

# Prevalence and related factors of psychological distress among cancer inpatients using routine Distress Thermometer and Chinese Health Questionnaire screening

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**Background:** Clinical practice guidelines suggest routine screening for distress among cancer patients for immediate early psychiatric care. However, previous studies focusing on routine screening for psychological distress among cancer inpatients in Taiwan are scant. Thus, the aim of this study was to evaluate the prevalence and related factors of psychological distress and mental illness among cancer inpatients in Taiwan.

**Patients and methods:** This study was conducted as a retrospective chart review in a general hospital in southern Taiwan. Cancer inpatients were regularly screened by nursing staff using the Distress Thermometer and the 12-item Chinese Health Questionnaire. Positive screening results on either instrument were followed by a non-commanded referral to psychiatrists for clinical psychiatric diagnosis and treatment.

**Results:** Of the 810 participants in this study, 179 (22.1%) were recognized as having psychological distress. Younger age (odds ratio [OR]=1.82), having head and neck cancer (OR=2.43), and having not received chemotherapy (OR=1.58) were significantly related to psychological distress. Among the 56 patients (31.3%) with psychological distress who were referred to psychiatrists, the most common mental illness was adjustment disorder (n=22, 39.2%), followed by major depressive disorder (n=13, 23.2%), depressive disorder not otherwise specified (n=6, 10.7%), and anxiety disorder not otherwise specified (n=4, 7.1%).

**Conclusion:** Our study indicated that cancer inpatients with psychological distress were more likely to be younger in age, have head and neck cancer, and have not received chemotherapy. The most common psychiatric disorder was adjustment disorder. Early detection of psychological distress and prompt psychiatric consultation and management are very important for cancer inpatients.

**Keywords:** psychological distress, cancer inpatients, prevalence, related factors, Distress Thermometer, Chinese Health Questionnaire

## Introduction

Cancer-related distress was depicted as a “multifactorial unpleasant emotional experience of a psychological, social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment” by the National Comprehensive Cancer Network (NCCN) of the US.<sup>1</sup> Distress is related to a lower quality of life,<sup>2</sup> treatment compliance and efficacy,<sup>3,4</sup> higher mortality,<sup>5-7</sup> and a higher risk of suicide.<sup>8,9</sup> Therefore, clinicians should make efforts to promote patients’ quality of life and decrease medical costs by alleviating patient distress.<sup>10,11</sup>

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The NCCN clinical practice guidelines (NCCN guidelines) in oncology distress management have, since 1997, advocated routine screening for distress in cancer patients.<sup>1</sup> Similar to the model of using pain for the 5th vital sign, the use of distress for the 6th vital sign was recommended in 2005.<sup>12</sup>

Several medical centers have recommended regular screenings on all cancer patients, as a component of routine cancer management.<sup>13</sup> This type of routine cancer care underscores that all patients with distress should receive the appropriate treatment and that top quality psychosocial cancer management involves systematic reevaluation and follow-up. However, challenges to care persist, containing not only the underestimation of the demand for psychosocial care but also the likely related factors. Since a majority of traditional tools designed to screen depression and distress are time-consuming for routine utilization in clinical situations, uncomplicated verbal and visual analog tools, such as the Distress Thermometer (DT),<sup>14</sup> the emotions thermometer,<sup>15</sup> and the 12-item General Health Questionnaire,<sup>16</sup> have been recommended. Of these scales, DT is probably the most widely utilized.<sup>17–20</sup>

Although several investigations on cancer patients with psychological distress have been published, there are very few investigations on the related factors of distress and its prevalence in Taiwanese patients. The prevalence of psychological distress as screened by the DT was 56.5% and 28.8%, respectively, according to Shim et al and Kim et al.<sup>21,22</sup> However, study limitations, including low response rates and scanty sample sizes, rendered generalization of the results to all cancer patients difficult. But with the increasing demands for treating distress in cancer patients, numerous hospitals have developed regular procedures for detecting and managing this condition.

