RESEARCH COMMUNICATION

Prevalence of Depression and its Correlations: a Cross-sectional Study in Thai Cancer Patients

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Abstract

  <u>Objectives</u>: Depression is common in cancer patients. However, only limited evidence is available for Asian populations. The authors therefore examine the prevalence of depression in Thai patients with cancer. In addition, associated factors were determined. <u>Methods</u>: This cross-sectional study was conducted in cancer patients admitted to a university hospital during December 2006 - December 2007. The Patient Health Questionnaire (PHQ-9) was used to assess all cancer patients. Suicidal risk was assessed by using the Mini-International Neuropsychiatric Interview (MINI) in the module of suicidal risk assessment. <u>Results</u>: Of 108 cancer patients, 29.6 % were diagnosed with a depressive disorder (mild, 14.8%; moderate, 5.6%; severe, 9.3%). However, only 25.0 % of these were recognized as being depressed by the primary physician. According to the MINI., 28.1% of these depressed cancer patients had a moderate to severe level of suicidal risk. In addition, the findings suggest that increased risk of depression is significantly associated with increased pain score, lower number of cancer treatments (<2 methods), increased educational duration (>13 years), increased age (>50 years old) and being female. <u>Conclusions</u>: The prevalence of depression is high in Thai cancer patients. However, depressive disorder in those patients is frequently undiagnosed. It is associated with several factors including pain, a number of cancer treatments, education duration, age and sex. To improve quality of life, increase compliance with treatments and prevent of suicide, screening for depressive disorders in this patient group is strongly recommended.

Keywords: Cancer - depressive disorder - suicide - pain - risk factors

Introduction

At the present time, increasing numbers of patients around the world are becoming ill and facing death from cancer. As with other chronic illnesses, cancer patients have to deal with many factors such as receiving bad news of repeated threats to their life, suffering from pain and medical treatments, and having poor support systems (Liu et al., 2011). Patients also face new social roles, lifestyle and medical treatment expense. All of these factors cause anxiety, fear of death, loss of confidence and some of them may have major depressive disorder. Studies have found that cancer patients with depression may have behavior problems, which can worsen over the course of cancer treatment, and persist long after cancer treatment, as well as have shorter survival from poor adherence to treatment plans (Thompson & Shear, 1998; Kissane, 2009; Yu et al., 2012). Moreover, these patients may ask for euthanasia (Breitbart et al., 2000; Ganzini et al., 2008; Ruijs et al., 2011) and prone to high risk of suicide (Bellini & Capannini, 1994; Yoshikawa, 2008; Madeira et al., 2011).

The study of cancer co-morbidity with depression has been challenged because depressive symptoms range from normal reactions to illness, through intense anxiety, to major depressive disorder (Yu et al., 2012). Patients with cancer also have depressive disorder co-morbidity 3-58%, with varying prevalence because of different definitions of depression, differences in depression screening methods, and different groups of participants (Massie & Holland, 1984; Ciaramella and Poli, 2001; Uchitomi et al., 2003; Katz et al., 2004; Ell et al., 2005; Boyd et al., 2012; Kim et al., 2012; Mitchell et al., 2012; Palmer et al., 2012; Tada et al., 2012; Warmenhoven et al., 2012; Yu et al., 2012). Depressive disorder co-morbid with cancer is underestimated and under-treated (Bellini and Capannini, 1994 ; Yoshikawa, 2008; Salvo et al., 2012). That is because most physicians do not pay attention to this condition, thinking that depression is in the nature of the physical disease, or a normal reaction to illness, or they did not know how to diagnose depression exactly.

Aims of this research were to find the percentage of diagnosis of depression in cancer accurately, the percentage of suicidality, and to determine the factors associated with depressive disorder, among inpatients who attended the usual cancer treatment program in northern Thailand.

