



Factors Associated With Risk of Body Image-Related Distress in Patients With Head and Neck Cancer

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ABSTRACT

Importance: Body image-related distress (BID) is common among head and neck cancer (HNC) survivors and associated with significant morbidity. Risk factors for HNC-related BID remain poorly characterized because prior research has used outcome measures that fail to fully capture BID as experienced by HNC survivors.

Objective: To assess the association of demographic and oncologic characteristics with HNC-related BID using IMAGE-HN, a validated, multidomain, patient-reported outcome measure of HNC-related BID.

Design, Setting, and Participants: This cross-sectional study assessed 301 adult survivors of surgically managed HNC at 4 academic medical centers.

Main Outcomes and Measures: The primary outcome measure was IMAGE-HN scores, for which higher scores reflect more severe HNC-related BID. Multivariable linear regression analyses were performed to evaluate the association of patient characteristics with IMAGE-HN global and 4 subdomain (other-oriented appearance concerns, personal dissatisfaction with appearance, distress with functional impairments, and social avoidance) scores.

Results: Of the 301 participants, (212 [70.4%] male; mean [SD] age, 65.3 [11.7] years), 181 (60.1%) underwent free flap reconstruction. Graduation from college or graduate school was associated with lower IMAGE- HN social avoidance scores compared with less than a high school education. Compared with paid work, unemployment was associated with higher IMAGE-HN other-oriented appearance, personal dissatisfaction with appearance and IMAGE-HN global scores. Compared with no reconstruction, free flap reconstruction was associated with higher IMAGE-HN global scores and all subdomain scores. Higher IMAGE-HN distress with functional impairment scores were found in those who received surgery and adjuvant radiation or chemoradiation compared with surgery alone. The multivariable regression model accounted for a modest proportion of variance in IMAGE-HN global (R² = 0.18) and subdomain (R² = 0.13-0.21) scores.

Conclusions and Relevance: In this cross-sectional study, factors associated with risk of HNC-related BID included lower educational attainment, unemployment, free flap reconstruction, and multiple treatment modalities. These characteristics explain a modest proportion of variance in IMAGE-HN scores, suggesting that other characteristics are the major determinants of HNC-related BID and should be explored in future studies.

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INTRODUCTION

Head and neck cancer (HNC) is the sixth most common cancer worldwide and the number of HNC survivors is increasing sharply in the US.¹ Both HNC and its treatment result in highly visible disfigurement and functionally critical impairments, which have significant negative effects on physical and psychosocial well-being and result in body image-related distress (BID), a disorder characterized by self-perceived displeasing change in appearance and/or function and the resultant psychosocial distress. Multiple studies have sought to identify pre-treatment risk factors for HNC-related BID, but the patient-reported outcome measures (PROMs) used in these studies were developed for non-HNC populations and do not fully capture the spectrum of body image concerns experienced by HNC survivors.² As a result, risk factors for HNC-related BID remain poorly characterized. The Inventory to Measure and Assess imaGe disturbance – Head & Neck (IMAGE-HN) is a psychometrically sound PROM of HNC-related BID that was developed to fill this gap.³ Therefore, this study aims to assess the association between sociodemographic and oncologic characteristics and HNC-related BID using the IMAGE-HN.

METHODS

Study Design and Participants: This study is a secondary analysis of data collected for the IMAGE-HN validation.³ Individuals ≥ 18 years of age with a history of surgically-managed HNC and no known active disease were included. Participants were enrolled from multidisciplinary HNC clinics at 4 academic medical centers (MUSC, Baylor College of Medicine, University of Pittsburgh, and Washington University).

IMAGE-HN: The IMAGE-HN is a 24-item, multidomain PROM of HNC-related BID consisting of 4 subdomains and a global domain. The 4 subdomains are 1) Other-Oriented Appearance concerns (perceived verbal and nonverbal reactions by others to the appearance of patients with HNC), 2) Personal Dissatisfaction with Appearance (dissatisfaction with their appearance by patients with HNC), 3) Distress with Functional Impairments (challenges related to speaking, swallowing, oral competence, etc.), and 4) Social Avoidance and Isolation (avoidance of social interaction due to image concerns). Higher IMAGE-HN scores reflect more severe HNC-related BID.

Statistical Analyses: Descriptive statistics for continuous variables were used to characterize the sample. Multivariable linear regression was used to identify characteristics associated with IMAGE-HN scores.