A regular procedure for screening distress has been continually performed at Kaohsiung Chang Gung Memorial Hospital since December 2014. This program has assisted in caring for and approaching distressed patients. In this study, we intended to ascertain the related factors and prevalence of psychological distress among cancer inpatients in a general hospital. We also aimed to evaluate psychiatric disorders among cancer inpatients with psychological distress.

## Patients and methods

### Participants

This study was conducted as a retrospective chart review in a general hospital in southern Taiwan from December 2014 to May 2015. Our inclusion criteria were as follows: 1) newly hospitalized patients with any confirmed cancer and 2) patients with verbal or written communication ability. Exclusion criteria were as follows: 1) patients with impaired

consciousness (Glasgow Coma Scale score below 15 points) and 2) patients who had been readmitted and underwent DT and 12-item Chinese Health Questionnaire (CHQ-12) screening within the past 3 months. However, we could not review the patients who were initially excluded from the program. Therefore, we did not compute the overall response rate for all the procedures.

### Measurement of psychological symptoms Distress Thermometer

The DT is a 1-item self-report screening tool for evaluating psychological distress in patients with cancer.<sup>15,23,24</sup> The DT grades distress levels over the prior week based on a visual analog scale with scores from 0 (indicating no distress) to 10 (indicating extreme distress). The DT has been utilized in diverse populations and its performance has been compared with different self-report symptom scales.<sup>14,25,26</sup> Scores of 4 or 5 have each been investigated as potential cutoff scores on the DT to show significant distress in different studies.<sup>14,24–29</sup> According to the Taiwan Psycho-Oncology Society, a cutoff of 5 on the DT possesses the optimal sensitivity and specificity characteristics among Taiwanese cancer patients.<sup>30–32</sup>

### 12-Item Chinese Health Questionnaire

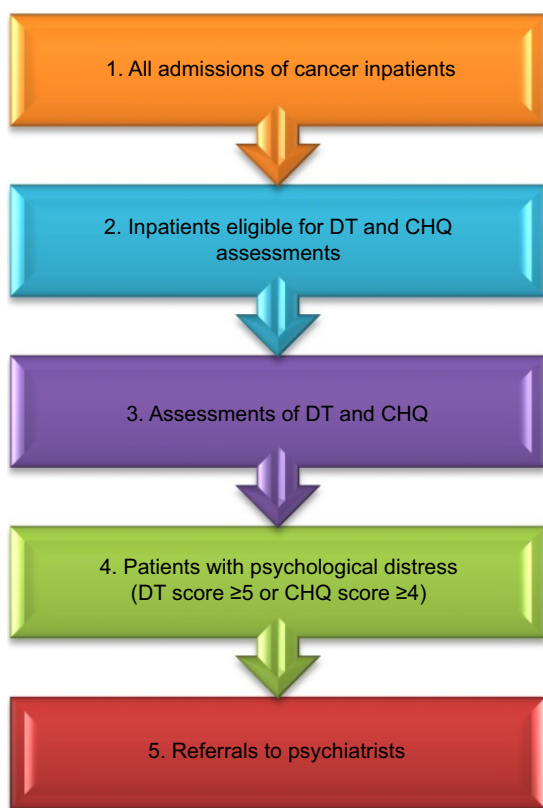
The CHQ-12, with cultural sensitivity, is an excellent tool for researching the potential psychiatric morbidity among ethnic Chinese individuals. The CHQ-12 was developed in Taiwan and derived from the 12-item General Health Questionnaire, which is widely used worldwide.<sup>33</sup> The CHQ-12 is a standardized screening tool and has been used previously in surveys of minor psychiatric morbidity in 3 communities in Taiwan.<sup>34</sup> It contains a 4-point response scale: 0= “not at all” and “same as usual”; 1= “rather more than usual” and “much more than usual”. It can be used to recognize a patient with a possible minor mental disorder based on a cutoff score above 3. The weighted validity of this instrument was found to be acceptable.<sup>34,35</sup>

### Procedures

Ethical approval was obtained from the Human Research Ethics Committee of Chang Gung Memorial Hospital which waived the requirement to obtain patient’s consent as all the data assessed in this study were collected from our regular clinical care to which the patients have already agreed. A 5-stage procedure was utilized (Figure 1).

