



ORIGINAL ARTICLE

Association of self-reported financial burden with quality of life and oncologic outcomes in head and neck cancer

Nicholas R. Lenze MD, MPH^{1,2}  | Jeannette T. Bensen MS, PhD³ |
Laura Farnan PhD⁴ | Siddharth Sheth DO, MPH⁵ |
Jose P. Zevallos MD, MPH⁶  | Wendell G. Yarbrough MD, MMHC^{1,4,7} |
Adam M. Zanation MD¹

¹Department of Otolaryngology – Head and Neck Surgery, University of North Carolina School of Medicine, Chapel Hill, North Carolina, USA

²Department of Otolaryngology-Head & Neck Surgery, University of Michigan, Ann Arbor, MI, USA

³Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

⁴Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

⁵Division of Hematology and Oncology, Department of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

⁶Department of Otolaryngology – Head & Neck Surgery, Washington University School of Medicine in St. Louis, St. Louis, Missouri, USA

⁷Department of Pathology, University of North Carolina School of Medicine, Chapel Hill, North Carolina, USA

Correspondence

Nicholas R. Lenze, MD, MPH, Michigan Medicine, University of Michigan, Department of Otolaryngology-Head & Neck Surgery, 1500 E Medical Center Drive, 1903 Taubman Center, SPC 5312, Ann Arbor, MI 48109-5312.
Email: nlenzemed@gmail.com

Section Editor: Benjamin Judson

Abstract

Background: There is a paucity of data on financial toxicity among patients with head and neck squamous cell carcinoma (HNSCC).

Materials: This was a retrospective, cross-sectional study of patients with HNSCC surveyed at an outpatient oncology clinic.

Results: The sample included 202 patients with HNSCC with a mean age of 59.6 years (SD 10.0). There were 53 patients (26%) with self-reported financial burden. Education of high school or less was a significant predictor of self-reported financial burden (OR 2.52, 95% CI 1.03–6.14, $p = 0.042$). Patients reporting financial burden had significantly worse physical ($p = 0.003$), mental ($p = 0.003$), and functional ($p = 0.036$) health-related quality of life (HRQOL). Patients reporting financial burden appeared to have lower 5-year overall survival (74.3% vs. 83.9%, $p = 0.165$), but this association did not reach statistical significance.

Conclusion: Financial burden or toxicity may affect approximately a quarter of patients with HNSCC and appears to be associated with worse HRQOL outcomes.

KEYWORDS

cancer survivors, cost of illness, head and neck neoplasms, health expenditures, patient-reported outcomes, quality of life

1 | INTRODUCTION

Financial toxicity (FT) is a concept increasingly being adopted within oncology to describe the economic burden of a cancer diagnosis and its adverse consequences for the patient.^{1,2} It is recognized as an important aspect of cancer survivorship, as it may affect outcomes such as patient quality of life, ability to work, adherence to treatment, and even survival.^{3–7} Financial toxicity may be especially relevant for patients with head and neck cancer because these patients face higher out-of-pocket expenses and have lower socioeconomic status compared to patients with other types of cancer.⁸ Additionally, patients with head and neck cancer often receive multimodal treatment with a combination of surgery, radiation therapy, and/or chemotherapy. Despite the potential for financial hardship in this population, few studies have examined FT among patients with head and neck cancer.

To help address this gap in current literature, we assessed self-reported financial burden among an institutional cohort of patients with head and neck squamous cell carcinoma (HNSCC). We used self-reported financial burden as a proxy for FT in this sample. We examined its association with health-related quality of life (HRQOL), overall survival (OS), and cancer-specific survival (CSS). A better understanding of FT in patients with head and neck cancer will be important for optimizing patient care and outcomes in this population.

2 | MATERIALS AND METHODS

This study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill. All participants provided informed consent to participate in this study.

