65 (21.2)	0 (0)	
Stomach	45 (6.6)	23 (7.5)	22 (5.8)	
Breast	42 (6.1)	42 (13.7)	0 (0)	
Urinary tract	33 (4.8)	5 (1.6)	28 (7.3)	
Esophagus	28 (4.1)	2 (0.7)	26 (6.8)	
Pancreas	27 (3.9)	12 (3.9)	15 (3.9)	
Neurologic system	13 (1.9)	4 (1.3)	9 (2.4)	
Hematologic	10 (1.5)	5 (1.6)	5 (1.3)	
Skin/connective tissue	9 (1.3)	3 (1.0)	6 (1.6)	
Others ^b	15 (2.2)	9 (2.9)	6 (1.6)	
Location of metastasis ^b				
Either	485 (70.6)	232 (75.8)	253 (66.4)	0.007
Liver	190 (27.7)	100 (32.7)	90 (23.6)	0.008
Lung	182 (26.5)	91 (29.7)	91 (23.9)	0.084
Bone	194 (28.2)	87 (28.4)	107 (28.1)	0.920
Abdomen	110 (16.0)	64 (20.9)	46 (12.1)	0.002
Brain	77 (11.2)	43 (14.1)	34 (8.9)	0.034
Discharge condition ^b				0.408
Death	254 (37.0)	103 (33.7)	151 (39.6)	
Home care	221 (32.2)	103 (33.7)	118 (25.7)	
Discharge on critical condition ^c	183 (26.6)	85 (27.8)	98 (31.0)	
Others	29 (4.2)	15 (4.9)	14 (3.7)	

Present with mean (SD) or *N* (%) as indicated

^aContinuous variables test using Student's *t* test between men and women

^bCategorical variables test using chi-square test between men and women

^cDischarge on critical condition: dying at home, wishes of patients or their families

Comparison of related factors in patients with and without dyspnea by univariate analysis

At the time of the study, 260 (37.8%) patients suffered from dyspnea. Using the Chi-square test, the factors significantly associated with dyspnea were determined as survival, lung cancer, lung metastasis, brain metastasis, pain, anorexia, constipation, nausea/vomiting, coughing, pleural effusion, edema, anxiety, and problem of propriety preparation, that is, arranging one's will, feelings of isolation, and fear of death (Tables 2 and 3). The prevalence of dyspnea was significantly higher in subjects with short survival, lung cancer, lung metastasis, brain metastasis, cough, pleural effusion, edema, anxiety, propriety preparation, and fear of death than in those without. There was no statistically significant difference in the prevalence of dyspnea between genders.

Related factors of dyspnea by multivariate logistic regression

Using multivariate logistic regression analyses with adjustment for potential confounders, the adjusted OR of having dyspnea among subjects with lung cancer and/or lung metastasis was 3.06 (95% CI, 1.80–5.19) and 2.71 (1.81–4.07), respectively (Table 4). Among the physical factors, subjects with cough, pleural effusion, and edema were more likely to have dyspnea (OR, 3.04 (95% CI, 1.83–5.05); OR, 4.77 (95% CI, 2.68–8.50); and OR, 2.09 (95% CI, 1.13–3.89), respectively). Among psychosocial–spiritual factors, subjects with propriety preparation problem, anxiety, and fear of death were more likely to have dyspnea (OR, 1.91 (95% CI, 1.15–3.19); OR, 1.45 (95% CI, 0.96–2.20); and OR, 1.58 (95% CI, 0.99–2.53), respectively). However,

Table 2 Demographic characteristics according to dyspnea status among advanced cancer patients