### Stage I

The psycho-oncological consultant service was progressively implemented in our general hospital, from the head and neck cancer ward, urologic cancer ward, colorectal cancer ward to other wards. All the nurses at the oncology wards were



**Figure 1** The cancer psychological consultant service implemented in a general hospital. **Abbreviations:** CHQ, Chinese Health Questionnaire; DT, Distress Thermometer.

required to attend a 120-minute training course given by the program investigators according to the hospital policy. The psychologist taught the nurses how to use the standardized questions in the clinical scenarios. These trained staff would then determine who were eligible for the distress screening program (using the inclusion and exclusion criteria described earlier).

### Stage 2

The distress screening tools were assessed before the cancer treatment. Nursing staff at the medical oncology wards routinely provided a distress screening service after explaining the aim and procedure of the program to the eligible patients.

### Stage 3

In our study, a patient with distress was defined as having a score of  $\geq 5$  on the DT or a score of  $\geq 4$  on the CHQ-12.<sup>35,36</sup> Similar to the previous DT studies,<sup>14,24,26,29</sup> only the visual analog DT itself was evaluated; the companion problem list was skipped.

### Stage 4

The nursing staff's assessment and patient sociodemographic data were entered into the electronic nursing records within 48 hours after admission. Scores  $\geq 5$  points on the DT or

scores  $\geq 4$  points on the CHQ-12, which represent psychological distress, indicated that a psychiatric consultation would be suggested by a pop-up window embedded in the Health Information System of our hospital.

### Stage 5

Based on the screening results and pop-up window's suggestion, the final decision on the referral was made by the in-charge doctor, who evaluated clinical factors, including the patient's preference for a psychiatric referral and their physical condition. Each referred cancer inpatient was assessed at bedside by senior psychiatrists within 24 hours after referrals. Psychiatric diagnoses were made according to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition, Text Revision.<sup>37</sup>

Sociodemographic data and clinical information based on a medical chart review including the nursing staff's evaluation and physicians' assessment were collected. The sociodemographic variables assessed were age, sex, marital status, employment status, education, and current cigarette, alcohol, and betel nut use. We asked whether the patient currently uses these substances habitually or not. The clinical characteristics were comorbid medical diseases, cancer diagnosis, cancer staging, and cancer treatment (surgery, radiotherapy, chemotherapy, and hormonal therapy) in which the patient had received. Since the stage of leukemia could not be defined, patients with leukemia were excluded when cancer staging was investigated. Comorbid medical diseases of patients included hypertension, diabetes mellitus, thyroid disease, heart diseases, respiratory diseases, autoimmune diseases, neurological diseases, etc.

### Statistical analysis

Values are shown as mean  $\pm$  SD. We used SPSS version 12.0 (IBM Corporation, Armonk, NY, USA) to analyze descriptive and inferential statistics. Descriptive statistics ( $\chi^2$  and Student's *t*-tests) were executed first to investigate the difference in demographic data and clinical characteristics among the subjects with and without psychological distress. A stepwise forward model of logistic regression was utilized to examine the possible related factors that reach significant levels in univariate analysis, using clinical and demographic data. The significance level was set at  $P < 0.05$ .

### Results

#### Sociodemographic and clinical characteristics of the participants

Of the 810 study participants, 32 did not complete the CHQ-12 assessments, and 10 did not complete the DT assessments.

The reasons for incomplete data were unknown. The average age of the patients was  $59.4 \pm 13.2$  years. A majority of the participants were male (73.1%), married (88.3%), educated to a high school or higher level (65.3%), and unemployed (64.9%). The predominant clinical diagnosis was head and neck cancer (30.7%), and 44.2% of the participants were in stage 4 (Table 1). The other cancer types included breast cancer, liver cancer, lung cancer, connective tissue cancer, pancreas cancer, and esophageal cancer (Table 1).