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Materials and Methods

Sampling procedure

Sampling was done by Haphazard sampling through approaching all cancer patients who were admitted during the time of sample collection (December 2006-December 2007). The study was approved by the ethics committee of Chiang Mai University. All subjects gave informed consent. Baseline interviews were conducted in person by a trained physician. The researcher ensured that all participants were not of any particular characteristics but were heterogeneous.

Subjects

We included all stages and types of cancer patients, who were admitted for investigation or treatment of cancer such as surgery, chemotherapy, radiotherapy on the inpatient ward of university hospital. The inclusion criteria were age 18-60 years old, can give informed consent, awareness of the diagnosis of cancer, and could communicate with the physician. The exclusion criteria were severe confusion or having unassessable brain pathology.

Procedures

The study was approved by the ethics committee of Chiang Mai University. All subjects gave informed consent. Baseline interviews were conducted in person by a trained physician.

Measurements

Demographic data: age, sex, educational level, marital status, support systems, employment status, income, and debt were recorded. Duration of cancer, primary organs site, stage of cancer, and oncology treatments were reviewed from medical records.

Depression status and suicidality

We used Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001; Walker et al., 2011) for diagnosing depression in cancer patients. This screening tool comprises 9 items to measure depression as described in the Diagnostic and Statistical Manual Fourth Edition (DSM-IV) criteria and has two parts: the first screening for sign and symptoms of depression and the second detailing of severity of signs and symptoms from 0=not at all, 1=several days, 2=more than half the day, and 3=nearly everyday. Patients who had depression score positive at least one of the first two questions (depressed mood or loss of interest for most of the day and nearly everyday in the past two weeks). Moreover, signs and symptoms of depression have to have caused difficulty in work or daily life. The cut-off point for major depressive disorder is up to 10. Depressive groups are classified mild (PHQ-9 score from 10 to 14), moderate (score from 15 to 19), and severe (score up to 20).

The study assessed suicidal risk by the Mini-International Neuropsychiatric Interview (M.I.N.I.) module of suicidal risk assessment (Sheehan et al., 1998). Patients who had suicide risk current scores between 1-5 were in a low risk group, 6-9 were in a moderate risk group, and scores up to 10 were in a high risk group.

Pain score

The study assessed severity of pain by using a Visual Analog Scale (VAS), a 10-cm horizontal line for patients to mark their pain intensity on, which ranges from 0 (no pain) to 10 (most severe pain). This ratio scale is simple, reliable and valid to assess pain level (Serlin et al., 1995). Pain scores were classified as no pain (VAS=0), mild pain (VAS=1-4), moderate pain (VAS=5-6), and severe pain (VAS=7-10). A clinically significant cut-off score of 7 or greater indicates severe pain.

Data analysis

Age was categorized as 50 or less versus > 50 years, educational level was categorized as 13 years or less versus > 13 years, and level of incomes was categorized as 10,000 bahts per month (333.3 USD; 1 USD=30 bahts) or less versus more than 10,000 bahts per month. The cancer patients who had PHQ-9 scores=10 or more were classified as the depressed group, and those who had PHQ-9 scores less than 10 were classified as the non-depressed group. The cancer patients who had suicidal risk current scores more than 1 were classified in the suicidal risk group, and those who had suicidal risk current scores=0 were classified as the non-suicidal risk group. The percentage of depressive disorder in cancer, and suicidality were recorded. Descriptive statistics were conducted to present the characteristics of the study sample. The comparison of the depressed vs non-depressed group and the suicidal risk vs non-suicidal risk group were performed by the Pearson's chi-square test, and Fisher's Exact Test for qualitative data, and Mann-Whitney U test for quantitative data. All tests were two sided and significance was set at 0.05. Each independent factor which was statistically significant at the bivariate level (p<0.100) was included into the logistic regression model. We then developed a final model that combined patient characteristics, considering inclusion variables independently associated with depressive disorder in the cancer patients.

Results

From December 2006 to December 2007, all admissions to the hospital in-patient service with the diagnoses of cancer were screened for entry into the study; 108 consented and all were included in the analysis.