2.1 | Study design and sample selection

We performed a retrospective, cross-sectional analysis of patients with head and neck cancer identified through the University of North Carolina Health Registry/Cancer Survivorship Cohort (HR/CSC). The UNC HR/CSC is an incident-prevalent cohort of patients who presented to UNC oncology outpatient clinics at the North Carolina Cancer Hospital. Patients were enrolled between May 2012 and July 2016. In this sample, 144 (71.3%) of cases were incident (enrolled during initial visit for HNSCC diagnosis) and 58 (28.7%) of cases were prevalent (enrolled after HNSCC diagnosis). Prevalent cases included patients who were initially diagnosed and treated before the enrollment period (2012–2016) and were returning to clinic for cancer surveillance. Patients completed the study

questionnaires at a median number of 27 days after enrollment via a computer-assisted telephone interview. Given the incident-prevalent study design, patients completed the study questionnaires on average 13.8 months after initial diagnosis. Patients were eligible to participate in the UNC HR/CSC if they were at least 18 years of age and had English or Spanish language proficiency. Patients meeting these eligibility criteria were approached by research staff in the oncology clinic and, upon informed consent, were enrolled in the HR/CSC. Of the eligible patients with HNSCC approached in clinic for enrollment, 64% consented to participate. Patients from the HR/CSC were included in this analysis if they had a pathologically confirmed diagnosis of HNSCC.

2.2 | Questionnaires and data extraction

Information on demographics, socioeconomic status, and medical history was obtained via a baseline questionnaire. Self-reported financial burden was elicited from the Patient Satisfaction Questionnaire (PSQ-18), a validated scale that has previously been used to examine FT.^{9–11} Self-reported financial burden was defined as a response of “agree” or “strongly agree” to the statement “you have to pay more for medical care than you can afford.” Socioeconomic variables collected in the survey included health insurance status, educational attainment, and employment status. Household income level was not collected in the initial survey, so we were unable to include this variable in the analysis. Clinical data such as tumor site, AJCC stage (7th edition), and p16 tumor status were extracted from patient medical records. HRQOL outcomes were measured using the Patient-Reported Outcomes Measurement Information System (PROMIS)¹² questionnaire and the Functional Assessment of Cancer Therapy-General Population (FACT-GP),¹³ which is further divided into physical, social, emotional, and functional domains.

2.3 | Statistical analysis

Descriptive statistics were used to examine sociodemographic and clinical characteristics of patients with and without self-reported financial burden. Bivariate testing methods included two-sided *t* tests, chi-square tests, and Fisher's exact test (for expected observations <5). All variables were examined for missing observations and excluded a priori if >10% of observations were missing; this did not apply to any of the variables. Missing observations included 3 for marital status (1.4%), 4 for education (2.0%), 13 for overall stage (6.4%), and 1 for treatment type and

TABLE 1 Baseline characteristics in patients with and without self-reported financial burden

	Patients with financial burden (n = 53)	Patients without financial burden (n = 149)	p-value
Age (mean, SD)	58.3 (10.1)	60.1 (10.0)	0.245
Sex			0.286
Male	41 (77.4)	125 (83.9)	
Female	12 (22.6)	24 (16.1)	
Race			0.174
White	47 (88.7)	129 (86.6)	
Black	6 (11.3)	12 (8.1)	
Other	0 (0)	8 (5.4)	
Marital status			0.059
Married	30 (58.8)	108 (73.0)	
Not married	21 (41.2)	40 (27.0)	
Education			0.025*
High school or less	40 (78.4)	84 (57.1)	
College graduate	7 (13.7)	37 (25.2)	
Post-graduate/professional degree	4 (7.8)	26 (17.7)	
Insurance status			0.295
Private	31 (58.5)	84 (56.4)	
None	4 (7.6)	4 (2.7)	
Medicare	13 (24.5)	50 (33.6)	
Medicaid	5 (9.4)	11 (7.4)	
Currently work for pay	23 (45.1)	72 (48.7)	0.662
Mean distance to hospital in miles (SD)	60.2 (53.2)	76.5 (71.0)	0.142
History of tobacco use	35 (66.0)	86 (61.0)	0.518
History of alcohol use	23 (43.4)	76 (51.0)	0.341
Comorbid depression	7 (13.2)	22 (15.2)	0.729
Comorbid anxiety	9 (17.0)	25 (17.2)	0.966
Tumor site			0.883
Oral cavity	22 (41.5)	52 (34.9)	
Oropharynx ^a	23 (43.4)	73 (49.0)	
Hypopharynx	1 (1.9)	5 (3.4)	
Larynx	5 (9.4)	12 (8.1)	
Other	2 (3.8)	7 (4.7)	
Overall stage (AJCC 7th edition)			0.861
Early (I/II)	15 (30.6)	41 (29.3)	
Advanced (III/IV)	34 (69.4)	99 (70.7)	
Treatment			0.361
Surgery alone	20 (37.7)	38 (25.7)	
Surgery + aRT	7 (13.2)	18 (12.2)	
Surgery + aCRT	10 (18.9)	38 (25.7)	
RT or chemotherapy alone	2 (3.8)	14 (9.5)	
Chemoradiation therapy	14 (26.4)	40 (27.0)	
Number of treatment modalities			0.498
1	22 (41.5)	52 (35.1)	
2	21 (39.6)	58 (39.2)	
3	10 (18.9)	38 (25.7)	

^ap16 status was available for 35 of the patients with oropharyngeal squamous cell carcinoma.

