Premiere Publications from The Triological Society

Read all three of our prestigious publications, each offering high-quality content to keep you informed with the latest developments in the field.

**The Laryngoscope**
Founded in 1896

Editor-in-Chief: Samuel H. Selesnick, MD, FACS

The leading source for information in head and neck disorders.

[Laryngoscope.com](http://Laryngoscope.com)

**Investigative Otology**

Editor-in-Chief: D. Bradley Welling, MD, PhD, FACS

Rapid dissemination of the science and practice of otolaryngology-head and neck surgery.

[InvestigativeOto.com](http://InvestigativeOto.com)

**ENTtoday**

Editor-in-Chief: Alexander Chiu, MD

Must-have timely information that Otolaryngologist-head and neck surgeons can use in daily practice.

[Enttoday.org](http://Enttoday.org)
Factors Associated With Suicidal Ideation Risk in Head and Neck Cancer: A Longitudinal Study

Dun-Cheng Chang, PhD; Andy Wei-Ge Chen, MD; Yu-Sheng Lo, MSc; Yi-Ching Chuang, MSc; Mu-Kuan Chen, MD, PhD

Objectives/Hypothesis: The risk factors associated with suicidal ideation among patients with head and neck cancer (HNC) have rarely been investigated. Thus, this study proposed an effective screening model to facilitate the identification of patients with HNC who are at risk of committing suicide.

Study Design: Retrospective longitudinal study.

Methods: We recruited 286 inpatients with HNC who were referred to the psychiatry department for an emotional distress assessment during cancer treatment. Sociodemographic and clinical factors, as well as Distress Thermometer (DT) scoring, were gathered and analyzed using multivariate logistic regression.

Results: Among the patients, 27 (9.4%) were recognized as having suicidal ideation. A logistic regression analysis revealed five significant indicators associated with suicidal ideation, namely depression (odds ratio [OR]: 42.83), dysphoria (OR: 8.06), hypopharyngeal cancer (OR: 4.61), cancer history (OR: 4.53), and average DT scores (OR: 1.84). Based on the receiver operating characteristic and logistic regression, the model can predict suicidal ideation with 93.4% accuracy (area under the curve value).

Conclusions: Our findings provide strong evidence that patients with depression, hypopharyngeal cancer, higher DT scores, and previous cancer history can be quickly screened for suicidal ideation, which may help to prevent suicide events in patients with HNC.

Key Words: Suicide risk factor, depression, dysphoria, hypopharyngeal cancer, distress thermometer.

Level of Evidence: 3b

INTRODUCTION

Studies on suicidal ideation in patients with cancer have consistently reported a relationship among male patients, head and neck cancer (HNC), and depression.1–5 Head and neck cancer patients receive treatments, either surgery, chemotherapy, or radiation therapy, with heavy side effects and functional loss. Several suicide studies based on head and neck cancer patients have confirmed the association between suicide and emotional distress.2,6–10 Screening and referral for depression, distress, mental illness, and mental health problems to psychiatrists is rapidly becoming the standard of care.10–15 Several screening tools have been proposed for psychosocial assessment using different questionnaires in clinical scenarios.4,6,8,10,14,16 However, most traditional assessment tools take a large amount of time to complete. The Distress Thermometer (DT), suggested by the National Comprehensive Cancer Network guidelines,17 introduced a simple, rapid, and self-reported distress screening tool for oncology patients.10,17–19 However, the relationship between DT score, as well as other risk factors, and suicidal ideation among head and neck cancer patients is still not studied enough. The aim of the recent research was to investigate the risk factors of suicidal ideation among head and neck cancer patients, giving more evidence for arranging intervention in the future.