Table 1 shows the baseline characteristics of the 108 patients whose data were used for analysis. There were 47 males and 61 females. Most of participants had completed less than 13 years of education 89.8%, had married 77.8%, and occupations were agriculturists (32.4%), and labourers (29.6 %); however, the rate of unemployment was also high (20.4%). Of the 108 patients, 98 (90.7%) earned less than 10,000 bahts per month. The most common primary organs of cancer were gynecological (25.0%), gastrointestinal (21.3%), and head and neck (18.5%). Most of patients (36.1%) were in stage 4 of cancer.

Prevalence of depression

Of 108 study patients, 32 patients (29.6 %) with PHQ-9

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Table 1. Sociodemographic and Clinical Characteristics of Cancer Patients

Characteristics	All	Pt with MDD	Pt without MDD	Analysis P-value	Pt with suicide	Pt without suicide	Analysis P-value
	(N=108)	(N=32, 29.6 %)	(N=76, 70.4%)		(N=29, 26.9%)	(N=79, 73.1%)	
Age group (years)				0.022[a]			0.109[a]
≤ 50	62 (57.4)	13 (40.6)	49 (64.5)		13 (44.8)	49 (62.0)	
> 50	46 (42.6)	19 (59.4)	27 (35.5)		16 (55.2)	30 (38.0)	
Sex				0.095[a]			0.251[a]
Male	47 (43.5)	10 (31.2)	37 (48.7)		10 (34.5)	37 (46.8)	
Female	61 (56.5)	22 (68.8)	39 (51.3)		19 (65.5)	42 (53.2)	
Education level (years)				0.015[b]			1.000[b]
≤ 13	97 (89.8)	25 (78.1)	72 (94.7)		26 (89.7)	71 (89.9)	
> 13	11 (10.2)	7 (21.9)	4 (5.3)		3 (10.3)	8 (10.1)	
Marital status				0.197[b]			0.385[b]
Married	84 (77.8)	22 (68.7)	62 (81.6)		23 (79.3)	61 (77.2)	
Single	10 (9.3)	3 (9.4)	7 (9.2)		1 (3.4)	9 (11.4)	
Divorced	6 (5.6)	4 (12.5)	2 (2.6)		3 (10.3)	3 (3.8)	
Widowed	8 (7.4)	3 (9.4)	5 (6.6)		2 (6.9)	6 (7.6)	
Support system				0.024[b]			0.175[b]
No support	3 (2.8)	3 (9.4)	0 (0)		2 (6.9)	1 (1.3)	
With support	105 (97.2)	29 (90.6)	76 (100)		27 (93.1)	78 (98.7)	
Employment status				0.080[b]			0.295[b]
Unemployment	22 (20.4)	8 (25.0)	14 (18.4)		7 (24.1)	15 (19.0)	
Labourer	32 (29.6)	9 (28.1)	23 (30.3)		12 (41.4)	20 (31.3)	
Agriculturist	35 (32.4)	6 (18.8)	29 (38.2)		7 (24.1)	28 (35.4)	
Personal business	11 (10.2)	4 (12.5)	7 (9.2)		1 (3.4)	10 (12.7)	
State enterprises, private	3 (2.8)	1 (3.1)	2 (2.6)		0 (0)	3 (3.8)	
Government	5 (4.6)	4 (12.5)	1 (1.3)		2 (6.9)	3 (3.8)	
Level of income (bahts per month)				0.007[b]			1.000[b]
≤ 10,000	98 (90.7)	25 (78.1)	73 (96.1)		27 (93.1)	71 (89.9)	
> 10,000	10 (9.3)	7 (21.9)	3 (3.9)		2 (6.9)	8 (10.1)	
Debt				0.803[b]			0.987[a]
yes	52 (48.1)	16 (50.0)	36 (47.4)		15 (51.7)	41 (41.9)	
no	56 (51.9)	16 (50.0)	40 (52.6)		14 (48.3)	38 (48.1)	
Primary organs of cancer				0.878[b]			0.781[b]
Head & neck	20 (18.5)	7 (21.9)	13 (17.1)		5 (17.2)	15 (19.0)	
Breast	5 (4.6)	2 (6.3)	3 (3.9)		2 (6.9)	3 (3.8)	
Respiratory	4 (3.7)	1 (3.1)	3 (3.9)		1 (3.4)	3 (3.8)	
Gastrointestinal	23 (21.3)	9 (28.1)	14 (18.4)		4 (13.8)	19 (24.1)	
Genitourinary	6 (5.6)	1 (3.1)	5 (6.6)		2 (6.9)	4 (5.1)	
Gynecology	27 (25.0)	7 (21.9)	20 (26.3)		10 (34.5)	17 (21.5)	
Musculoskeletal	8 (7.4)	1 (3.1)	7 (9.2)		1 (3.4)	7 (8.9)	
Hematological	15 (13.9)	4 (12.5)	11 (14.5)		4 (13.8)	11 (13.9)	
Stages of cancer				0.109[b]			0.124[b]
1	13 (12.0)	6 (18.8)	7 (9.2)		4 (13.8)	9 (11.4)	
2	16 (14.8)	1 (3.1)	15 (19.7)		1 (3.4)	15 (19.0)	
3	29 (26.9)	10 (31.3)	19 (25.0)		12 (41.4)	17 (21.5)	
4	39 (36.1)	13 (40.6)	26 (34.2)		10 (34.5)	29 (36.7)	
	11 (10.2)	2 (6.3)	9 (11.8)		2 (6.9)	9 (11.4)	
							0.553[a]