**Table 1** Sociodemographic and clinical characteristics of the participants

| Characteristics          | Total<br>N (%), N=810 |
|--------------------------|-----------------------|
| Sex                      |                       |
| Male                     | 592 (73.1)            |
| Female                   | 218 (26.9)            |
| Age (years)              |                       |
| Mean $\pm$ SD            | 59.4 $\pm$ 13.2       |
| Education                |                       |
| $\leq 6$ years           | 281 (34.7)            |
| 7–15 years               | 453 (55.9)            |
| $\geq 16$ years          | 76 (9.4)              |
| Marital status           |                       |
| Married                  | 715 (88.3)            |
| Employment               | 284 (35.1)            |
| Cigarette use            | 261 (32.2)            |
| Alcohol use              | 205 (25.3)            |
| Betel nut use            | 155 (19.1)            |
| Cancer type              |                       |
| Head and neck            | 247 (30.7)            |
| Colorectal               | 113 (14)              |
| Urologic                 | 100 (12.3)            |
| Leukemia                 | 81 (10)               |
| Others                   | 267 (33)              |
| Surgery                  | 726 (89.6)            |
| Radiotherapy             | 213 (26.3)            |
| Chemotherapy             | 403 (49.8)            |
| Hormonal therapy         |                       |
| Yes                      | 3 (0.4)               |
| No                       | 807 (99.6)            |
| Comorbid medical disease |                       |
| 0                        | 593 (73.2)            |
| 1                        | 150 (18.5)            |
| 2                        | 38 (4.7)              |
| 3                        | 20 (2.5)              |
| 4                        | 4 (0.5)               |
| 5                        | 5 (0.6)               |
| Stage                    |                       |
| 0                        | 30 (4.3)              |
| 1                        | 121 (17.4)            |
| 2                        | 113 (16.3)            |
| 3                        | 123 (17.7)            |
| 4                        | 307 (44.2)            |
| DT                       | 2.57 (0–10)           |
| CHQ                      | 1.17 (0–12)           |

**Abbreviations:** CHQ, Chinese Health Questionnaire; DT, Distress Thermometer.

## Prevalence and related factors of psychological distress among cancer patients

Of the 810 inpatients, 179 (22.1%) were designated as having psychological distress. Inpatients with psychological distress were significantly younger compared with elder inpatients ( $\chi^2=16.66, P<0.001$ ), had a lower educational level compared with having a higher educational level ( $\chi^2=9.06, P=0.011$ ), had head and neck cancer compared with having other cancers ( $\chi^2=41.05, P<0.001$ ), and had not received chemotherapy compared with having received chemotherapy ( $\chi^2=9.35, P=0.002$ ). No significant correlations were determined in the light of sex, marital status, employment status, comorbid other disease, having received surgery, radiotherapy and hormonal therapy, cancer staging, and current cigarette, alcohol, and betel nut use (Table 2). When the significant variables mentioned earlier were investigated with respect to psychological distress utilizing the stepwise forward model of logistic regression, younger age (odds ratio [OR] =1.82; 95% CI, 1.22–2.71;  $P=0.003$ ), having head and neck cancer (OR =2.43; 95% CI, 1.71–3.46;  $P<0.001$ ), and having not received chemotherapy (OR =1.58; 95% CI, 1.09–2.29;  $P=0.015$ ) were ascertained to be 3 significant related factors (Table 3).

## Categorization of psychiatric disorders among cancer inpatients with significant psychological distress

Of the 179 inpatients with psychological distress, 123 were not referred to psychiatrists; 56 inpatients (31.3%) received a psychiatric assessment and psychiatric diagnosis (Table 4). The diagnoses comprised adjustment disorder (n=22, 39.2%), major depressive disorder (n=13, 23.2%), depressive disorder not otherwise specified (n=6, 10.7%), anxiety disorder not otherwise specified (n=4, 7.1%), delirium (n=2, 3.6%), psychotic disorder not otherwise specified (n=1, 1.8%), and insomnia disorder (n=1, 1.8%). Seven patients (12.5%) did not have a psychiatric diagnosis.

