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ORIGINAL ARTICLE

The prevalence and determinants of return to work in head and neck cancer survivors

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Abstract

Purpose To determine the prevalence of and factors associated with the reduction or complete cessation of employment following treatment in head and neck cancer survivors.

Methods This cross-sectional study was conducted among head and neck cancer survivors visiting outpatient clinics at the Princess Margaret Cancer Centre over a period of 18 months. Participants at any point along their survivorship course completed a survey that included demographic information, the Radiation Therapy Oncology Group (RTOG) Work Status Questionnaire, the Functional Assessment of Cancer Therapy–Head and Neck (FACT-HN), the M.D. Anderson Symptom Inventory–Head and Neck (MDASI-HN), the Cancer Survivors' Unmet Needs Measure (CaSUN), and the EuroQol EQ-5D-5L utility scale.

Results Among 130 participants, 64 were employed at diagnosis. At the time of study, 31 (48%) had reduced their work, among whom, 21 (32.8%) had not returned to work at all following treatment. Pre-treatment employment status, cancer-related symptoms, quality of life, and health utility were associated with employment outcomes.

Conclusion A high proportion of head and neck cancer survivors reduced their work capacity and many did not return following cancer treatment. Further research is needed to understand the barriers to work return in these survivors and to explore strategies to encourage resumption of employment and employment satisfaction.

Keywords Survivorship · Return to work · Insurance · Unemployment · Head and neck neoplasms

Introduction

Recent advancements in the detection and treatment of head and neck cancer (HNC) have resulted in a growing number of cancer survivors [1–4], emphasizing the need for adequate survivorship health services and support programs. HNC has traditionally affected older male populations, with 61% of patients ≥ 60 years of age [5], and often close to or beyond retirement age [6]. However, the demographic of HNC is dramatically shifting to include women and younger men due to the altered patterns of tobacco use and the evolving incidence of HPV-associated oropharyngeal cancer [2]. The more favorable prognosis and clinical outcomes associated with HPV-related malignancies contribute to the improved 5-year survival rate for HNC overall [1, 2, 7]. The main population affected by this emerging trend in HNC has been men between the ages of 50–59 [5, 8]. Consequently, the HNC demographic is evolving to include a greater proportion of individuals who are further from retirement age and still in the active workforce [1]. The increasing proportion of working age HNC survivors living longer beyond diagnosis and treatment warrants further attention to rehabilitation and survivorship strategies that support reintegration into the workforce.

The consequences of cancer can have significant employment implications for both cancer survivors and

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society at large. Reduction of work hours after treatment may lead to financial loss, social isolation, reduced self-esteem, and impaired quality of life for survivors [6, 9–12]. For the individual, returning to work is a means of regaining a sense of normality and control [13–16]. Disability or reduced work capacity of cancer survivors results in decreased productivity and an overall economic burden to society [10, 12].

HNC comprises over 5000 new cases in Canada annually [3]. Despite contributing only a small number to the total population of cancer survivors, this is significant due to the frequency of disability [10, 17] and complexity of survivorship needs among this population [1, 3]. Numerous studies have suggested that survivors of HNC face a higher risk of disability and increased difficulty returning to work compared to survivors of other solid tumors [5, 6, 9–11, 18, 19]. The complex course of treatment and the critical role of the head and neck in function and socialization places HNC survivors at high risk of physical, emotional, and psychological morbidity [3]. Common treatment sequelae include trismus, permanent dysphagia, xerostomia, lymphedema, speech impediments, reduced physical conditioning, weight loss, fatigue, altered physical appearance, and psychological distress [16]. The long-term physical and psychological effects from HNC treatment may impact overall quality of life [17], rehabilitation, and return to work. Despite the added difficulty head and neck cancer survivors face in regaining normality after treatment, this population is drastically underserved [3].

