Disability in Patients With Head and Neck Cancer

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Background: Patients with head and neck cancer often experience debilitating speech, eating, and respiratory problems as well as the psychological effects of loss of function and change in body image. These patients often become unemployed as a result of their disease process, which adds financial burden to their already stressful lives. Yet the specific factors associated with unemployment have not been systematically studied.

Methods: This multisite study used survey and chart data to determine the predictors of work-related disability.

Results: Of the 384 patients who were working prior to their diagnosis of head and neck cancer, 52% (n=201) were disabled by their cancer treatment. Multivariate analysis demonstrated significant links between disability and chemotherapy (odds ratio [OR], 3.4; \( P<.001 \)), neck dissection status (OR, 2.3; \( P=.01 \)), pain scores (OR, 1.2; \( P=.01 \)), and time since diagnosis (OR, 0.9; \( P=.04 \)).

Conclusions: More than half of the patients in this study were disabled by their head and neck cancer or treatment. Patients with head and neck cancer who have undergone chemotherapy or neck dissection or have high pain scores are at increased risk for disability from their cancer or their treatment. Efforts to prevent (if possible), better assess, and treat pain and other adverse effects of head and neck cancer treatments may also have the potential to reduce patient disability.

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More than 40,000 new cases of head and neck cancer are diagnosed each year in the United States and 500,000 new cases worldwide. Mortality in the United States from head and neck cancer is 12,000 deaths per year. Mortality statistics, however, do not reflect the entire scope of the problem. Studies of quality of life in patients with head and neck cancer have demonstrated substantial decrements in eating, communication, pain, general functional status, emotional well-being, and other quality of life scales. However, individual studies often use different instruments, and the true impact of a decrement in any particular scale (e.g., physical function, pain, or eating) is difficult to interpret, even for the head and neck oncology team. Understanding the clinical predictors of a concrete tangible outcome such as work disability may help clinicians better interpret the impact of head and neck cancer therapy.

Previous research has demonstrated that cancer has the highest reported incidence of work-related impairment and the greatest number of impaired work days of all chronic medical conditions, including ulcers, major depression, panic disorder, and heart disease. It has been shown that oral problems, cancer, depression, smoking, decreased physical activity, and poor nutrition increase the odds for disability. Head and neck cancer can result in tremendous financial burdens for the individual, family, and society at large. Terrell et al\(^2\) found a 34% disability rate after treatment for head and neck cancer, yet the relationship between head and neck cancer and disability has not been systematically studied. Further investigation into disability issues in patients with head and neck cancer would complement current research on quality of life and may help clinicians better interpret the impact of head and neck cancer therapy. Hence, the aim of this study is to determine the relationship between major clinical variables and work disability.

Methods: This multisite study is part of a larger study to evaluate the quality of life of patients with head
and neck cancer. This smaller study used survey and chart data to determine the predictors of work-related disability.

PATIENTS

Respondents of the larger study (N = 994) were recruited from 4 sites, including the Ann Arbor, Mich (n = 147), Gainesville, Fla (n = 110), and Dallas, Tex (n = 127) Veterans Affairs Medical Centers and the University of Michigan Hospital (n = 610). Inclusion criteria included patients with head and neck cancer who, from the time of diagnosis and any time thereafter, were (1) not pregnant; (2) at least 18 years old; (3) English speaking; and (4) free from severe unstable psychiatric and/or mental conditions such as suicidal ideation, acute psychosis, or dementia. Exclusion criteria for this smaller study included (1) survey taken within 3 months of an initial diagnosis (n = 260); (2) subject not working at the time of initial diagnosis (n = 322); and (3) failure to answer both of the items concerning work and work disability (n = 28). A total of 384 subjects met all eligibility criteria and provided data for these analyses.

VARIABLES MEASURED

The major independent variables of interest included clinical, mental health and/or substance abuse, and demographic variables. The dependent variable was disability.