MATERIALS AND METHODS

Design and Participant

This retrospective longitudinal study was approved by the Changhua Christian Hospital Committee of Human Testing and was conducted under the supervision of its institutional review board (170410). Participants were patients diagnosed with HNC who had been admitted to the Changhua Christian Hospital, Taiwan, between March 2015 and August 2017. Psychiatric consultation was arranged for HNC patients with relatively poor physical and psychosocial status, including those with poor family support, lower socioeconomic status, severe oral mucositis rendering solid diet intolerable, and major posttreatment disability. Suicidal ideation was identified after detailed psychiatric interviewing performed by experienced psychiatrists during admission. Patients who did not undergo psychiatric consultation were excluded from this study.
RESULTS

Statistical Analysis

Three major data analysis steps were conducted. First, descriptive statistics was performed to identify general characteristics. The patients were divided into two groups according to the presence or absence of suicidal ideation. To investigate the risk indicators of suicidal ideation, sociodemographic and clinical factors were compared between the two groups by using univariate analysis. The factors analyzed included depression, mood and affect, behavior, disturbance, and addiction to alcohol or drugs.

The one-step DT survey, adapted from the National Comprehensive Cancer Network guidelines, was assessed by experienced nursing staff during each admission to evaluate psychological distress. The DT included a question asking “How much distress have you been experiencing in the past week, including today,” with responses being scored on a 10-point scale (from 0 for no distress to 10 for severe distress). This procedure was routinely assessed before cancer treatment, such as operations, or at the start of a chemotherapy cycle.

Sociodemographic Factors of Inpatients With Head and Neck Cancer Classified by Suicidal Ideation.

<table>
<thead>
<tr>
<th>Sociodemographic Factors</th>
<th>No, n = 259</th>
<th>Yes, n = 27</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years, mean ± SD</td>
<td>57.3 ± 12.0</td>
<td>54.1 ± 10.0</td>
<td>.177</td>
</tr>
<tr>
<td>Gender, no. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>249 (96.1)</td>
<td>26 (96.3)</td>
<td>.696</td>
</tr>
<tr>
<td>Female</td>
<td>10 (3.9)</td>
<td>1 (3.7)</td>
<td></td>
</tr>
<tr>
<td>Marital status, no. (%)</td>
<td></td>
<td></td>
<td>.532</td>
</tr>
<tr>
<td>Single</td>
<td>31 (12.0)</td>
<td>1 (3.7)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>178 (68.7)</td>
<td>22 (81.5)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>24 (9.3)</td>
<td>1 (3.7)</td>
<td></td>
</tr>
<tr>
<td>Widowed/other</td>
<td>26 (10.0)</td>
<td>3 (11.1)</td>
<td></td>
</tr>
<tr>
<td>Living status, no. (%)</td>
<td></td>
<td></td>
<td>.651</td>
</tr>
<tr>
<td>Alone</td>
<td>18 (7.0)</td>
<td>2 (7.4)</td>
<td></td>
</tr>
<tr>
<td>With family/other</td>
<td>241 (93.0)</td>
<td>25 (92.6)</td>
<td></td>
</tr>
<tr>
<td>Occupation, no. (%)</td>
<td></td>
<td></td>
<td>.744</td>
</tr>
<tr>
<td>No</td>
<td>59 (22.8)</td>
<td>5 (18.5)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>188 (72.6)</td>
<td>20 (74.1)</td>
<td></td>
</tr>
<tr>
<td>Oral habits, no. (%)</td>
<td></td>
<td></td>
<td>.238</td>
</tr>
<tr>
<td>Alcohol only</td>
<td>3 (1.2)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Betel nuts only</td>
<td>6 (2.3)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Smoking only</td>
<td>19 (7.3)</td>
<td>5 (18.5)</td>
<td></td>
</tr>
<tr>
<td>Alcohol + betel + smoke</td>
<td>117 (45.2)</td>
<td>14 (51.9)</td>
<td></td>
</tr>
<tr>
<td>Betel + smoke</td>
<td>65 (25.1)</td>
<td>7 (25.9)</td>
<td></td>
</tr>
<tr>
<td>Alcohol + smoke</td>
<td>15 (5.8)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Alcohol + betel</td>
<td>5 (1.9)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>29 (11.2)</td>
<td>1 (3.7)</td>
<td></td>
</tr>
</tbody>
</table>

There are some missing data. The basic information is incomplete because of death, loss to follow-up, or other reasons. SD = standard deviation.