The existing literature focuses on return to work for survivors of more common cancers with a particular emphasis on breast cancer [1, 5, 11]. There has been a dearth of studies investigating employment outcomes and associated factors in head and neck cancer survivors specifically [11, 17, 20]. Very little attention has been paid to developing standardized interventions to support survivors' re-entry into the workforce [21]. There is a need for coordinated support from health and vocational professionals and a more strategic method to educate survivors about how to prepare for the transition back to work [22]. The complexities of HNC make the limited existing resources and strategies less applicable to this population. Support from rehabilitation professionals like occupational therapists, who have experience with the HNC population and developing strategic return-to-work plans, would help fill a gap in services and enable individuals with HNC to return to work successfully. This study examines the prevalence of, and factors associated with, the reduction or complete cessation of employment following treatment in HNC survivors. Results may help to identify a vulnerable population and inform future interventions to assist in their transition back into the workforce.

Methods

Data collection

A single institution cross-sectional study was conducted from January 2013 to May 2014 at the Princess Margaret Cancer Centre (PM), a quaternary care cancer center with an interdisciplinary HNC treatment team and a developing HNC survivorship program. Princess Margaret is the largest HNC treatment center in Canada, and among the largest in the world, with over 850 new patients each year. For the purpose of this study, the National Cancer Institute (NCI) definition of cancer survivor was used. The NCI defines a survivor as an individual with cancer from the time of diagnosis throughout their life [23]. Survivors at any phase in the cancer care trajectory from diagnosis to long-term follow-up were eligible to participate. Survivors were approached in the waiting rooms of outpatient HNC clinics at Princess Margaret and invited to participate in the study. Survivors with any form of HNC (nasal cavity, paranasal sinuses, pharynx, larynx, oral cavity, salivary gland, cervical esophagus, and complex skin cancers in the head and neck area), excluding thyroid cancer, who were age ≥ 18 and were receiving/had received any combination of treatment modalities were eligible for this study. Survivors were excluded if they could not read English. Eligible participants provided written informed consent. This study was conducted with Research Ethics Board approval. Results focusing on unmet needs from the overall cohort have been previously published [3]; this report focuses on the subgroup who was employed prior to their cancer diagnosis. Informed consent was obtained from all individual participants included in the study.

Study measures

Each consented participant completed a one-time survey which included survivor-reported demographic data, the Functional Assessment of Cancer Therapy–Head and Neck (FACT-HN Version 4.0) [24], the M.D. Anderson Symptom Inventory–Head and Neck (MDASI-HN) [25], the EuroQuol EQ-5D-5L visual analogue scale [26], the Cancer Survivors' Unmet Needs Measure (CaSUN) [27], and the Radiation Therapy Oncology Group (RTOG) Work Status Questionnaire [28].

To characterize employment-related factors, the RTOG Work Status Questionnaire was used [28]. The RTOG Work Status Questionnaire is a patient-reported outcome measure that comprises 12 descriptive questions regarding previous and current employment status and related factors including occupational field, income, and employer accommodation.

The FACT-HN and MDASI-HN are validated tools used to assess quality of life (QOL) and symptom severity in head and neck cancer survivors. The FACT-HN (Version 4) comprises 37 items, each scored from 0 to 4 on a Likert-type scale, grouped into 5 domains, with a total maximum summary score of 148 representing the best possible QOL [24]. The MDASI-HN is a 28-item instrument and each item is matched to a 1–10 score. The total score is out of 280, with higher scores representing more symptoms/worse QOL [25].

The EQ-5D-5L [26] is a self-reported scale used to characterize health utility. The descriptive component consists of five levels across five domains (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) to capture how survivors feel that day. The visual component asks patients to rate their health that day on a vertical visual scale ranging from "the best health you can imagine" to "the worst health you can imagine".

The CaSUN is a 35 item validated instrument designed to assess unmet survivorship needs across 5 domains: existential survivorship (14 items), comprehensive cancer care (6 items), information (3 items), quality of life (2 items), and relationships (3 items) [27]. The CaSUN asks respondents to indicate each item in one of three categories: no need or not applicable; have need but it is met; or need is unmet.