Variables	Dyspnea (N=260)	No dyspnea(N=427)	<i>p</i>
Age (years) ^a	63.1 (15.1)	62.8 (14.0)	0.188
Gender ^b			
Women	114 (43.8)	192 (45)	0.775
Men	146 (56.2)	235 (55)	
Length of admission (days) ^b			
1 to 7	133 (51.2)	193 (45.2)	0.271
8 to 14	59 (22.7)	116 (27.2)	
>14	68 (26.1)	118 (27.6)	
Education (years) ^b			
<7	142 (54.6)	232 (54.3)	0.822
7 to 12	92 (35.4)	146 (34.2)	
>12	26 (10)	49 (11.5)	
Discharge condition ^b			
Death	107 (41.2)	147 (34.4)	0.245
Discharge on critical condition ^d	68 (26.2)	115 (26.9)	
Home care	77 (29.6)	144 (33.7)	
Others	8 (3.1)	21 (4.9)	
Survival (days (mean (SD), median))	26.2 (49.7, 11)	38.0 (89.8, 16)	
Survival I (<i>n</i> =234 ^c ; 1 to 7 days)	108 (41.7)	126 (29.5)	<0.001
Survival II (<i>n</i> =226 ^c ; 8 to 25 days)	84 (32.4)	142 (33.3)	
Survival III (<i>n</i> =226 ^c ; >25 days)	67 (25.9)	159 (37.2)	
Primary cancer sites ^b			
Lung	71 (27.3)	36 (8.4)	<0.001
Other cancers	189 (72.7)	391 (91.6)	
Location of metastasis ^b			
Either	195 (75.0)	290 (67.9)	0.048
Liver	67 (25.8)	123 (28.8)	0.388
Lung	99 (38.1)	83 (19.4)	<0.001
Bone	83 (31.9)	111 (26)	0.094
Abdomen	35 (13.5)	75 (17.6)	0.155
Brain	38 (14.6)	39 (9.1)	0.027

Present with mean (SD) or *N* (%) as indicated

^aContinuous variables test using Student's *t* test between subjects with and without dyspnea

^bCategorical variables test using chi-square test between subjects with and without dyspnea

^cSurvival was divided by tertiles. Among 687 individuals, only one patient's survival was not confirmed

^dDischarge on critical condition: dying at home and wishes of patients or their families

Table 3 Prevalence of physical, psychosocial, and spiritual factors according to dyspnea status among advanced cancer patients

Variables	Dyspnea (N=260)	No dyspnea (N=427)	<i>p</i>
Physical factors^a			
Pain	199 (76.5)	363 (85)	0.005
Fatigue	171 (65.8)	288 (67.4)	0.651
Anorexia	142 (54.6)	288 (67.4)	0.001
Cachexia	90 (34.6)	162 (37.9)	0.381
Consciousness change	80 (30.8)	120 (28.1)	0.456
Constipation	62 (23.8)	135 (31.6)	0.029
Nausea/vomiting	52 (20)	141 (33)	<0.001
Ascites	44 (16.9)	73 (17.1)	0.953
Cough	69 (26.5)	36 (8.4)	<0.001
Pleural effusion	71 (27.3)	21 (4.9)	<0.001
Insomnia	28 (10.8)	56 (13.1)	0.363
Jaundice	25 (9.6)	58 (13.6)	0.122
Tumor wound	23 (8.8)	46 (10.8)	0.415
Edema	40 (15.4)	25 (5.9)	<0.001
Dysphagia	30 (11.5)	33 (7.7)	0.093
Bleeding	20 (7.7)	42 (9.8)	0.342
Body weight loss	16 (6.2)	41 (9.6)	0.112
Psychosocial and spiritual factors^a			
Poor awareness of diagnosis	120 (46.2)	179 (41.9)	0.278
Depression	111 (42.7)	176 (41.2)	0.704
Anxiety	95 (36.5)	105 (24.6)	0.001
Other emotional distress	74 (28.5)	103 (24.1)	0.207
Others psychosocial problems	51 (19.6)	84 (19.7)	0.986
Propriety preparation	52 (20)	45 (10.5)	0.001
Problems of communication	41 (15.8)	49 (11.5)	0.106
Poor relationship with families	23 (8.8)	55 (12.9)	0.106
Feeling of isolation	12 (4.6)	39 (9.1)	0.028
Unable to make a decision	17 (6.5)	15 (3.5)	0.068
Divarication	3 (1.2)	14 (3.3)	0.082
Problems of bequest management	3 (1.2)	7 (1.6)	0.606
Fear of death	59 (22.7)	71 (16.6)	0.049
Inability to reconcile with the disease	47 (18.1)	69 (16.2)	0.515
Agony	29 (11.2)	52 (12.2)	0.686
Helplessness/hopelessness	31 (11.9)	48 (11.2)	0.786
Emptiness	16 (6.2)	29(6.8)	0.743

Present with *N* (%) and test using Chi-square test

^aThe assessment tool used was the Symptom Reporting and Clinical Evaluation Forms.