*Statistically significant.

TABLE 2 Univariate logistic regression model examining predictors of self-reported financial burden

	OR and 95% CI	p-value
Age > 60 years (vs. ≤60 years)	0.63 (0.33–1.19)	0.152
Female sex	1.52 (0.70–3.32)	0.288
Black race (vs. white)	1.37 (0.49–3.86)	0.549
Not married (vs. married)	0.53 (0.27–1.03)	0.061
Education (vs. college graduate)		
High school or less	2.52 (1.03–6.14)	0.042*
Post-graduate/professional degree	0.81 (0.22–3.07)	0.760
Insurance (vs. private)		
None	2.71 (0.64–11.50)	0.177
Medicare	0.70 (0.34–1.47)	0.351
Medicaid	1.23 (0.40–3.83)	0.719
Currently work for pay	0.87 (0.46–1.64)	0.662
Distance to hospital above median (>52 miles)	0.73 (0.38–1.40)	0.342
History of tobacco use	1.24 (0.64–2.41)	0.518
History of alcohol use	0.74 (0.39–1.38)	0.342
Comorbid depression	0.85 (0.34–2.13)	0.729
Comorbid anxiety	0.98 (0.43–2.27)	0.966
Tumor site (relative to oral cavity)		
Oropharynx	0.74 (0.38–1.48)	0.398
Hypopharynx	0.47 (0.05–4.28)	0.505
Larynx	0.98 (0.31–3.13)	0.979
Other	0.68 (0.13–3.51)	0.641
Advanced stage (vs. early)	0.94 (0.46–1.91)	0.861
Treatment (vs. surgery alone)		
Surgery + aRT	0.74 (0.26–2.06)	0.564
Surgery + aCRT	0.50 (0.21–1.21)	0.124
RT or chemotherapy alone	0.27 (0.06–1.31)	0.105
Chemoradiation therapy	0.67 (0.29–1.50)	0.326
Number of treatment modalities (relative to 1)		
2	0.82 (0.41–1.67)	0.589
3	0.60 (0.25–1.41)	0.240

*Statistically significant.

number of treatment modalities, respectively (0.5%). Univariate logistic regression models were used to estimate significant predictors of self-reported financial burden. Two-sided *t* tests were used to examine the association of self-reported financial burden with HRQOL scores. The PROMIS scales used T scores linked to population norms. Kaplan–Meier curves were constructed to assess 5-year OS and CSS in patients with and without self-reported financial burden. The log-rank test was used to compare the survival curves and obtain *p*-values. Updates on patient vital status were provided monthly up until October 1, 2020 by the North Carolina Department of Health and Human Services. Vital status and cause of death was known for all subjects at 5 years of follow-up from initial diagnosis. A sensitivity

analysis to determine if incident versus prevalent case status (proxy for time between diagnosis and enrollment) had any impact on our primary outcome. We used a statistical significance criterion of $p < 0.05$ for all testing and Stata 16.0 (StataCorp LP, College Station, TX) for all analyses.

3 | RESULTS

3.1 | Baseline characteristics

The sample consisted of 202 patients with HNSCC with a mean age of 59.6 years (SD 10.0). Eighty-two percent of patients were male and 87% were white. The majority of

TABLE 3 HRQOL outcomes in patients with and without self-reported financial burden

Questionnaire	Patients with financial burden, mean (SD)	Patients without financial burden, mean (SD)	Mean difference (95% CI)	p-value
FACT GP total	77.9 (15.2)	83.3 (16.7)	-4.85 (-10.05 to 0.35)	0.067
FACT GP physical	22.0 (4.9)	23.2 (5.0)	-1.03 (-2.61 to 0.55)	0.201
FACT GP social	20.7 (5.4)	21.1 (5.7)	-0.40 (-2.17 to 1.37)	0.654
FACT GP emotional	18.8 (4.5)	19.7 (4.7)	-0.98 (-2.44 to 0.48)	0.189
FACT GP functional	16.4 (7.1)	18.9 (7.3)	-2.44 (-4.72 to -0.16)	0.036*
PROMIS physical	45.1 (8.0)	49.3 (9.0)	-4.24 (-7.01 to -1.46)	0.003*
PROMIS mental	49.2 (8.0)	53.5 (9.0)	-4.31 (-7.09 to -1.52)	0.003*

*Statistically significant.