Statistical analyses

Survivor-reported demographic data were summarized using descriptive statistics. Factors associated with reduction in work were explored using univariable and multivariable logistic regression analysis. A stepwise variable selection was performed, and variables with $p < 0.10$ were kept in the final multivariable logistic regression analysis. Odd ratio (OR) and 95% confidence interval (CI) were reported, with OR > 1 indicates more likely having reduction in work and OR < 1 otherwise. Analysis was performed using SAS v9.4.

Results

Sample characteristics

Among 130 participants recruited to the main study [3], 64 who were employed at diagnosis comprise the sub-cohort for this analysis. From the original study sample of 130, patients were excluded if they were > 65 years old ($n = 50$), retired ($n = 15$), or had an incomplete employment status on the questionnaire ($n = 1$). The age threshold of > 65 was selected although the authors acknowledge that a small proportion of these survivors may continue to work. See Fig. 1 for exclusion criteria. The median age was 56.5 years with a range of 23 to 65 years. The sample was predominately male (63.5%) and most participants ($n = 47$, 73.4%) had a post-secondary level of education. Twenty-nine participants (46.0%) reported previous tobacco use, and 7 (11.1%) maintained this habit after treatment. Participants' socio-demographic characteristics are displayed in Table 1.

Tumor sites were evenly distributed and included the oral cavity in 18 participants (28.1%), oropharynx in 14 (21.9%), larynx or hypopharynx in 9 (14.1%), and other sites of the head and neck in 23 (35.9%). Survivors were at various stages along the cancer trajectory, however, most ($n = 42$, 71.2%) had completed treatment for over 6 months. With regard to treatment modality, 32 participants (52.5%) were treated with surgery and adjuvant radiation and 15 participants (24.6%) were treated with concurrent chemoradiation. Fifteen participants (31.9%) reported having HPV-associated cancer and 32 (68.1%) did not. Participants' cancer-related clinical characteristics are displayed in Table 1.

The mean total score on the FACT-HN was 112.2 (SD ± 21.6). The mean total score on the MDASI-HN was 46.8 (SD ± 46.9). Median overall health utility on the EQ-5D visual analog scale was 80, with a range from 20 to 100. The results from the CaSUN revealed only 19 participants (29.7%) who reported no unmet needs. Of those with unmet needs, 33% of participants had 1 to 3 needs, 33% had 4–10 needs, and 33% had > 10 needs. Unmet needs were most common in the domain of Comprehensive Cancer Care (49.2%), which addresses the provision of health services and communication between doctors.

Employment characteristics

All 64 survivors were employed upon diagnosis. Thirty participants (46.9%) were employed full-time and 11 were employed part-time (35.9%). The average household income was $89,300 (SD ± $54.800) and under half of the participants ($n = 23$, 37.7%) were the sole earner. Participants reported working an average of 21.2 h (SD ± 20) per week at the time of questionnaire completion. There was a diverse spread of occupational categories among participants. The vast majority of participants ($n = 48$, 82.8%) did not have physically demanding jobs. Employment characteristics are summarized in Table 2. Among the 64 survivors employed prior to diagnosis, 33 participants (52%) were able to return to their previous level of work. Thirty-one (48%) survivors experienced a reduction of work after treatment. This number includes those who reduced their work ($n = 10$) and those who did not return to work at all ($n = 21$, 32.8%). An overview of occupational categories is listed in Table 2.

Variables associated with reduced work

Univariable analysis

On univariable analysis, post-treatment reduction in work (including non-return) was associated with worse self-reported scores on several domains of the quality of life measure (FACT-HN): functional (OR 0.84, 95% CI 0.76–0.93, $p < 0.01$), HNC-related (OR 0.89, 95% CI 0.82–0.96, $p < 0.01$),