scores=10 or more were classified in the depressive group. Among these, sixteen patients (50.0 %) experienced mild depression, six (18.8 %) had moderate depression, and ten (31.2 %) were in severe depression. Sensitivity and specificity of diagnosis being correctly were 25.0% and 9.2% respectively.

Pain and depression

The mean (SD) of pain scores of cancer patients with and without depression were 4.2 (3.2) and 2.1 (2.1). Mann-Whitney U testing showed that cancer patients with depression experienced significantly more pain than cancer patients without depression (p<0.001). If patients were classified according to pain level, we found that 6 (18.8%) and 9 (28.1%) depressed cancer patients had moderate and severe pain level respectively.

Suicidal risk of depressed cancer patients

Suicide risk score and depression are shown in tables 1 and 2. Mann-Whitney U testing showed that cancer patients with high depressive and pain score significantly have higher risk of suicidality than cancer patients without those factors (p<0.001 and p<0.001, respectively). Cancer patients with depression and pain were 1.3 (95 % CI

Table 2. Patient Functional Characteristics

Characteristics Mean (SD), median	All (n = 108)	Patients with MDD (n = 32)	Patients without MDD (n = 76)	Analysis (P-value)	Pt with suicide (N=29, 26.9%)	Pt without suicide (N=79, 73.1%)	Analysis (P-value)
PHQ-9 score; mean (SD)	7.9 (6.0)	15.6 (4.5)	4.7 (2.7)	< 0.001[a]	12.2 (6.0)	6.3 (5.2)	< 0.001[a]
Pain score; mean (SD)	2.8 (2.8)	4.4 (3.2)	2.1 (2.4)	< 0.001[a]	4.6 (3.3)	2.2 (2.3)	0.001[a]
Duration of cancer; mean (SD), month	12.4 (17.1)	13.1 (22.7)	12.1 (14.3)	0.693[a]	17.4 (25.6)	10.5 (12.3)	0.076[a]
Suicidal score; mean (SD)	2.6 (6.7)	5.5 (9.5)	1.4 (4.7)	< 0.001[a]	9.8 (10.0)	-	

[a]Mann-Whitney U test; SD, standard deviation

Table 3. Significant Correlates of Depression

Significant predictors of depression	Odds ratio*	95% CI	P-value
Age (years)			
≤ 50 vs > 50*	4.15	1.21-14.21	0.023
Sex			
Male vs Female*	3.83	1.12-13.13	0.033
Number of treatments (method)			
≤1* vs ≥2	11.05	2.75-44.42	0.001
Pain score	1.49	1.19-1.86	< 0.001
Education (years)			
≤13 vs >13*	7.76	1.024-58.82	0.047

interval =1.06-1.52) and 1.2 (95 % CI interval=1.06-1.25) times more prone to have suicidal risk, respectively.