## Discussion

The primary result from our report was that 22.1% of the cancer patients suffered from psychological distress. The psychological distress in cancer inpatients was significantly associated with younger age, head and neck cancer, and having not received chemotherapy. The most common psychiatric disorder was adjustment disorder, followed by major depressive disorder, depressive disorder not otherwise specified, and anxiety disorder not otherwise specified. So far as we know, this is the first research to investigate the routine

**Table 2** Comparison of sociodemographic and clinical characteristics between patients with and without psychological distress

| Characteristics          | Cancer patients with distress<br>N (%), N=179 | Cancer patients without distress<br>N (%), N=631 | P-value | $\chi^2$ / Student's t-test |
|--------------------------|---|--|---------|-----------------------------|
| Sex                      |   |  | 0.425   | 0.636                       |
| Male                     | 135 (75.4)                                    | 457 (72.4)                                       |         |                             |
| Female                   | 44 (24.6)                                     | 174 (27.6)                                       |         |                             |
| Age (years)              |   |  | <0.001  | 16.655                      |
| ≤50                      | 66 (36.9)                                     | 138 (21.9)                                       |         |                             |
| >50                      | 113 (63.1)                                    | 493 (78.1)                                       |         |                             |
| Education                |   |  | 0.011   | 9.064                       |
| ≤6 years                 | 46 (25.7)                                     | 235 (37.2)                                       |         |                             |
| 7–15 years               | 117 (65.4)                                    | 336 (53.2)                                       |         |                             |
| >16 years                | 16 (8.9)                                      | 60 (9.5)   |         |                             |
| Marital status           |   |  | 0.999   | <0.001                      |
| Married                  | 158 (88.3)                                    | 557 (88.3)                                       |         |                             |
| Employment               |   |  | 0.199   | 1.651                       |
| Employed                 | 70 (39.1)                                     | 214 (33.9)                                       |         |                             |
| Cigarette use            |   |  | 0.674   | 0.177                       |
| Yes                      | 60 (33.5)                                     | 201 (31.9)                                       |         |                             |
| Alcohol use              |   |  | 0.953   | 0.003                       |
| Yes                      | 45 (25.1)                                     | 160 (25.4)                                       |         |                             |
| Betel nut use            |   |  | 0.420   | 0.651                       |
| Yes                      | 38 (21.2)                                     | 117 (18.5)                                       |         |                             |
| Cancer type              |   |  | <0.001  | 41.047                      |
| Head and neck            | 86 (48.0)                                     | 163 (25.8)                                       |         |                             |
| Leukemia                 | 10 (5.6)                                      | 103 (16.3)                                       |         |                             |
| Colorectal               | 20 (11.2)                                     | 80 (12.7)  |         |                             |
| Urologic                 | 7 (3.9)                                       | 74 (11.7)  |         |                             |
| Others                   | 56 (31.3)                                     | 211 (33.4)                                       |         |                             |
| Surgery                  |   |  | 0.477   | 0.507                       |
| Yes                      | 163 (91.1)                                    | 563 (89.2)                                       |         |                             |
| Radiotherapy             |   |  | 0.127   | 2.327                       |
| Yes                      | 55 (30.7)                                     | 158 (25.0)                                       |         |                             |
| Chemotherapy             |   |  | 0.002   | 9.354                       |
| Yes                      | 71 (39.7)                                     | 332 (52.6)                                       |         |                             |
| Hormonal therapy         |   |  | 0.638   | 0.221                       |
| Yes                      | 1 (0.6)                                       | 2 (0.3)  |         |                             |
| Comorbid medical disease |   |  | 0.082   | 9.766                       |
| 0                        | 141 (78.8)                                    | 452 (71.6)                                       |         |                             |
| 1                        | 29 (16.2)                                     | 121 (19.2)                                       |         |                             |
| 2                        | 2 (1.1)                                       | 36 (5.7)   |         |                             |
| 3                        | 4 (2.2)                                       | 16 (2.5)   |         |                             |
| 4                        | 2 (1.1)                                       | 2 (0.3)  |         |                             |
| 5                        | 1 (0.6)                                       | 4 (0.6)  |         |                             |
| Stage                    |   |  | 0.720   | 2.085                       |
| 0                        | 9 (5.3)                                       | 24 (4.5)   |         |                             |
| 1                        | 26 (15.4)                                     | 95 (18.0)  |         |                             |
| 2                        | 27 (16)                                       | 86 (16.3)  |         |                             |
| 3                        | 26 (15.4)                                     | 97 (18.4)  |         |                             |
| 4                        | 81 (47.9)                                     | 226 (42.8)                                       |         |                             |
| DT                       |   |  | <0.001  | 21.436                      |
| N=800* mean ± SD         | 5.67±2.23                                     | 1.73±1.27  |         |                             |
| N=800*                   | 139 (17.4)                                    | 661 (82.6)                                       |         |                             |
| CHQ                      |   |  | <0.001  | 14.317                      |
| N=778* mean ± SD         | 3.66±2.95                                     | 0.45±0.84  |         |                             |
| N=778*                   | 89 (11.4)                                     | 689 (88.6)                                       |         |                             |