A postsurvey chart review generated the clinical data for tumor site and stage, surgery (primary site, laryngectomy, and/or neck dissection), and whether the patient had undergone chemotherapy or radiotherapy. Tumor sites were later dichotomized into 2 groups, oropharynx and/or hypopharynx vs all others, based on previous quality of life studies that indicated worse outcomes in oropharyngeal and hypopharyngeal tumors.3,6 Tumor stage was classified into stages 0, I, and II vs stages III and IV. Time since most recent diagnosis of head and neck cancer was collected by chart review and survey. Self-reported medical comorbidities were collected by survey.

The Head and Neck Quality of Life questionnaire (HNQOL)7 pain domain was included as the only quality of life variable because previous research found that the pain domain score was associated with disability.3 The HNQOL questionnaire pain domain addresses shoulder and/or neck pain, general physical problems, pain or burning in the mouth, and frequency of taking pain medication. It has been shown to correlate with patients’ overall discomfort and has been validated.7 Although the other domains of the HNQOL and the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)9 were collected and reported, they were not included in the analysis of disability because the present study primarily focuses on clinical variables rather than quality of life or health status associations with disability.

The survey asked questions using previously validated instruments, including the Fagerstrom Test for Nicotine Dependence,8 the Alcohol Use Disorders Identification Test (AUDIT),10 and the Geriatric Depression Scale–Short Form (GDS-SF).11,12 Patients were considered smokers if they had smoked in the past 6 months. A score of 8 or higher on the AUDIT was used to identify problem drinkers. A score of 4 or more on the GDS-SF was used to identify probable depression.

Demographic control variables consisted of age, sex, race (white or nonwhite), marital status (separated, widowed, divorced, or never married), education (high school or less vs some college or more), and hospital site (University of Michigan or a Veterans Affairs hospital).

The dependent variable, disability, was assessed by asking whether the patients were working before their diagnosis of head and neck cancer and, if so, whether their physicians had told them they were unable to work because of their cancer or treatment. Patients were scored as disabled by their cancer only if they were working before receiving their diagnosis and were declared unable to work after treatment.

STATISTICAL ANALYSIS

Descriptive statistics (means and frequencies) were analyzed for all demographic, clinical, treatment, health behavior, and quality of life characteristics. Associations among the independent variables including demographics, time since diagnosis, cancer site, cancer stage, radiation treatment, chemotherapy, treatment modality, overall comorbidities, smoking status, alcohol consumption, and depression characteristics were determined. χ² Tests were used for categorical variables, and t tests were used for interval level variables. Logistic regression was used to conduct multivariate analyses to determine the associations with disability.

The data were double entered into a Microsoft Access database (Redmond, Wash) and analyzed using SAS software (SAS Institute Inc, Cary, NC). Since all of the respondents did not answer all of the questions, the sample size may vary for different results. For all tests, a 2-sided P value of less than .05 was considered statistically significant.

UNIVARIATE ANALYSIS

Most patients (n = 244, 70%) presented with stage III or IV disease. A large proportion of the study population (n = 321, 84%) had undergone irradiation during the course of their therapy. Two thirds of patients (n = 253, 66%) had primary site surgery, and 58% (n = 222) had a neck dissection. Fifty-five percent (n = 208) of all patients had 1 or more comorbidities. Thirty percent (n = 115) of patients had smoked within the last 6 months. Almost half (n = 164, 44%) had depressive symptoms indicated by an AUDIT score of 8 or higher. Almost half (n = 164, 44%) had depressive symptoms indicated by a GDS-SF score of 4 or higher.

Most patients were male (n = 340, 89%) and white (n = 334, 88%). Just over half had been treated at the University of Michigan (n = 224, 58%), while the rest were treated at a Veterans Affairs hospital (n = 160, 42%). The mean age for the patients surveyed was 53 years at the time they were given their initial diagnosis and 58 years at the time of the survey. The mean number of months since they were given their initial diagnosis was 54 (Table 1).