Upon admission, the measurements of patients' physical, psychosocial, and spiritual problems were recorded by the main care-staff members who assessed and recorded the presence or absence of these problems according to patients' reports and clinical evaluation. The recorded physical, psychosocial, and spiritual problems of each patient were discussed and confirmed by a multidisciplinary team consisting of physicians, nurses, psychologists, social workers, clinical Buddhist chaplains, and volunteers in a team meeting. Team meetings were held once a week

subjects with anorexia were less likely to have dyspnea (OR, 0.64; 95% CI, 0.42–0.96) (Table 4)

Discussion

We demonstrated that dyspnea was significantly correlated with lung cancer, lung metastasis, cough, pleural effusion, edema, propriety preparation, and anorexia among advanced cancer patients. Advanced cancer patients with certain psychosocial and spiritual problems, such as, propriety preparation problem, fear of death, and anxiety,

tended to have dyspnea. Among these factors, propriety preparation plays an important role among dyspnea patients.

Weisman's definition of good death, which was modified in accordance with Chinese and Taiwanese culture, consists of five factors, namely, (1) awareness, awareness of one's dying; (2) acceptance, accepting death peacefully; (3) propriety, arranging one's will; (4) timeliness, death timing, and (5) comfort, degree of physical comfort 3 days before death [24, 27, 30]. Propriety, that is, arranging one's will is an important factor of good death. We found that dyspnea among advanced cancer patients was significantly correlat-

Table 4 Unadjusted and adjusted ORs (95% confidence interval) of having dyspnea among advanced cancer patients using logistic regression analysis in different models, adjusted for potential confounders

Variables	Model 1 ^a	Model 2 ^b	Model 3 ^c
Primary cancer sites and location of metastasis			
Lung cancer	4.08 (2.64–6.32)*	3.17 (1.88–5.32)*	3.06 (1.80–5.19)*
Lung metastasis	2.55 (1.80–3.60)*	2.65 (1.79–3.94)*	2.71 (1.81–4.07)*
Brain metastasis	1.70 (1.06–2.74)**	0.97 (0.54–1.73)	1.21 (0.66–2.20)
Survival			
Survival I (<i>n</i> =234) ^d	1.00 (reference)	1.00 (reference)	1.00 (reference)
Survival II (<i>n</i> =226) ^d	0.69 (0.48–1.00)	0.58 (0.37–0.90)**	0.57 (0.36–0.89)**
Survival III (<i>n</i> =226) ^d	0.49 (0.34–0.72)*	0.47 (0.30–0.74)***	0.46 (0.29–0.73)***
Physical factors			
Pain	0.58 (0.39–0.85)**	0.69 (0.44–1.09)	0.65 (0.40–1.04)
Anorexia	0.58 (0.42–0.80)***	0.67 (0.45–0.99)**	0.64 (0.42–0.96)**
Constipation	0.68 (0.48–0.96)**	0.69 (0.46–1.05)	0.76 (0.50–1.17)
Nausea/vomiting	0.51 (0.35–0.73)*	0.73 (0.47–1.14)	0.77 (0.49–1.23)
Cough	3.92 (2.53–6.08)*	2.90 (1.77–4.74)*	3.04 (1.83–5.05)*
Pleural effusion	7.26 (4.33–12.17)*	5.34 (3.05–9.37)*	4.77 (2.68–8.50)*
Edema	2.92 (1.73–4.95)*	2.51 (1.38–4.56)***	2.09 (1.13–3.89)**
Psychosocial and spiritual factors			
Anxiety	1.77 (1.26–2.47)***	1.40 (0.94–2.07)	1.45 (0.96–2.20)
Propriety preparation	2.12 (1.38–3.27)***	2.09 (1.27–3.44)***	1.91 (1.15–3.19)**
Feeling of isolation	0.48 (0.25–0.94)**	0.73 (0.35–1.51)	0.72 (0.34–1.52)
Fear of death	1.47 (1.00–2.17)**	1.67 (1.06–2.61)**	1.58 (0.99–2.53)