RESULTS

Sociodemographic Characteristics

A total of 286 patients with HNC were referred for psychiatric consultation due to poor physical and psychosocial status during the study period. Of these patients, 9.4% (27 cases) were diagnosed as having suicidal ideation by an experienced psychiatrist. Table I presents the sociodemographic characteristics of the patients, with the majority being male (96.2%) and having a mean age of 57.0 ± 11.9 years. Seventy percent of these patients were married, 93% lived with family, and 77.6% were employed at the time the survey was conducted. Over 45% of these patients drank alcohol, chewed betel nuts, and smoked cigarettes.

Clinical Factors

Approximately 60% of patients were in advanced stages (stage III and IV) of cancer (Table II). The most frequent cancer site was the oral cavity (66.4%), followed by the oropharynx (12.6%) and the hypopharynx (10.8%). Over 25% of patients received only surgical treatment, whereas others also underwent further adjuvant chemotherapy or concurrent chemoradiotherapy. Approximately 49% had previous cancer history. One-third of patients had hypertension and one-quarter had diabetes mellitus. Of these patients, 21% were diagnosed with hepatitis B virus and 8% were diagnosed with hepatitis C virus. The 259 patients in the absence of suicidal ideation group, with 899 repeated DT measures, had an average DT score of 1.97. The 27 patients referred due to the presence of suicidal ideation, along with the 233 repeated DT measures who had previously exhibited suicidal ideation, had an average DT score of 2.57. For a one-point increase in the DT score, there was an 84% increase in the risk of suicidal ideation (P = .018).

Psychiatric Diagnosis

Approximately 9% of the research participants were diagnosed with depression (Table III), which had a statistically significant relationship with suicidal ideation. Mood and affect were the most frequent symptoms, accounting for approximately 53% of referred patients.
Among mood and affect, the major subcategories were dysphoria (19.6%), anxiousness and restlessness (18.2%), and feeling agitated (13.3%). Among the observed behaviors, psychomotor retardation was most common, followed by psychomotor agitation and psychomotor hypoactivity. Over 80% of patients denied a disturbance of consciousness. Of the research participants, 16% had alcohol or other drug dependencies.

### Predictive Risk Factors Influencing Suicidal Ideation

Multivariate logistic regression (Table IV) revealed that depression (odds ratio [OR]: 42.83, 95% confidence interval [CI]: 11.62-157.81), dysphoria (OR: 8.06, 95% CI: 2.55-25.54), hypopharyngeal cancer (OR: 4.61, 95% CI: 1.14-16.56), previous cancer history (OR: 4.53, 95% CI: 1.30-15.83), and average DT scores (OR: 1.84, 95% CI: 1.11-3.04) were risk factors for suicidal ideation. In this model, for each point increase in the DT score, the risk of suicidal ideation increases by 84% (P = .018). The corresponding empirical ROC curve is provided in Figure 1, with the area under the curve (AUC) = 93.35% (95% CI: 0.89-0.98); the screening model predicts a 93.4% probability of suicidal ideation. This curve and the corresponding AUC revealed that the model accurately differentiated between patients with suicidal ideation and the other inpatients with HNC through five risk factors: depression, dysphoria, hypopharyngeal cancer, cancer history, and average DT score.

### DISCUSSION

Depression is a well-documented risk factor for suicidal ideation in patients with HNC. In the suicidal ideation group of the present study, over 50% of patients were diagnosed with depression. This is concordant with previous data reporting 20% to 80% rates of...
The adjusted OR of 42.8 (95% CI: 11.62-157.81) indicated that the risk of persistent suicidal ideation was 42 times higher in patients diagnosed with depression than in those without such symptoms. The association between dysphoria and depression is well documented, but suicidal ideation has rarely been addressed in past studies. The results of this study indicate that patients with HNC who experience dysphoria have an eight times higher risk of suicidal ideation than those without these symptoms.