BIVARIATE ANALYSIS

Significant differences in rates of disability were found between those people who had a stage III or IV disease; underwent irradiation, chemotherapy, or primary site surgery; and/or had a more recent diagnosis compared with those who did not (P < .05). Patients with stage III or IV disease were more likely to be disabled than patients with stage 0, 1, or II, but this association did not remain significant on multivariate analysis (P = .30). Moreover, patients who smoked, were depressed, and/or had less education also had greater disability than those without these characteristics (P < .05) (Table 2).
The major clinical associations of disability were found with chemotherapy, neck dissection, HNQOL pain score, and time since most recent head and neck cancer diagnosis. Patients who had undergone chemotherapy had almost 3.5 times the odds of being disabled as those who had not undergone chemotherapy ($P = 0.001^*$. Patients who had undergone a neck dissection had over twice the odds of being disabled as those who had not ($P = 0.01^*$. Each 10-point decrease in score on the HNQOL Pain Scale led to a 20% increase in the odds of being disabled ($P = 0.001^*$. Greater time since most recent head and neck cancer diagnosis decreased the likelihood of disability (odds ratio, 0.9 for each decade; $P = 0.05$) ($Table$ $3$).

**Table 1. Clinical, Substance Abuse and/or Mental Health, and Demographic Characteristics of Patients With Head and Neck Cancer Who Were Working at the Time of Their Diagnosis**

<table>
<thead>
<tr>
<th>Clinical Variable</th>
<th>No. (%) of Patients (N = 384)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer site</td>
<td></td>
</tr>
<tr>
<td>Hypopharynx/oropharynx</td>
<td>140 (37)</td>
</tr>
<tr>
<td>All others</td>
<td>241 (63)</td>
</tr>
<tr>
<td>Cancer stage</td>
<td></td>
</tr>
<tr>
<td>0, I, II</td>
<td>106 (30)</td>
</tr>
<tr>
<td>III, IV</td>
<td>244 (70)</td>
</tr>
<tr>
<td>Radiation</td>
<td>321 (84)</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>102 (27)</td>
</tr>
<tr>
<td>Surgery (any head and neck)</td>
<td>290 (76)</td>
</tr>
<tr>
<td>Primary site surgery (any)</td>
<td>253 (66)</td>
</tr>
<tr>
<td>Neck dissection (any)</td>
<td>222 (58)</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>167 (45)</td>
</tr>
<tr>
<td>$\geq 1$</td>
<td>208 (55)</td>
</tr>
<tr>
<td>Disabled due to head and neck condition</td>
<td>201 (52)</td>
</tr>
<tr>
<td>Substance abuse and/or mental health variables</td>
<td></td>
</tr>
<tr>
<td>Smoked in past 6 mo</td>
<td>115 (30)</td>
</tr>
<tr>
<td>Alcohol problem (AUDIT$^9 \geq 8$)</td>
<td>51 (14)</td>
</tr>
<tr>
<td>Depressive symptoms (GDS-SF$^{10,11} \geq 4$)</td>
<td>164 (44)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>340 (89)</td>
</tr>
<tr>
<td>Female</td>
<td>44 (11)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>334 (88)</td>
</tr>
<tr>
<td>All other</td>
<td>47 (12)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>236 (62)</td>
</tr>
<tr>
<td>Not married</td>
<td>147 (38)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>184 (48)</td>
</tr>
<tr>
<td>Some college or more</td>
<td>198 (52)</td>
</tr>
<tr>
<td>Hospital site</td>
<td></td>
</tr>
<tr>
<td>University of Michigan</td>
<td>224 (58)</td>
</tr>
<tr>
<td>Veterans Affairs medical center</td>
<td>160 (42)</td>
</tr>
<tr>
<td>Age at initial diagnosis of cancer, y</td>
<td>53 (9) [25-80]$^*$</td>
</tr>
<tr>
<td>Age at time of survey, y</td>
<td>58 (9) [29-83]$^*$</td>
</tr>
<tr>
<td>Months since initial diagnosis</td>
<td>54 (62) [4-399]$^*$</td>
</tr>
<tr>
<td>Months since most recent diagnosis</td>
<td>43 (53) [0-399]$^*$</td>
</tr>
</tbody>
</table>