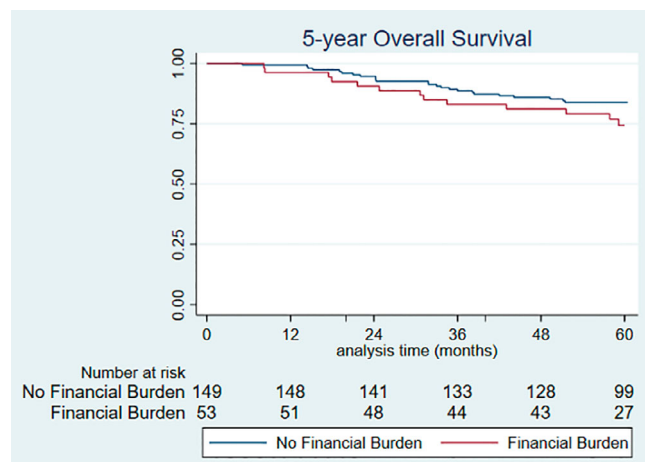


FIGURE 1 Kaplan-Meier curves for 5-year overall survival in patients with and without self-reported financial burden [Color figure can be viewed at wileyonlinelibrary.com]

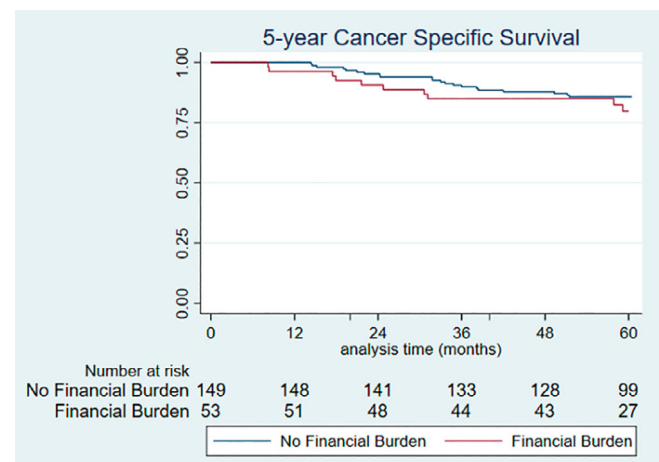


FIGURE 2 Kaplan-Meier curves for 5-year cancer-specific survival in patients with and without self-reported financial burden [Color figure can be viewed at wileyonlinelibrary.com]

patients had private insurance or Medicare (88%), and 70% of patients had advanced stage (III/IV) cancer at diagnosis. The majority of patients received definitive surgery with or without adjuvant therapy (65%). Nearly half of the patients reported currently working for pay at the time of the study (47%). A total of 53 patients (26%) had self-reported financial burden.

3.2 | Associations with self-reported financial burden

Baseline characteristics are stratified by patients with and without self-reported financial burden (Table 1). Patients with self-reported financial burden were significantly more likely to have an education of high school or less (78.4% vs. 57.1%, $p = 0.025$). There was a higher percentage of patients with self-reported financial burden who were

unmarried compared to patients without self-reported financial burden (41.2% vs. 27.0%, $p = 0.059$), but this association did not reach statistical significance. There was no association between self-reported financial burden and the type ($p = 0.361$) or number ($p = 0.498$) of treatment modalities. Tumor p16 status was available for 35 of the patients with oropharyngeal squamous cell carcinoma. In a subset analysis, there were 26 p16+ OPSCC and 9 p16- OPSCC patients. The rate of p16 positivity did not differ between patients with and without self-reported financial burden (79.9% vs. 72.3%, respectively, $p = 1.000$). Finally, in a sensitivity analysis, there was no difference in prevalent/incident case status in patients with and without self-reported financial burden (26.4% vs. 29.5% prevalent cases, respectively, $p = 0.667$).

In a univariate logistic regression model examining predictors of self-reported financial burden, patients with an education of high school or less were over twice as likely to have self-reported financial burden compared to

patients with at least a college degree (OR 2.52, 95% CI 1.03–6.14, $p = 0.042$) (Table 2). There were no other demographic, social, or clinical variables that significantly predicted self-reported financial burden in the logistic regression model.

