

Characterizing Pain, Functional Limitations, and Comorbidities in Head and Neck Cancer Survivors: A Pooled Analysis of the National Health Interview Survey

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Abstract

Objective: To describe comorbidities, pain, and functional limitations (FL) among head and neck cancer (HNC) survivors relative to other cancer survivors (OCS) and evaluate risk factors for self-care and work limitations.

Methods: This was a pooled, cross-sectional analysis of cancer survivors responding to the National Health Interview Survey (NHIS) between 1997 and 2016. HNC survivors were age- (±3 years), sex- and survey-year-matched to OCS (not including non-melanoma skin cancer survivors; 1:4 ratio). Univariate and multivariable logistic regression analyses were performed to evaluate risk factors for: 1) self-care limitations (SCL) and 2) work limitations (WL).

Results: We identified 918 HNC survivors and 3672 matched OCSs. HNC survivors more commonly exhibited: stroke (HNC: 10.1% 95%CI: 8.1-12.4; OCS: 6.9%; 95%CI: 6.1-7.8), emphysema (HNC:14.4% 95%CI: 12.1-17.2, OCS: 6.2% 95%CI: 5.4-7.1), chronic bronchitis (HNC: 11.6% 95%CI: 9.4-14.3; OCS: 6.9% 95%CI:6.0-8.0), edentulous state (HNC: 37.9% 95%CI: 34.6-41.4; OCS: 17.9% 95%CI: 16.6-19.3). HNC survivors were more likely to report significant WLs (HNC: 41.7%; 95%CI: 38.0-45.4, OCS: 30.2%; 95%CI: 28.6-31.9) and SCL (HNC: 18.0%; 95%CI 15.3-21.0 :, OCS: 11.2%; 95%CI: 10.2-12.4). HNC survivors reporting SCLs and WLs were associated with greater risk of movement difficulty (SCL OR:3.44, 95%CI: 1.73-6.84, WL OR:3.16; 95%CI: 2.14-4.66) and pain (SCL OR: 1.4; 95%CI: 0.81-2.40, WL OR: 1.84; 95%CI:1.24-2.74).

Conclusions: HNC survivors exhibit a disproportionately high burden of comorbidities and functional limitations. Self-care and work limitations are associated with modifiable risk factors that may be addressed through comprehensive multidisciplinary care.

Introduction

There are over 430,000 HNC survivors in the United States. Despite this, the burden of comorbidities and functional limitations in this population is poorly characterized.

Methods and Materials

- Pooled, cross-sectional analysis of National Health Interview Survey (NHIS) cancer survivor respondents from 1997 – 2016
- HNC survivors were age (±3 years), sex, and survey year matched in a 1:4 ratio to OCS
- Primary outcomes: comorbidities and functional limitations
- Descriptive statistics and logistic regression using STATA16 and R Studio
- Basic activity difficulties and complex activity limitations definitions were based on those previously established by lezzoni et al¹
 - Movement:** Difficulty walking 3 blocks, climbing stairs, standing for two hours, stooping, reaching, grasping, or carrying items
 - Sensory:** Blindness or vision problems, hearing problems or hearing aid use
 - Emotional:** Kessler score ≥ 6
 - Cognitive:** Difficulty with memory
 - Self-Care Limitations:** Requiring assistance with showering, dressing, toileting, moving out of chairs or around the house, or IADIs
 - Work Limitations:** Limitations or inability to work due to health problem