**Table 2. Bivariate Statistical Findings for 384 Patients With Head and Neck Cancer Who Were Working at the Time of Their Diagnosis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Disabled Patients, %</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypopharynx/oropharynx (n = 140)</td>
<td>54.3</td>
<td>.49</td>
</tr>
<tr>
<td>All others (n = 241)</td>
<td>50.6</td>
<td></td>
</tr>
<tr>
<td>Cancer stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0, I, II (n = 106)</td>
<td>37.7</td>
<td>&lt;.001$^*$</td>
</tr>
<tr>
<td>III, IV (n = 244)</td>
<td>59.4</td>
<td></td>
</tr>
<tr>
<td>Radiation treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 321)</td>
<td>55.1</td>
<td>.01$^*$</td>
</tr>
<tr>
<td>No (n = 63)</td>
<td>38.1</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 102)</td>
<td>71.6</td>
<td>&lt;.001$^*$</td>
</tr>
<tr>
<td>No (n = 282)</td>
<td>45.4</td>
<td></td>
</tr>
<tr>
<td>Surgery (any head and neck)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 290)</td>
<td>50.7</td>
<td>.25</td>
</tr>
<tr>
<td>No (n = 94)</td>
<td>57.5</td>
<td></td>
</tr>
<tr>
<td>Primary site surgery (any)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 208)</td>
<td>48.6</td>
<td>.04$^*$</td>
</tr>
<tr>
<td>No (n = 176)</td>
<td>59.5</td>
<td></td>
</tr>
<tr>
<td>Neck dissection (any)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 222)</td>
<td>55.9</td>
<td>.11</td>
</tr>
<tr>
<td>No (n = 162)</td>
<td>47.5</td>
<td></td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 (n = 167)</td>
<td>47.9</td>
<td>.13</td>
</tr>
<tr>
<td>$\geq 1$ (n = 208)</td>
<td>55.8</td>
<td></td>
</tr>
<tr>
<td>Substance abuse and/or mental health variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoked in the past 6 mo (n = 115)</td>
<td>65.2</td>
<td>.001$^*$</td>
</tr>
<tr>
<td>Did not smoke (n = 263)</td>
<td>46.8</td>
<td></td>
</tr>
<tr>
<td>Alcohol problem† (n = 51)</td>
<td>58.9</td>
<td>.33</td>
</tr>
<tr>
<td>Alcohol problem‡ (n = 322)</td>
<td>51.6</td>
<td></td>
</tr>
<tr>
<td>No alcohol problem (n = 164)</td>
<td>58.5</td>
<td>.02$^+$</td>
</tr>
<tr>
<td>No depressive symptoms (n = 210)</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n = 340)</td>
<td>52.7</td>
<td>.74</td>
</tr>
<tr>
<td>Female (n = 44)</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (n = 334)</td>
<td>52.7</td>
<td>.63</td>
</tr>
<tr>
<td>All other (n = 47)</td>
<td>48.9</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married (n = 236)</td>
<td>48.3</td>
<td>.052</td>
</tr>
<tr>
<td>Not married (n = 147)</td>
<td>58.5</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less (n = 184)</td>
<td>59.8</td>
<td>.004$^*$</td>
</tr>
<tr>
<td>Some college or more (n = 198)</td>
<td>45.0</td>
<td></td>
</tr>
<tr>
<td>Hospital site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Michigan (n = 224)</td>
<td>48.7</td>
<td>.09</td>
</tr>
<tr>
<td>Veterans Affairs medical center (n = 160)</td>
<td>57.5</td>
<td></td>
</tr>
</tbody>
</table>