p*<0.001; *p*<0.05; ****p*<0.01^aUnadjusted^bAdjusted for lung cancer, lung metastasis, brain metastasis, pain, anorexia, constipation, nausea/vomiting, cough, pleural effusion, and edema^cAdjusted for lung cancer, location of metastasis, pain, anorexia, constipation, nausea/vomiting, cough, pleural effusion, edema, anxiety, propriety preparation, feeling of isolation, fear of death, and survival (survival I as reference)^dSurvival was divided by tertiles. Among 687 individuals, only one patient's survival was not confirmed

ed with the propriety preparation problem. To our knowledge, this is the first study comparing the propriety preparation problem with dyspnea among advanced cancer patients. The possible problems of propriety preparation were “no reference to the patient's will” and “conflict between the patient's will and that of the family.” The Buddhist funeral ceremony adjusted for Confucian culture, Taoism, and Taiwanese folk religion is one of the most common funeral ceremonies in Taiwan. Funeral ceremonies and the place of death are very important for most people in Taiwan. The Chinese saying, “Luo Yeh Guei Gen,” reflects the traditional beliefs in having a good death, stating that dying at home is as natural as the leaves falling down to the roots of a tree [30]. One possible conflict between the will of the patient and that of the family is that some patients wish to die at home, but their families want them to remain in the hospital until their death [30]. The reasons may be related to “the patient's families worrying that they cannot handle the patient suffering at home” and “no caregivers are

available to care for the dying patient all day.” In addition, with the earlier involvement of hospice care in the cancer treatment, a continuous relationship among the hospice staff, cancer patients, and their families will grow, contributing to better discharge planning, propriety preparation, and death preparation for palliative home care [30]. A possible explanation for the association between propriety preparation and dyspnea is that the problem of propriety preparation may lead to psychological distress, which may cause dyspnea, according to previous studies on lung cancer patients [21]. Chochinov et al. reported that as death draws near, psychological variables are replaced by physical mediators of variation in the will to live and that the four main predictor variables of the will to live are depression, anxiety, shortness of breath, and sense of well-being [6]. These findings also suggest another explanation for the relationship among dyspnea, low will to live, and propriety preparation. Our results suggest that the appropriate management of the propriety preparation problem by

a multidisciplinary hospice care team and hospice home care may be beneficial for good death and improving dyspnea among advanced cancer patients. Therefore, patients with dyspnea have greater needs for propriety preparation.

Gysels et al. reported that chronic obstructive pulmonary disease patients with breathlessness are usually isolated and become invisible, and a palliative care approach is promoted and essential priorities are identified to reduce barriers to access [13]. However, our results suggest that feelings of isolation are not associated with dyspnea after adjusting for related factors (Table 4, model 3; OR, 0.72; 95% CI, 0.34–1.52). The possible explanation is that hospice admission cancer patients receive initial hospice palliative care consultations or hospice outpatient-clinic visits. Therefore, early hospice palliative care may improve the feelings of isolation among advanced cancer patients.

Although fear of death and anxiety were not significantly associated with increased risks of dyspnea after adjustment for other confounders among advanced cancer patients, the positive association was similar to other studies [3, 5, 10, 17]. For example, Bruera et al. reported that anxiety is associated with dyspnea [3]. Delgado-Guay et al. also found that patients with anxiety are more likely to have dyspnea [10]. The possible reason for this result may be due to the small sample size in our study.

Our results suggest that patients with anorexia are less likely to have dyspnea (Table 4, model 3) and that cachexia is not significantly related to dyspnea. However, Dudgeon et al. reported that cachexia is one of the causes of dyspnea indirectly caused by cancer [12]. To our knowledge, no similar study has investigated the relationship between cachexia and dyspnea after adjusting for primary cancer, metastasis, and other psychosocial–spiritual problems. Further research is required to clarify the mechanism linking anorexia, cachexia, and dyspnea.

Some limitations of this study should be noted. First, the study is cross-sectional, and causality remains to be determined. Further longitudinal studies can provide better evidence. Second, the participants were inpatients in a hospice palliative care unit in Taiwan; therefore, the results of this study may not apply to other races or cultures.

Conclusions

Advanced cancer patients with certain psychosocial and spiritual problems, such as, the propriety preparation problem, fear of death, and anxiety are more likely to suffer from dyspnea. After adjusting for lung cancer, location of metastasis, and physical–psychosocial–spiritual factors, advanced cancer patients with dyspnea were found to have greater needs for propriety preparation.

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