Results

Table 1. HNC Survivor and OCS Characteristics

	Head and Neck Cancer (n = 918)		Matched Other Cancer (n = 3672)	
	%	95% CI	%	95% CI
Sex: Female	37.60	(34.22 – 41.10)	36.56	(34.79 – 38.36)
Age (Years; Median)	65.60	(64.7 – 66.4)	65.60	(65.1 – 66.0)
Race/Ethnicity: Non-Hispanic White	85.30	(83.7– 87.0)	84.00	(82.8 – 85.3)
Years since cancer diagnosis (≥ 1 Year)	88.54	(86.13 - 90.57)	91.34	(90.24 – 92.33)
Tumor Subsite				
- Larynx	15.40	(13.60 - 17.30)	-	-
- Pharynx	54.80	(52.20-57.30)	-	-
- Lip or oral cavity	29.80	(27.5—32.00)	-	-
Unemployed or Not in Workforce	75.72	(72.34– 78.63)	67.69	(65.92 – 69.41)
Education: <HS/GED	53.91	(50.20 – 57.58)	45.69	(43.66 – 47.73)
Marital Status: Non-partnered	54.25	(50.80 – 57.66)	48.86	(47.00– 50.72)
Insurance Status: Uninsured or any Medicaid	33.07	(29.77 – 36.55)	24.51	(22.93 – 26.17)
BMI				
- Underweight (<18.5 kg/m2)	5.65	(4.11 - 7.71)	1.93	(1.44 – 2.58)
- Normal Weight (18.5 – 24.9 kg/m2)	40.93	(37.36 – 44.60)	31.86	(30.08 – 33.70)
- Overweight (25.0 – 29.9 kg/m2)	31.39	(28.30 - 34.66)	39.64	(37.78– 41.53)
- Obese (≥30 kg/m2)	22.03	(19.24 – 25.10)	26.57	(24.97 – 28.23)
Any Pain	50.27	(46.62– 53.92)	42.86	(40.97 – 44.76)
Emotional Difficulty	7.13	(5.14 – 9.34)	4.50	(3.79 – 5.33)
Movement Difficulty	57.49	(53.91 - 60.99)	54.89	(53.07 – 56.69)
Cognitive Difficulty	10.24	(8.24 – 12.65)	7.08	(6.21 – 8.06)
Social Limitations	22.27	(19.40 – 25.43)	17.16	(15.82 – 18.58)