**MULTIVARIATE ANALYSIS**

The major clinical associations of disability were found with chemotherapy, neck dissection, HNQOL pain score, and time since most recent head and neck cancer diagnosis. Patients who had undergone chemotherapy had almost 3.5 times the odds of being disabled as those who had not undergone chemotherapy ($P < 0.001$. Patients who had undergone a neck dissection had over twice the odds of being disabled as those who had not ($P < 0.01$). Each 10-point decrease in score on the HNQOL Pain Scale led to a 20% increase in the odds of being disabled ($P = 0.001$). Greater time since most recent head and neck cancer diagnosis decreased the likelihood of disability (odds ratio, 0.9 for each decade; $P < 0.05$) ($Table$ $3$).

**Comment**

More than half of the respondents were disabled by their cancer treatment. Chemotherapy, neck dissection sta-
tus, time since diagnosis, and scores on the pain domain of the HNQOL were major clinical variables associated with disability.

CAUSES OF DISABILITY

Several adverse effects of chemotherapy such as mucositis, anemia, immunosuppression, malaise, and nausea are well recognized. However, the long-term impact of chemotherapy on quality of life, employment, or disability has not been well described. The present study demonstrated that patients who underwent chemotherapy had over 3 times the odds of being disabled as patients who did not undergo chemotherapy. Our clinical impression is that patients who have undergone chemotherapy have a prolonged treatment course (since each round of chemotherapy typically takes 3-4 weeks).

It is not unusual for head and neck cancer treatment that includes chemotherapy to take 4 to 6 months, during which time patients often develop profound deconditioning or fatigue. Such deconditioning, in our experience, is a strong predictor for work-related disability. Moreover, the sheer length of treatment time and recovery period after treatment may warrant disability determination for employer-related reasons. In addition to the deconditioning related to treatment, patients who undergo chemotherapy often have mild to moderate neuropathies, dysphagia, loss of taste, and potentially other adverse effects.

The extent to which each of these chemotherapy-related factors affects disability status for patients with head and neck cancer is not well understood and deserves further study, so that such morbidity may be reduced with new therapies. However, these data do not support the notion that chemotherapy should be avoided in the treatment of head and neck cancer. Although chemotherapy appears to be associated with disability, decisions regarding treatment modalities typically should be more concerned with primary outcomes such as survival and recurrence rates and only secondarily influenced by disability rates or quality of life.

Of patients who underwent neck dissection as part of therapy, more than half were disabled. These results are similar to those of another study in which 48% of the patients who were employed before undergoing surgery with a neck dissection were unable to return to work afterwards.13 These data also confirm findings in previous neck dissection studies in which patients who underwent neck dissections had increased levels of pain, weakness, and overall loss of function.14,15

When we controlled for other demographic, clinical, and treatment variables, multivariate analysis demonstrated that patients who underwent neck dissection had over 2 times the odds of being disabled compared with those patients who did not have a neck dissection. Unlike quality of life scores, disability status is a concrete marker of the negative impact of neck dissection on a person’s quality of life. From a clinician’s or patient’s perspective, the odds of disability may be easier to comprehend or interpret than the “change in quality of life scores” that we and other authors have used to describe the impact of neck dissection on quality of life or functional status.16,17