We compared the difference between the patients who experienced depression and who did not (Table 1, 2). Significant differences (p<0.05) were found among the two groups in age, educational level, support system, level of incomes, number of treatments, and pain score. As a result, these factors were included in binary logistic regression analyses as covariables. Moreover, other factors which had significant differences (p<0.100) were also included in the analysis (sex and employment status).

Binary logistic regression analysis was conducted with the following 8 main effects: age, sex, educational level, support system, employment status, level of incomes, numbers of treatments, and pain score to investigate how well each factor can be used to explain depressive disorder. We used depressive disorder as a dependent variable. Depressive disorder was best explained by increased pain score, number of treatments (less than 2 methods), educational level (more than 13 years), age group (more than 50 years old), and being female.

Discussion

Depressive disorder is the most common problem in cancer patients. From our study, the prevalence of major depressive disorder in cancer patients was 29.6 %, which is in the middle range of findings of previous studies (3%-58%) (Massie and Holland, 1984; Ciaramella and Poli, 2001; Uchitomi et al., 2003; Katz et al., 2004; Ell et al., 2005; Boyd et al., 2012; Kim et al., 2012; Mitchell et al., 2012; Palmer et al., 2012; Pirl et al., 2012; Tada et al., 2012; Warmenhoven et al., 2012; Yu et al., 2012). As previous works (Bellini and Capannini, 1994; Caplette-Gingras and Savard, 2008), from our study shows low sensitivity of diagnosis depressive disorder (25.0 %), that means 75.0 % of patients was misdiagnosed and lacking in treatment. Cancer patients who are pain, depressed, and no support system are significantly more likely to experience suicidal ideation, compared with those without all of these factors. From this point of view, the mechanism of the association between cancer, depression, and suicidal ideation should be approached as holistic (biopsychosocial factors), not as a single disease. Therapist should pay attention in biopsychosocial factors: biological factors treatment cancer, pain and other complications; that the pain as well as social support system (Liu et al., 2011).

Treatment depressed cancer patients is complicated and need multidisciplinary team. However, primary clinicians should aware of basic principles related to the assessment and treatment of depressive disorder. Increased survival rates resulting from advances in the treatment of cancer have led to an increased interest in patients' emotional reactions and adaptations to the illness (Massie and Holland, 1984).

Evidence has shown that treating co-morbid depression in cancer patients can enhance the patient's ability to adapt to the disease and tolerate its treatments, increase survival rates and improve quality of life (Spiegel et al., 1989; Richardson et al., 1990; Fawzy et al., 1993). Good palliative care potentially improves the quality of life in depressed cancer to the extent that the rise of western euthanasia is abated when life becomes worth living again, even briefly. Mirtazapine is a particular helpful antidepressant for insomnia, nausea and malignant poor appetite (Kim et al., 2008; Riechelmann et al., 2010; Farriols et al., 2012).

In conclusion, our study confirmed the prevalence of depressive disorder among cancer patients which was underdiagnosed. Factors which influenced to high risk of depression were by increase pain score, number of treatment (less than 2 methods), educational level (more than 13 years), age group (more than 50 years old), and being female.

This study was a cross-sectional study and further prospective study with screening, giving accurate diagnosis, and treatment of depressive disorder co-morbidity in cancer patients will further clarify important questions overtime for this vulnerable yet readily treatable group in future. It is of paramount interest how treatment of depression improves cancer patients' quality of life.

Acknowledgements

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