3.3 | HRQOL outcomes

Patients with self-reported financial burden had significantly worse physical (mean difference [MD] -4.24 , 95% CI -7.01 to -1.46 , $p = 0.003$) and mental (MD -4.31 , 95% CI -7.09 to -1.52 , $p = 0.003$) HRQOL outcomes on the PROMIS questionnaires (Table 3).

Patients with self-reported financial burden had significantly worse functional HRQOL on the FACT-GP functional scale (MD -2.44 , 95% CI -4.72 to -0.16 , $p = 0.036$). The total HRQOL score on the FACT-GP was also lower for patients with self-reported financial burden, although this association did not reach statistical significance (MD -4.85 , 95% CI -10.05 to 0.35 , $p = 0.067$).

3.4 | Survival outcomes

The mean time from diagnosis to last follow-up was 5.5 years (SD 2.30) and vital status at 5 years was known for all participants in this study. The 5-year OS rate was 81.7%, and the 5-year CSS rate was 84.6% for the cohort. There was no significant difference in 5-year OS (74.3% vs. 83.9%, log-rank p -value = 0.165) or 5-year CSS (79.7% vs. 85.7%, log-rank p -value = 0.366) in patients with and without self-reported financial burden, respectively (Figures 1 and 2).

4 | DISCUSSION

In this study, we used a cross-sectional institutional cohort of patients with HNSCC to examine patient-reported financial burden and its association with HRQOL and survival outcomes. The prevalence of self-reported financial burden in this cohort was 26%. We found that an education of high school or less was a significant predictor of self-reported financial burden ($p = 0.042$). Unmarried patients also appeared to be more likely to have financial burden compared to married patients, although this association did not reach statistical significance ($p = 0.059$). Patients with self-reported financial burden had significantly worse physical ($p = 0.003$), mental ($p = 0.003$), and functional ($p = 0.036$) quality of life outcomes. Despite lack of statistical significance, patients reporting financial burden had approximately a 10% absolute difference in 5-year OS compared to those without financial burden (74.3% vs. 83.9%). To our

knowledge, this is the first study to examine the impact of self-reported financial burden on both HRQOL and survival outcomes among patients with HNSCC.

These findings are corroborated by three other studies in current literature, all of which were institutional-based cohorts of patients with head and neck cancer. Mady et al. reported FT in 40.5% of their 104-patient sample, and they found associations of FT with lower education levels, unmarried status, and worse HRQOL.¹⁴ In another study of 63 patients with head and neck cancer, Beeler et al. found that younger age and lower household income were significant predictors of FT and that patients with FT were more likely to skip clinic visits or report medication noncompliance.¹⁵ Collectively, these findings suggest that certain sociodemographic characteristics (e.g., age, education, marital status, household income) are associated with FT, and FT can lead to adverse outcomes in HNSCC such as worse HRQOL and nonadherence to recommended treatment or follow-up.

In the largest study available to date, Ma et al. assessed FT in 284 patients with head and neck cancer treated with definitive or postoperative radiation therapy.¹⁶ The prevalence of FT in their cohort was 14%, and it was significantly associated with younger age, distant metastasis at diagnosis, HPV-negative tumor status, surgical treatment, and higher comorbidity burden.¹⁶ They also found that patients with FT had significantly worse OS and CSS in both multivariable and matched analyses, although the absolute survival differences were not reported.¹⁶ The differences between our findings and Ma et al. may be due to limitations in our sample size, differences in patient populations, or differences in how FT was measured. Our study was not restricted to patients receiving radiation therapy, and we only included patients with HNSCC rather than all patients with head and neck cancer. In addition, our sample was predominately white (87%) and well-insured (57% with private insurance) which is not representative of all patients with HNSCC in the United States. Finally, Ma et al. measured FT by a response of “very much” to the question “Has your physical condition or medical treatment caused you financial difficulties?”