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Odds Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>3.4 (1.7-6.6)</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Neck dissection</td>
<td>2.3 (1.2-4.4)</td>
<td>.01*</td>
</tr>
<tr>
<td>HNQOL Pain Scale†</td>
<td>1.2 (1.1-1.3)</td>
<td>.001*</td>
</tr>
<tr>
<td>Time since most recent diagnosis, y</td>
<td>0.9 (0.8-1.0)</td>
<td>.04*</td>
</tr>
<tr>
<td>Oropharynx or hypopharynx cancer site (vs all other)</td>
<td>0.7 (0.4-1.2)</td>
<td>.21</td>
</tr>
<tr>
<td>Stage III or IV (vs 0, I, or II)</td>
<td>1.4 (0.7-2.7)</td>
<td>.30</td>
</tr>
<tr>
<td>Radiation treatment</td>
<td>1.4 (0.7-3.2)</td>
<td>.36</td>
</tr>
<tr>
<td>Primary site surgery (any)</td>
<td>0.7 (0.4-1.5)</td>
<td>.38</td>
</tr>
<tr>
<td>Comorbidities (any vs none)</td>
<td>1.5 (0.8-2.5)</td>
<td>.18</td>
</tr>
<tr>
<td><strong>Substance Abuse and/or Mental Health Variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoked in the past 6 mo</td>
<td>1.6 (0.9-3.0)</td>
<td>.11</td>
</tr>
<tr>
<td>Depressive symptoms‡</td>
<td>0.8 (0.5-1.5)</td>
<td>.50</td>
</tr>
<tr>
<td>Alcohol problem§</td>
<td>1.2 (0.6-2.6)</td>
<td>.60</td>
</tr>
<tr>
<td><strong>Demographic Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at diagnosis (in decades)</td>
<td>0.9 (0.6-1.2)</td>
<td>.52</td>
</tr>
<tr>
<td>High school or less (vs some college or more)</td>
<td>1.6 (0.9-2.6)</td>
<td>.08</td>
</tr>
<tr>
<td>Married</td>
<td>0.6 (0.4-1.1)</td>
<td>.11</td>
</tr>
<tr>
<td>VAMC (vs UM) patient</td>
<td>1.5 (0.8-2.6)</td>
<td>.18</td>
</tr>
</tbody>
</table>

*Statistically significant finding. †HNQOL Pain Scale is 0 to 100; the lower the score, the worse the subject's health in this domain. ‡Score on Geriatric Depression Scale—Short Form10,11 >4. §Score on Alcohol Use Disorders Identification Test9 >8.

Again, these data should not be used to argue against neck dissection because we strongly believe that treatment decisions should primarily be weighted toward treatments that maximize survival. If treatment options differ minimally in survival outcomes, then quality of life, functional status, and disability rates might factor into decision-making analysis for patients and clinicians. This type of data and future research on the impact of treatments such as neck dissection, chemotherapy, or primary site surgery on disability rates may be useful in choosing therapies with similar survival implications but different treatment morbidities that may have particular impact on individual patients.

Pain was a major predictor of disability. Based on the results of our multivariate analysis, a 10-point lower score on the HNQOL pain domain would be associated with a 20% increase in the odds of being disabled. In general, patients with cancer pain report higher levels of disability.19 For example, 40% of patients newly diagnosed with cancer reported having pain, and 40% of patients receiving pain medication reported inadequate relief.20 Pain can be disabling for multiple reasons. Disability due to pain might be related to disturbances in physical functioning and increased fatigue. Pain medications might also limit a patient’s ability to work. A cancer patient’s perception of pain may also affect disability sta-
Pain. The present study shows that pain and discomfort have a substantial relationship to a patients’ ability to return to work and suggests that future therapies that minimize patient discomfort could have substantial impact on the indirect costs of cancer and cancer care.

We found that for every decade that passed after the time of diagnosis, the odds of a patient being disabled increased by 10%. This result may be due largely to survivorship. Since the present study surveyed all patients with head and neck cancer at various times in their treatment, and the average time from most recent diagnosis was more than 3 years, the patients who were surveyed years from their diagnosis might have been a healthier cohort (cancer survivors) and might have been less likely to be disabled from their condition. On the other hand, patients who were in worse clinical condition might not have survived to be included in our survey years after receiving their diagnosis. Therefore, rates of disability might be higher in a group of patients who were all described, for instance, only 2 years after therapy. It is also possible that over time, patients recover or adapt to the consequences of their diagnosis and treatment. This association between time since diagnosis and disability should be further examined to tease out the extent to which survivorship, adaptation, recovery, fatigue, or other factors related to cancer survivorship are associated with disability.