Fig. 1 Inclusion criteria flow chart

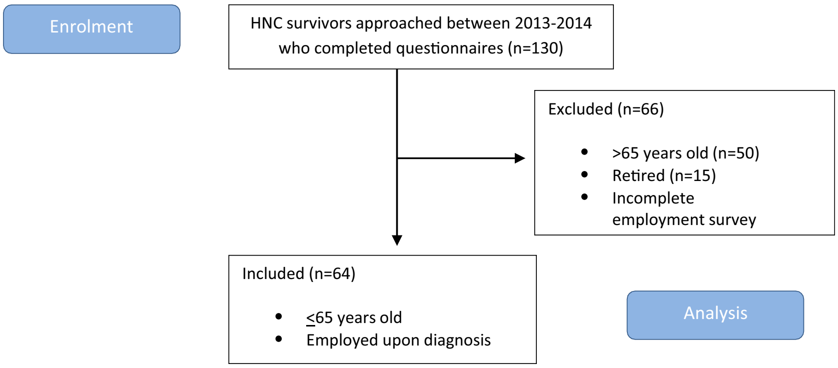

Table 1 Participant demographics and clinical characteristics

Variables ($n = 64$)	N (%)
Age, median (range)	56.5 (23–65)
Sex	
Female	23 (36.5%)
Male	40 (63.5%)
Unknown	1
Marital status	
Married/common-law	44 (69.8%)
Other	19 (30.2%)
Unknown	1
Education	
Post-secondary	47 (73.4%)
Other	17 (26.6%)
Smoking status	
Never smoked	27 (42.9%)
Former smoker	29 (46.0%)
Current smoker	7 (11.1%)
Unknown	1
Cancer site	
Hypopharynx/larynx	9 (14.1%)
Oral cavity	18 (28.1%)
Oropharynx	14 (21.9%)
Others	23 (35.9%)
Disease status	
Completed treatment ≤ 6 months	10 (16.9%)
Completed treatment > 6 months	42 (71.2%)
Recurrence/on-treatment	7 (11.9%)
Unknown	5
Treatment	
Radiotherapy (RT)	5 (8.2%)
Chemotherapy + RT	15 (24.6%)
Surgery + RT	32 (52.5%)
Surgery	9 (14.8%)
Unknown	3
HPV status	
Positive	15 (31.9%)
Negative	32 (68.1%)
Unknown	17

physical (OR 0.84, 95% CI 0.74–0.96, $p < 0.01$), social (OR 0.90, 95% CI 0.81–0.99, $p = 0.03$), and overall well-being (OR 0.95, 95% CI 0.91–0.98, $p < 0.01$; Table 3). Reduced work was also correlated with lower self-reported health utility on the EQ-5D VAS (OR 0.96, 95% CI 0.92–0.99, $p = 0.01$) plus increased core symptom severity (OR 1.03, 95% CI 1.00–1.03, $p < 0.04$), symptom interference (OR 1.09, 95% CI 1.04–1.15, $p < 0.01$), and overall symptom score (OR 1.02, 95% CI 1.00–1.03, $p = 0.01$) on the MDASI-HN. Participants who were not employed full-time prior to diagnosis were less likely to return to work (OR 0.23, 95% CI 0.08–0.67, $p < 0.01$). Sociodemographic factors (age, gender, education), clinical characteristics, and scores regarding unmet survivorship needs (CaSUN) were not found to be statistically significant in predicting employment status following HNC treatment.

Multivariable analysis

Multivariate analysis showed that successful return to work following treatment was associated with prior full-time employment (OR 0.06, 95% CI 0.01–0.41, $p < 0.01$) and lower MDASI-HN symptom interference scores (OR 1.1, 95% CI 1.02–1.19, $p = 0.02$; Table 3). On multivariate analysis, sociodemographic factors (age, gender, education) and clinical characteristics were not significantly associated with reduction in work for HNC survivors. Scores indicating health utility (EQ-5D), quality of life (FACT-HN), and number of unmet survivorship needs (CaSUN) were not associated with employment.