Table 1: Association of demographic and oncologic characteristics with the 4 subdomains and global domain of the IMAGE-HN					
	OOA β (95% CI)	PDA β (95% CI)	DFI β (95% CI)	SA β (95% CI)	Global β (95% CI)
Educational attainment					
Less than high school	NA	NA	NA	1 (reference)	NA
High school graduate	NA	NA	NA	-2.1 (-9.7 to 5.6)	NA
Some college	NA	NA	NA	-5.4 (-13.1 to 2.4)	NA
College graduate	NA	NA	NA	-9.6 (-17.5 to -1.7)	NA
Graduate school	NA	NA	NA	-12.6 (-21.2 to -3.8)	NA
Employment					
Part or full-time paid work	1 (reference)	1 (reference)	NA	NA	1 (reference)
Disability	5.3 (-0.5 to 11.2)	5.0 (-2.6 to 12.5)	NA	NA	5.1 (0.1 to 10.0)
Retired	-1.4 (-6.0 to 3.1)	-3.1 (-9.0 to 2.8)	NA	NA	-2.4 (-6.3 to 1.4)
Unemployed	10.7 (2.0 to 19.3)	12.5 (1.2 to 23.7)	NA	NA	8.0 (0.6 to 15.4)
Tumor location					
Oral cavity	1 (reference)	NA	1 (reference)	NA	NA
Oropharynx	-2.3 (-8.0 to 3.5)	NA	-0.2 (-6.2 to 5.9)	NA	NA
Larynx/hypopharynx	9.6 (3.3 to 15.8)	NA	1.3 (-5.1 to 7.7)	NA	NA
Unknown/other	12.0 (2.8 to 21.2)	NA	2.2 (-7.7 to 12.0)	NA	NA
Major salivary gland	6.5 (-1.4 to 14.4)	NA	-4.1 (-12.3 to 4.1)	NA	NA
Facial cutaneous	3.9 (-1.5 to 9.2)	NA	-14.5 (-20.1 to -8.9)	NA	NA
Cancer treatment					
Surgery	NA	NA	1 (reference)	NA	NA
Surgery and RT	NA	NA	7.8 (2.9 to 12.7)	NA	NA
Surgery and CRT	NA	NA	6.5 (1.8 to 11.3)	NA	NA
Reconstructive surgery					
None	1 (reference)	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Microvascular free flap	13.1 (8.6 to 17.6)	15.4 (10.0 to 20.7)	12.8 (8.1 to 17.4)	10.2 (5.8 to 14.6)	11.5 (7.9 to 15.0)
Other	1.5 (-6.2 to 9.2)	1.9 (-7.9 to 11.8)	5.1 (-2.9 to 13.2)	0.3 (-7.9 to 8.5)	1.1 (-5.5 to 7.6)
Model R ²	0.20	0.14	0.21	0.13	0.18

Abbreviations: CRT = chemoradiation, DFI = distress with functional impairments, OOA = other-oriented appearance concerns, NA = not applicable (the variable was not associated with scores in bivariate analysis and was not included in the final regression model), PDA = personal dissatisfaction with appearance, RT = radiation therapy, SA = social avoidance and isolation, bolded variables represent statistically significant associations

RESULTS

A total of 301 participants (212 [70.4%] male; mean [SD] age, 65.3 [11.7] years) were included in this study. The most common HNC subsites were oral cavity (129 [42.9%]), oropharynx (50 [16.6%]), and facial cutaneous (50 [16.6%]); 186 patients (61.8%) underwent free flap reconstruction. **Table 1** gives the results of the multivariable linear regression models, demonstrating the association of demographic characteristics with HNC-related BID. Higher educational attainment was associated with lower social avoidance and isolation subdomain scores. Disability employment status and unemployment were associated with an increased IMAGE-HN global score compared with part or full-time paid work. **Table 1** also shows the association of oncologic characteristics with HNC-related BID. Relative to patients with oral cavity cancer, patients with laryngeal/hypopharyngeal cancer and other/unknown primary had increased scores on the other-oriented appearance concerns subdomain. Microvascular free flap surgery had a large, positive association with the IMAGE-HN global domain and all 4 subdomains. The addition of adjuvant therapy was associated with higher distress with functional impairments subdomain scores. The coefficients of multiple determination (*R*²) for the multivariable linear regression models accounted for a modest proportion of variance in global IMAGE-HN scores (*R*², 0.18) as well as scores on each IMAGE-HN subdomain (*R*², 0.13-0.21).

DISCUSSION

In this study, we describe characteristics associated with HNC-related BID including (1) educational attainment, (2) employment, (3) tumor subsite, (4) type of reconstruction, and (5) adjuvant therapy. Patients undergoing microvascular free flap surgery appear to be at very high risk for developing HNC-related BID. While this finding is in accordance with prior studies,^{1,4,5} this association is potentially confounded by the association among cancer stage, extent of surgery, need of adjuvant therapy, and free flap reconstruction and future studies could consider the interplay between these variables and HNC-related BID. Our findings regarding educational attainment are consistent with numerous prior studies^{6,7} and although the mechanism by which more education offers protection against HNC-related BID is not known, it is hypothesized that more education provides patients with improved coping abilities, psychological insight, and a better understanding of their cancer and its effects, thus allowing for healthier responses to changes in appearance and function.⁵ Practical implications of our study findings include properly counseling patients about their risk of developing HNC-related BID post-treatment. Whether patients will benefit from pre-emptive discussions about expectations related to post-treatment BID is unknown and should be explored in future studies. Although our study identified several demographic and oncologic characteristics associated with HNC-related BID, our models explained only a modest proportion of the overall variance in IMAGE-HN scores, suggesting that additional variables explain differences in the risk of developing BID following HNC treatment. Limitations of our study include a cross-sectional design and the reliance on self-reported oncologic data.

CONCLUSIONS

In this multi-institutional study using a validated, multidomain PROM of HNC-related BID, we identified several demographic and oncologic characteristics associated with HNC-related BID. These characteristics, which are likely known in the pre-treatment setting, may be used to identify those at greatest risk of suffering from HNC-related BID. However, these associations explain a modest proportion of variance in IMAGE-HN scores, suggesting that other patient-specific characteristics contribute to HNC-related BID as well.

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