Efforts are warranted to better address the financial well-being of HNSCC survivors. In a study of unmet needs among head and neck cancer survivors, 23% of respondents said they needed more help managing financial issues.¹⁷ One potential solution may involve cancer survivorship care plans, where patients are provided with information about treatment costs and financial resources such as medication assistance programs, job protection policies, and credit management.¹⁸ Ideally these care plans should be provided early after cancer diagnosis and as part of a multidisciplinary approach. A related solution is the use of financial navigators embedded in oncology clinics to help

patients proactively optimize insurance policies, identify external assistance programs, and understand the cost of different treatment options.^{19,20} Additionally, hospitals should take steps to provide physicians and patients with information about the costs of different interventions to make the decision-making process as transparent as possible.²¹ Interventions aimed at improving the mental, physical, and functional well-being of head and neck cancer survivors may also be warranted.²² Given the relationship between self-reported financial burden and worse HRQOL, such interventions may have the greatest impact on patients with a high degree of financial burden.

Our study has several limitations. There is a potential for selection bias because sampling relied on voluntary participation in an outpatient oncology clinic. Sixty-four percent of eligible patients with HNSCC approached in clinic consented to participate in the study, and it is plausible that patients experiencing financial stress were less willing to participate in research given the time and effort required. In addition, participation among underrepresented minorities was lower than expected. Studies have found that African Americans are less likely to volunteer for medical research and may have more distrust of medical research compared to white patients.²³ This is not surprising given the history of racism and medical discrimination against African Americans in the United States. Our sample was from a single, large, public, outpatient clinic setting and may not be generalizable to all patients with HNSCC in the United States. Given the sociodemographic makeup of our sample, which was predominately white and privately insured, we would expect our findings to underestimate FT in the HNSCC population.

Our definition of financial burden was limited by the initial survey design for this study. Defining financial burden as “you have to pay more for medical care than you can afford” is subjective, and survey respondents may have varying degrees of interpretation. Some cancer survivors may underestimate their true financial burden, while others may overestimate it. Ideally, more objective and validated tools such as the Comprehensive Score for Financial Toxicity (COST) survey should be used.²⁴ Finally, our study lacked data on household income which is an important marker of socioeconomic status and has been shown in previous studies to be associated with financial toxicity.^{14,15} To date, all studies examining FT in head and neck cancer have relied on institutional cohorts with relatively small sample sizes. Additional research using multi-institutional or population-based cohorts may help build on these initial studies to provide a better understanding of FT and its adverse consequences in HNSCC.

5 | CONCLUSION

Self-reported financial burden may affect at least one fourth of patients with head and neck cancer and is associated with significantly worse HRQOL outcomes. Socioeconomic variables such as low educational attainment and unmarried status appear to be associated with a higher degree of financial burden in this population. The physical, mental, functional, and financial implications of cancer survivorship may exacerbate already poor HRQOL in patients facing a high degree of financial burden. More research is warranted to better understand and address the financial burden faced by head and neck cancer survivors.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ORCID

Nicholas R. Lenze  <https://orcid.org/0000-0002-2126-6663>

Jose P. Zevallos  <https://orcid.org/0000-0002-9111-6767>

REFERENCES

1. Lentz R, Benson AB, Kircher S. Financial toxicity in cancer care: prevalence, causes, consequences, and reduction strategies. *J Surg Oncol*. 2019;120(1):85-92. doi:10.1002/jso.25374
2. Collado L, Brownell I. The crippling financial toxicity of cancer in the United States. *Cancer Biol Ther*. 2019;20(10):1301-1303. doi:10.1080/15384047.2019.1632132
3. PDQ Adult Treatment Editorial Board. Financial toxicity (financial distress) and cancer treatment (PDQ): patient version. *PDQ Cancer Information Summaries*. National Cancer Institute; 2002.
4. Carrera PM, Kantarjian HM, Blinder VS. The financial burden and distress of patients with cancer: understanding and stepping-up action on the financial toxicity of cancer treatment. *CA Cancer J Clin*. 2018;68(2):153-165. doi:10.3322/caac.21443
5. Smith GL, Lopez-Olivo MA, Advani PG, et al. Financial burdens of cancer treatment: a systematic review of risk factors and outcomes. *J Natl Compr Canc Netw*. 2019;17(10):1184-1192. doi:10.6004/jnccn.2019.7305
6. Brauer E, Morasso E. Financial vulnerability: a case study involving a patient with head and neck cancer. *Clin J Oncol Nurs*. 2019;23(5):31-35. doi:10.1188/19.CJON.S2.31-35
7. Lu L, O'Sullivan E, Sharp L. Cancer-related financial hardship among head and neck cancer survivors: risk factors and associations with health-related quality of life. *Psychooncology*. 2019; 28(4):863-871. doi:10.1002/pon.5034
8. Massa ST, Osazuwa-Peters N, Adjei Boakye E, Walker RJ, Ward GM. Comparison of the financial burden of survivors of head and neck cancer with other cancer survivors. *JAMA Otolaryngol Head Neck Surg*. 2019;145(3):239-249. doi:10.1001/jamaoto.2018.3982
9. Knight TG, Deal AM, Dusetzina SB, et al. Financial toxicity in adults with cancer: adverse outcomes and noncompliance. *J Oncol Pract*. 2018;14(11):e665-e673. doi:10.1200/JOP.18.00120