**Notes:** \*Of the 810 study participants, 32 did not complete the CHQ-12 assessments, and 10 did not complete the DT assessments.

**Abbreviations:** CHQ, Chinese Health Questionnaire; DT, Distress Thermometer; SD, standard deviation.

**Table 3** Related factors for psychological distress among cancer inpatients: logistic regression analysis

| Item                 | $\beta$ | SE ( $\beta$ ) | Wald   | OR   | 95% CI    | P-value |
|----------------------|---------|----------------|--------|------|-----------|---------|
| Age $\leq$ 50 years  | 0.600   | 0.203          | 8.738  | 1.82 | 1.22–2.71 | 0.003   |
| Education            | 0.258   | 0.357          | 0.524  | 1.30 | 0.64–2.61 | 0.469   |
| Head and neck cancer | 0.888   | 0.180          | 24.382 | 2.43 | 1.71–3.46 | <0.001  |
| Non-chemotherapy     | 0.459   | 0.189          | 5.866  | 1.58 | 1.09–2.29 | 0.015   |

**Abbreviations:** OR, odds ratio; SE, standard error.

screening for psychological distress among Taiwanese cancer inpatients using DT and CHQ.

## Prevalence and related factors of psychological distress among cancer patients

Our finding that 22.1% of the cancer inpatients had psychological distress was concordant with the previous data reporting that nearly 20%–40% of cancer patients suffered from psychological distress.<sup>15,38–42</sup> But our result was lower than that in 2 studies on Korean cancer patients<sup>21,22</sup> and other studies,<sup>43,44</sup> which found a rate higher than 50%. This variation in prevalence was related mostly to research method (retrospective or prospective study), sample size, ethnicity, diagnostic criteria, and cancer types. In Taiwan, there has been one study on the prevalence of psychological distress among cancer inpatients as recognized by routine screening utilizing the Taiwanese Depression Questionnaire with a cutoff score of  $\geq 13$ ,<sup>45</sup> yielding 26.9% positive screens.

We found that younger age significantly correlated with psychological distress, which was consistent with previous studies.<sup>42,46–49</sup> The differences based on the life stage revealed that younger patients were inclined to describe psychological distress and need help, nearly 2.1 times more likely than older patients.<sup>49</sup> We surmised that the relationship between distress and age is unlikely linear, but is associated with the obligations that emerged in different life phases. It appears that simultaneously working and looking after children

**Table 4** Psychiatric diagnoses of cancer inpatients

| Category and diagnosis                      | Total (N=56) (%) |
|---|------------------|
| Major depressive disorder                   | 13 (23.2)        |
| Depressive disorder not otherwise specified | 6 (10.7)         |
| Adjustment disorder                         | 22 (39.2)        |
| Anxiety disorder not otherwise specified    | 4 (7.1)          |
| Delirium                                    | 2 (3.6)          |
| Insomnia disorder                           | 1 (1.8)          |
| Psychotic disorder not otherwise specified  | 1 (1.8)          |
| No psychiatric diagnosis                    | 7 (12.5)         |

dwelling at home when battling cancer in the meantime, as particularly young and middle-aged patients did, raises the demand for additional care.<sup>49</sup>