In this study, patients with hypopharyngeal cancer had a 4.61 (95% CI: 11.62-157.81) adjusted OR for suicidal ideation. This result is consistent with a previous investigation by Kam et al. available in the Surveillance, Epidemiology, and End Results database in the United States, which suggested that patients with hypopharyngeal cancer had a 13-fold increased risk of suicide. Although patients with hypopharyngeal cancer are perceived to have a lower quality of life, evidence of the relationship between hypopharyngeal cancer and suicide is lacking.

The rate of second primary tumors remained high in HNC. Approximately 49% of the patients included in the current study had been treated for cancer previously. These patients often required further salvage surgery, chemotherapy, and even consideration of reirradiation. Multiple operations among these patients were reported, with higher incidences of flap failure, wound infection, fistula formation, and longer hospital stay. Numerous resections and reirradiation may also affect neuromuscular structures in the upper aerodigestive tract, causing difficulties in breathing, speech, and swallowing, which may place a considerable burden in patients’ quality of life.

Psychological distress and depression is common among cancer patients. Many screening tools have been developed in the past, but most of them are consuming, making it difficult for them to be routinely conducted. DT is a well-known, ultrashort screening tool recommended by the National Comprehensive Cancer Network guidelines. A previous meta-analysis revealed sufficient sensitivity and specificity, ranging from 77% to 81% and 56% to 72%, respectively. Wang et al. reported similar results with a Mandarin version of the DT arranged in Taiwan. However, although the role of DT in screening psychological disorders is well documented, the correlation between DT and suicidal ideation has been reported less. Despite slightly lower DT scoring compared with previous research, the present study revealed that for a one-point increase in the DT score, there is an 84% increase in the risk of suicidal ideation ($P = .018$).

The current study had some limitations that should be noted. It is widely acknowledged that three major factors—betel nut chewing, smoking, and drinking alcohol—are responsible for the occurrence of oral cancer. The prevalence of oral cancer in Taiwan is higher than in Western countries, and the consumption of these products is significantly associated with men. High male predominance (96.2%) was noted in the present study, which was comparable to a previous nationwide HNC study conducted in Taiwan that reported a male predominance of 91.3%. However, this male predominance was still considerably higher than in the United States, where HNC was approximately twofold to threefold more common in men. Males are often considered to have higher suicide risk among general cancer patients. Thus, the results related to gender, betel nut chewing, smoking, and drinking alcohol in our study cannot be generalized. Secondly, only patients admitted to our hospital for cancer treatments were enrolled in our study. Outpatients, including those undergoing

### Table IV

<table>
<thead>
<tr>
<th>Factors</th>
<th>Adjusted OR</th>
<th>95% CI</th>
<th>$\beta$, SE</th>
<th>$P$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42.83</td>
<td>11.62-157.81</td>
<td>1.88, 0.33</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Dysphoria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8.06</td>
<td>2.55-25.54</td>
<td>1.04, 0.29</td>
<td>.0004</td>
</tr>
<tr>
<td>Cancer site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other HNC sites</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypopharyngeal</td>
<td>4.61</td>
<td>1.14-16.56</td>
<td>0.76, 0.36</td>
<td>.032</td>
</tr>
<tr>
<td>Previous cancer history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4.53</td>
<td>1.30-15.83</td>
<td>0.76, 0.32</td>
<td>.018</td>
</tr>
<tr>
<td>Distress thermometer Average scores</td>
<td>1.84</td>
<td>1.11-3.04</td>
<td>0.61, 0.26</td>
<td>.018</td>
</tr>
</tbody>
</table>

$\beta$ = regression coefficient for this logistic model; CI = confidence interval; HNC = head and neck cancer; OR = odds ratio; SE = standard error.
CONCLUSION

In this study, 9.4% of patients with HNC who underwent psychiatric consultation suffered from suicidal ideation. Patients with depression, dysphoria, hypopharyngeal cancer, previous cancer history, and a higher DT score tended to experience suicidal ideation. Further studies, including intervention and cost-effectiveness analyses, will be crucial for improving the quality of cancer care among such patients.

BIBLIOGRAPHY