10. Chino F, Peppercorn J, Taylor DH, et al. Self-reported financial burden and satisfaction with care among patients with cancer. *Oncologist*. 2014;19(4):414-420. doi:10.1634/theoncologist.2013-0374
11. Casilla-Lennon MM, Choi SK, Deal AM, et al. Financial toxicity among patients with bladder cancer: reasons for delay in care and effect on quality of life. *J Urol*. 2018;199(5):1166-1173. doi:10.1016/j.juro.2017.10.049
12. Cella D, Riley W, Stone A, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. *J Clin Epidemiol*. 2010;63(11):1179-1194. doi:10.1016/j.jclinepi.2010.04.011
13. Cella DF, Tulsky DS, Gray G, et al. The functional assessment of cancer therapy scale: development and validation of the general measure. *J Clin Oncol*. 1993;11(3):570-579. doi:10.1200/JCO.1993.11.3.570
14. Mady LJ, Lyu L, Owoc MS, et al. Understanding financial toxicity in head and neck cancer survivors. *Oral Oncol*. 2019;95:187-193. doi:10.1016/j.oraloncology.2019.06.023
15. Beeler WH, Bellile EL, Casper KA, et al. Patient-reported financial toxicity and adverse medical consequences in head and neck cancer. *Oral Oncol*. 2020;101:104521. doi:10.1016/j.oraloncology.2019.104521
16. Ma SJ, Iovoli AJ, Attwood K, et al. Association of significant financial burden with survival for head and neck cancer patients treated with radiation therapy. *Oral Oncol*. 2021;115:105196. doi:10.1016/j.oraloncology.2021.105196
17. Giuliani M, McQuestion M, Jones J, et al. Prevalence and nature of survivorship needs in patients with head and neck cancer. *Head Neck*. 2016;38(7):1097-1103. doi:10.1002/hed.24411
18. Coughlin SS, Dean LT. Cancer survivorship care plans, financial toxicity, and financial planning alleviating financial distress among cancer survivors. *Support Care Cancer*. 2019;27(6):1969-1971. doi:10.1007/s00520-019-04703-6
19. Sherman D, Fessele KL. Financial support models: a case for use of financial navigators in the oncology setting. *Clin J Oncol Nurs*. 2019;23(5):14-18. doi:10.1188/19.CJON.S2.14-18
20. Farrugia M, Yu H, Ma SJ, et al. Financial counseling is associated with reduced financial difficulty scores in head and neck cancer patients treated with radiation therapy. *Cancers (Basel)*. 2021;13(11):2516. doi:10.3390/cancers13112516
21. Desai A, Gyawali B. Financial toxicity of cancer treatment: moving the discussion from acknowledgement of the problem to identifying solutions. *EClinicalMedicine*. 2020;20:100269. doi:10.1016/j.eclinm.2020.100269
22. Miller MC, Shuman AG, American Head and Neck Society's Committee on Survivorship. Survivorship in head and neck cancer: a primer. *JAMA Otolaryngol Head Neck Surg*. 2016;142(10):1002. doi:10.1001/jamaoto.2016.1615
23. Webb FJ, Khubchandani J, Striley CW, Cottler LB. Black-white differences in willingness to participate and perceptions about health research: results from the population-based HealthStreet study. *J Immigr Minor Health*. 2019;21(2):299-305. doi:10.1007/s10903-018-0729-2
24. de Souza JA, Yap BJ, Wroblewski K, et al. Measuring financial toxicity as a clinically relevant patient-reported outcome: the validation of the Comprehensive Score for financial Toxicity (COST). *Cancer*. 2017;123(3):476-484. doi:10.1002/cncr.30369

How to cite this article: Lenze NR, Bensen JT, Farnan L, et al. Association of self-reported financial burden with quality of life and oncologic outcomes in head and neck cancer. *Head & Neck*. 2022;44(2):412-419. doi:10.1002/hed.26934