Discussion

This study provides unique knowledge with regard to the factors associated with returning to work after treatment in head and neck cancer survivors. Return to work in a cohort of working age HNC survivors was investigated in relation to sociodemographic factors, clinical characteristics, cancer-related symptoms, quality of life, and overall health utility. Although various barriers to returning to work for this

Table 2 Employment characteristics and occupational categories

Variables	Current study $N = 64$
Pre-treatment employment status	
Full-time	30 (46.9%)
Part-time	11 (17.2%)
Other	23 (35.9%)
Reduced work	
Yes	31 (48.4%)
No	33 (51.6%)
Unable to return to work	
Yes	21 (32.8%)
No	43 (67.2%)
Health plan coverage	
Yes	39 (61.9%)
No	24 (38.1%)
Unknown	1
Available paid sick leave	
Yes	37 (58.7%)
No	26 (41.3%)
Unknown	1
Occupational category	
Arts, media or athletics	2 (3.1%)
Managerial or professional specialty	22 (34.4%)
Operator, fabricator, or laborer	8 (12.5%)
Sales, technical, or administrative support	11 (17.2%)
Service	4 (6.3%)
Other	11 (17.2%)
Unknown	6 (9.4%)
Current work hours/week, mean (SD)	21.2 (20.0)
Income, mean (SD)	\$89,300 (\$54,800)

population have been previously identified [6, 11, 14, 16, 18–20, 29], few studies have evaluated all of these factors concurrently.

Working status of the sample

From this cross-sectional study, it is evident that the rate of employed HNC survivors significantly decreased following treatment. Among the 64 HNC survivors who were employed at diagnosis, 31 (48%) were forced to reduce work in some capacity, of whom 21 (32.8%) did not return at all following treatment. This result is consistent with other recent studies that have reported that a substantial proportion (17–57%) of HNC survivors were unable to return to work post-treatment [6, 14, 16, 19, 20, 29]. The sample of the present investigation included a sample of highly educated individuals and the majority of these survivors worked jobs that were not physically demanding. This particular study demographic may account for a slightly higher rate of return to work than usual. Physical limitations from the cancer and its treatment may have had a lesser impact on employment outcomes for professional workers, resulting in an overall higher rate of return in this cohort.

The current study did not examine the average time it took HNC survivors to reintegrate back into the workforce. One previous study of HNC survivors found the median time to return to work was 6 months, ranging between 0 and 24 months [11]. However, head and neck cancer is an individualized experience and successful rehabilitation depends on the severity and management of cancer- and treatment-related effects, as well as the specific demands of an individual's work environment.

Factors associated with working status

Sociodemographic factors

The present study revealed that full-time employment prior to diagnosis was associated with successful return to work. There are many factors that could influence this. For example, full-time workers may have an increased financial need to remain employed [13]; they may have positive and active support from their employers and colleagues [13], and possibly a Human Resources Department that offers greater flexibility to employees returning from sick leave [30].

Survivors who worked only part-time may have been less inclined to continue working if they perceived that income earned or fulfillment from their job did not outweigh the distress caused by the cancer and its treatment. Part time work may also indicate less job security, less flexibility in the job to return to, or an environment or employer that is less supportive of returning to the workplace. Alternatively, part-time workers may not have been the primary earner of their household, making retirement a more viable option. Previous HNC studies have indicated associations between reduction in work and other sociodemographic factors including manual work [19, 20], lower education level [29], older age [6, 18], and risky alcohol consumption [20, 29]. None of these factors were statistically significant upon univariate or multivariate analyses in the present study.

Clinical factors

Clinical factors such as late tumor stage [6, 11, 29], increased comorbidity score [18], increased number of treatment modalities [31], and surgery as a form of treatment [20] have been previously associated with employment disability for HNC survivors. Surgery can be particularly debilitating since it often results in disfigurements and substantial functional impairments of the head and neck [2]. However, clinical factors were not found to be significant predictors of return to work in the current study.