Moreover, this study, in line with former reports,<sup>39,42</sup> revealed that patients with head and neck cancer were more likely to have psychological distress than did those with leukemia, or colorectal or urologic cancer. Dysfunction of speech and articulation and facial disfigurement were the main reasons for the distress that set head and neck cancer patients apart from other cancer patients.<sup>50</sup>

We also demonstrated that patients who had not received chemotherapy significantly correlated with psychological distress. The possible explanations are as follows: first, those having received chemotherapy may have benefited more from the inhibition of disease progress, which would result in low levels of psychological distress. Second, there was a decline in depression, anxiety, and the impact of the adverse effects of chemotherapy in patients with the passing of time because of the acceptance of the diagnosis and management.<sup>51–53</sup>

In a recent study, Kim et al<sup>22</sup> examined the prevalence and related factors of psychological distress in recently diagnosed cancer patients at a medical oncology unit in Korea. They demonstrated that a low educational level was related to psychological distress, which supports our finding that lower educational levels were possibly correlated with psychological distress. Possible explanation for the result mentioned earlier is lower educated people might have lower socioeconomic status, and might have more stressful life events and, thus render psychological distress.

## Psychiatric disorders among cancer patients with significant psychological distress

We analyzed the psychiatric disorders among cancer inpatients with significant psychological distress. Past reports have indicated that major depressive disorder and adjustment disorder were prevalent in cancer patients.<sup>54–57</sup> Approximately 15%–20% of cancer patients with psychiatric disorder were diagnosed with major depressive disorder, 65% with adjustment disorder, and ~10% with delirium.<sup>54–56,58</sup> Our results showed nearly equal percentages of patients with adjustment disorder and depressive disorder, at 39% and 34%, respectively. This finding implicated that 10%–30% of cancer inpatients have depressive disorder and need psychotropic and psychological combination treatment.

However, the real prevalence may have exceeded those results. We executed psychiatric assessments for nearly one-third of the inpatients who were recognized as having

psychological distress and consequently referred to a psychiatrist. Previous data revealed that the referral percentage of cancer patients from oncologists to consultation-liaison psychiatrists was 4%–45%.<sup>22,59–62</sup> The possible reasons for the limited referral rate are a low level of psychological awareness among medical doctors, the stigma attached to psychiatric disease by clinicians, and the traditional idea that a clinician's main mission is saving life rather than dealing with psychological distress. We could improve the referral rates through promotion in formal hospital meetings and offering website learning to the physicians. Furthermore, many cancer inpatients have severe psychosocial problems (eg, lack of social support). We could consult the social workers to conduct family interviews to overcome the lack of support.

In this study, we effectively overcame several methodological limitations of previous studies on the DT. The strength of this study was that the sample was larger and more varied in terms of cancer treatment and kinds of cancer than former studies. These advantages should allow a generalization of our results to other groups of patients. Nevertheless, several limitations should be kept in mind when interpreting these data. First, we did not analyze the total response rate for our regular procedures for screening distress because we could not ascertain the total number of patients who were initially excluded from the procedures. Second, our participants were from a general hospital in southern Taiwan, which may make generalization of our results difficult. Third, this was a retrospective study, so we were unable to probe into the patients' psychiatric distress in the course of their cancer disease. Fourth, a number of inpatients with psychological distress were not referred to a psychiatrist, although we attempted to elevate the referral rate many times through promotion in formal hospital meetings and individually encouraging the physicians caring for the patients.

## Conclusion

Our study indicated that cancer inpatients with psychological distress were more likely to be younger, have head and neck cancer, and have not received chemotherapy. The most common psychiatric disorder was adjustment disorder, followed by major depressive disorder. Early detection of psychological distress and prompt psychiatric consultation and management are very important for cancer inpatients.

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## Author contributions

YJC and YL originally conceived the study and drafted its funding application. All the authors planned, wrote, and edited this article and took joint responsibility for its contents. All the authors contributed to and approved the final report, and YL is the study guarantor. All authors contributed toward data analysis, drafting and critically revising the paper and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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