While cancer stage was found to be associated with disability on the bivariate analysis (greater disability was found in patients with stage III or IV disease than in those with less severe disease), it was surprisingly unrelated to disability in the multivariate analysis. This finding suggests that treatment-related variables might have more important associations than cancer stage with disability outcome.

There was a nonsignificant association (P = .08) between lower educational levels and disability. A similar association was discovered in veterans with ankylosing spondylitis, in whom it was shown that patients with less than 12 years of formal education were much more likely to have work disability than patients with more than 12 years of formal education. The reason for this trend may be explained by differences in occupations and/or workplace environments for jobs held by workers with different educational levels.

Previous research on patients with head and neck cancer found that smoking and depression were strongly linked to quality of life. However, the present study failed to show a relationship between these behavioral factors and patient disability. Nonetheless, about one third of the patients with cancer in the present study smoked (higher than the general population mean of 22%); about one tenth scored positive for problem drinking; and a little more than half had elevated depression scores. Perhaps heavy smokers or drinkers and depressed patients were not working prior to their cancer diagnosis, thus skewing the surveyed population to patients with milder problems. While one would expect that people nearing the end of their career would be prone to not return to work after treatment for cancer, surprisingly, age was not a significant factor in patient disability. The average patient age at diagnosis in the present study was in the early 50s, and clinical factors (chemotherapy, neck dissection, pain, and time since diagnosis) rather than age were most associated with disability.

STUDY LIMITATIONS

Because of its cross-sectional design, the present study could evaluate only associations between clinical variables and disability. Thus causality cannot be proven. Although it may seem logical, for instance, that neck dissection, chemotherapy, and pain may cause patient disability, it is not necessarily clear, for example, that depression might lead to disability, or disability lead to depression. In the present study, we found no association between depression and disability. However, as our research continues longitudinally, and pretreatment and posttreatment predictors of outcome become available, we may be better able to define predictors of disability.

Another limitation of the study was that the patients self-reported whether they were disabled by their treatment or by the disease. To obtain disability data directly from treating physicians was technically too difficult to accomplish.

This study was also limited by sample size and could not include other possible predictors of disability (such as the 8 domains of the SF-36, the other 3 domains of the HNQOL, or other factors). Also, patients were surveyed at different times in their treatment course rather than at a consistent time such as “at diagnosis.” Nonetheless, time since diagnosis was included as a control variable and was found to be linked to disability status.

Temporality might also have affected time-dependent variables like smoking and alcohol use. It is possible that patients who were smoking or drinking at the time of diagnosis or disability might have subsequently quit before taking the survey.

Due to the demographics of the population most affected by head and neck cancer and treated at the surveyed hospital sites, only a small number of women and nonwhite patients were included in our sample. Since cancer-related quality of life employment patterns differ for men and women, and treatment variables have been shown to vary among different ethnicities, rates of disability might have been different if the sample were more balanced.

CONCLUSIONS

Overall, more than half of the patients in this study were disabled as a result of their head and neck cancer or treatment. Patients with head and neck cancer who have undergone chemotherapy or neck dissection or who have high pain scores have increased odds of being disabled by their cancer or their treatment. Our data corroborate the consensus opinion of the National Institutes of Health State of the Science Conference Statement on Symptom Management in Cancer: that pain, fatigue, and depression were major problem areas affecting quality of life and disability.

The report stated that efforts to manage
the symptoms of cancer have not kept pace with the insights into cures.

Some of the problems associated with researching pain, fatigue, and depression include the inability to separate the 3 factors, a wide variety of measurement tools, reliance on patient self-report, and lack of intervention studies specifically related to fatigue. Recommended strategies to solve these problems include regular assessments, combination interventions, consistent measurement tools, and rigorous intervention studies to address these issues. Our data suggest that efforts to prevent (if possible), assess, and treat pain and the adverse effects of chemotherapy and neck dissection may also have the potential to reduce patient disability.

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