Table 3 Regression analysis of reduced work

Variables	Univariable			Multivariable		
	OR	CI	*p* value	OR	CI	*p* value
Age	0.95	0.89–1.01	0.13	–	–	–
Gender	0.70	0.25–1.95	0.49	–	–	–
Marital status	0.82	0.28–2.41	0.72	–	–	–
Live with another	0.49	0.14–1.71	0.26	–	–	–
Education	1.49	0.49–4.58	0.49	–	–	–
Full-time employment	0.23	0.08–0.67	0.007	0.06	0.01–0.41	0.004
Income	1.00	0.99–1.01	0.78	–	–	–
Treated > 6 months	0.37	0.12–1.20	0.10	0.19	0.03–1.05	0.06
Number treatment modalities	1.88	0.55–6.45	0.32	–	–	–
Health plan coverage	0.95	0.34–2.63	0.92	–	–	–
Family health plan coverage	1.20	0.30–4.80	0.80	–	–	–
Paid sick leave	1.41	0.48–4.14	0.53	–	–	–
Employer accommodation	0.91	0.12–7.07	0.93	–	–	–
Full earner	1.35	0.48–3.81	0.57	–	–	–
EQ-5D visual analogue scale	0.96	0.92–0.99	0.01	–	–	–
FACT-HN physical well-being	0.84	0.74–0.96	0.008	–	–	–
FACT-HN social well-being	0.90	0.81–0.99	0.03	–	–	–
FACT-HN emotional well-being	0.94	0.84–1.05	0.28	–	–	–
FACT-HN functional well-being	0.84	0.76–0.93	0.001	–	–	–
FACT-HN head and neck	0.89	0.82–0.96	0.004	–	–	–
FACT-HN total	0.95	0.91–0.98	0.001	–	–	–
MDASI symptom interference	1.09	1.04–1.15	0.001	1.10	1.02–1.19	0.02
MDASI symptom severity	1.01	1.00–1.03	0.051	–	–	–
MDASI core symptom severity	1.03	1.00–1.06	0.04	–	–	–
MDASI HN symptom severity	1.02	0.99–1.05	0.13	–	–	–
MDASI total	1.02	1.00–1.03	0.01	–	–	–
Unmet CaSUN factor 1	0.99	0.80–1.24	0.96	–	–	–
Unmet CaSUN factor 2	0.88	0.67–1.15	0.35	–	–	–
Unmet CaSUN factor 3	1.13	0.67–1.90	0.64	–	–	–
Unmet CaSUN factor 4	1.63	0.85–3.11	0.14	2.85	0.4–9.72	0.09
Unmet CaSUN factor 5	1.26	0.77–2.06	0.36	–	–	–

Quality of life

HNC has been characterized as the most emotionally traumatic type of cancer [2] and frequently impacts survivors' quality of life [1, 17]. This may be attributed to the rising intensity of standard treatment and consequent toxicity [7], the central role of the head and neck in daily function and socialization, and the complex and often unmet survivorship needs of this population [3]. Previous investigations have identified anxiety [11], depressive symptoms [20], and psychological problems [16] as barriers to return to work, emphasizing the high prevalence of psychosocial distress among HNC survivors [31]. The current study revealed that individuals who indicated lower quality of life were frequently unemployed or had reduced their work hours. These individuals reported worse scores on domains specific to the head and neck as well as physical, social, and functional well-being. These findings coincide with the literature indicating more severe decrements in quality of life for the HNC survivors who were unable to return to work [16, 18, 20]. Further studies are needed to elucidate the directionality of this relationship.