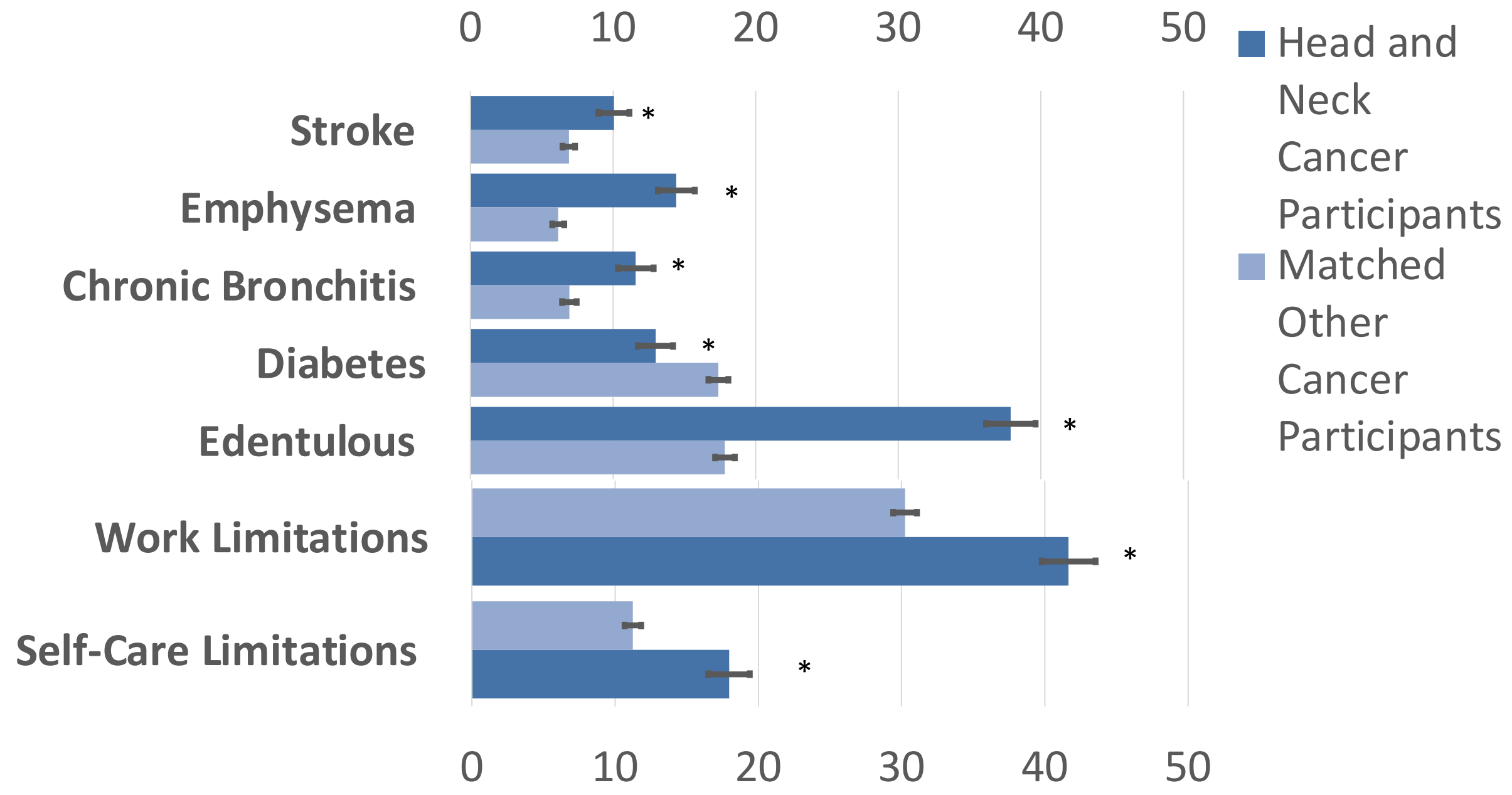


Figure 1. Prevalence of comorbidities and complex activity limitations among HNC and matched other cancer survivors (Legend: * P< 0.05)

	Self-Care Limitations		Work Limitations	
	Adjusted OR	95% CI	Adjusted OR	95% CI
Sex: Female (REF: Male)	1.83	1.14-2.95	-	-
Age	1.02	1.00-1.04	-	-
Years Since Diagnosis (≥1 Year) (REF: < 1 Year)	0.45	0.25-0.80	0.48	0.28-0.81
Larynx (REF: Lip or oral cavity)	-	-	2.00	1.14-3.51
Unemployed or Not in Workforce (REF: Employed)	4.49	1.29-15.65	-	-
Education: Less than HS or GED (REF: > HS/GED)	-	-	1.47	0.98-2.19
Marital Status: Non-partnered (REF: Partnered)	-	-	1.77	1.21-2.56
Insurance Status: Uninsured or any Medicaid (REF: Insured)	-	-	1.62	1.08-2.42
BMI: Overweight (REF: Normal)	-	-	0.60	0.38-0.95
Any Pain (REF: No pain)	1.40	0.81-2.40	1.84	1.24-2.74

Table 2: Risk Factor Analysis of Self-Care and Work Limitations in HNC Survivors

	Self-Care Limitations		Work Limitations	
	Adjusted OR	95% CI	Adjusted OR	95% CI
Emotional Difficulty	1.55	0.71-3.35	1.59	0.81-3.12
Movement Difficulty	3.44	1.73-6.84	3.16	2.14-4.66
Sensory Difficulty	-	-	1.63	1.07-2.48
Cognitive Difficulty	4.69	2.42-9.06	6.56	2.54-16.97
Social Limitations	3.92	2.37-6.49	2.90	1.77-4.75

Table 2 Continued: Risk Factor Analysis of Self-Care and Work Limitations in HNC Survivors

Discussion

- Compared to OCSs, HNC survivors were more likely to be edentulous and exhibit certain pulmonary and cardiovascular comorbidities.
 - Other studies have described the high burden of comorbidities in HNC survivors² compared to the general population.³
 - To our knowledge this is the first study to describe the increased burden of select comorbidities in HNC survivors relative to OCSs.
- HNC survivors exhibited a disproportionately high burden of cognitive and social difficulties along with self-care- and work limitations.
 - The etiology of these limitations is likely multifactorial and may include: cardiopulmonary comorbidities stemming from substance use, and the harms of the tumor and treatment – particularly as they impact speech and breathing
- HNC survivors with self-care and work limitations more commonly reported pain and movement difficulty. Therefore, these limitations *may* be modified with improved pain control and physical rehabilitation.
- HNC survivors with work limitations exhibited a greater risk for social limitations, cognitive difficulty, and laryngeal cancer.
 - According to Taylor et al⁴, 52% of HNC survivors who worked prior to cancer diagnosis report disability secondary to cancer treatment, most commonly due to fatigue and speech limitations
 - Occupational therapy may alleviate work limitations in this population

Conclusions

HNC survivors exhibit a disproportionately high burden of comorbidities and functional limitations. Some risk factors for self-care and work limitations (e.g. pain, movement difficulties, social limitations) may be modified. These findings highlight the importance of coordinated multidisciplinary care involving oncologists, primary care physicians, and supportive care services.

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