Cancer-related symptoms

HNC survivors who reduced their working hours reported significantly worse core symptom severity and symptom interference with daily life. This study highlights the disparities that exist among HNC survivors regarding symptoms and sequelae from disease progression and cancer treatment. Core symptoms are outcomes that have the highest frequency among patients of various cancer types and include factors such as pain, fatigue, nausea, and distress [25]. Fatigue has been identified as the most common reason for discontinuing work in previous HNC studies [6, 16]. Other studies have highlighted oral dysfunction as a barrier for returning to work, specific to head and neck cancer survivors [6, 11, 16, 20]. HNC survivors constitute a vulnerable population and frequently experience problems with swallowing, salivary function, communication, breathing, disfigurement, and decrements in general functioning [1, 2, 17, 18]. It is necessary that targeted interventions be designed and implemented to mitigate the interference of HNC-related symptoms with everyday life [4]. Return to work in survivorship requires a holistic, client-centered, and collaborative approach to ensure success [32]. Rehabilitation professionals like occupational therapists, who work to address factors related to the person, environment, and occupation [33], would be beneficial in addressing the various cancer-related symptoms unique to the HNC population in preparation for return to work. Education on strategies for disclosure, communication of accommodation needs, and coordinating various stakeholders are areas that should be addressed in return to work planning. Lack of funding for clinicians to address these areas creates a barrier for developing services that would be extremely helpful for HNC patients when navigating the many factors that impact returning to work.

Health utility

Successful reintegration into the workforce was correlated with higher self-reported overall health utility. This enforces a previous finding for HPV-related oropharyngeal cancer [18] which applied the same measure of health utility (EQ-5D).

Study limitations

Limitations of this study include its relatively small sample size, cross-sectional design, unknown accuracy of certain patient-reported tumor and treatment-related variables, and generalizability of the findings. Employment status was captured at one point in time. No data was collected regarding individual motivation to return to work or satisfaction with eventual work status. A prospective cohort study would be able to determine if employment outcomes were dynamic over time and the average time of returning to work. In addition, this study was performed in one of the largest HNC treatment centers in the world, in the context of socialized medicine and universal health care. The nature of this patient population and the resources available to them may limit the generalizability of the data. Finally, there is likely respondent bias inherent in the individuals willing to complete the study intervention.

Conclusion

A large proportion of head and neck cancer survivors did not return to work following treatment. Reduction of work was associated with non-full-time employment upon diagnosis and worse self-reported quality of life, cancer-related symptoms, and health utility. The results of this study highlight the importance of prevention, management, and control of acute and long-term effects of head and neck cancer and its treatment.

Implications for research and practice

There is a dearth of studies investigating return to work specifically in the HNC population. This is likely due to the fact that many individuals diagnosed with HNC are nearing or beyond retirement age, making it challenging to obtain data on employment disability [6]. However, the emerging cohort of working-age HNC survivors warrants significant attention to this population. The present findings may help inform the development of rehabilitation interventions and survivorship programs to assist HNC survivors with their transition back into the active workforce. Further systematic research is needed to elucidate the relationships between specific barriers and employment outcomes. The role of health professionals as effective communicators may be of increasing significance to improve employment status among HNC survivors [15]. Healthcare professionals must engage in dialog with patients about their intention to return to work and subsequently, become the conduit to connect survivors with appropriate supports including social work and community programs.

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Compliance with ethical standards

Conflict of interest No financial relationship exists with the organization that sponsored this research.

We have full control of all primary data and agree to allow the journal to review the data if requested.
Meredith Giuliani declares that she has no conflict of interest.
Janet Papadakos declares that she has no conflict of interest.
Michaela Broadhurst declares that she has no conflict of interest.
Jennifer Jones declares that she has no conflict of interest.
Maurene McQuestion declares that she has no conflict of interest.
Lisa W Le declares that she has no conflict of interest.
Lydia Beck declares that she has no conflict of interest.
John Waldron declares that he has no conflict of interest.
Jolie Ringash declares that he has no conflict of interest.

Ethical approval Research involving human participants and/or animals**:** all procedures performed in studies involving human participants were in accordance with the ethical standards of the Princess

Margaret Cancer Center institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Results focusing on unmet needs from the overall cohort have been previously published (Giuliani, M. McQuestion, M. Jones, J. Papadakos, J. Le, LW. Alkazaz, N. Cheng, T. Waldron, J. Catton, P. Ringash, J. Prevalence and nature of survivorship needs in patients with head and neck cancer. Head Neck. 2016;38(7): 1097-1103.

Informed consent Informed consent was obtained from all individual participants included in the study.

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