Functionality of Older Adults with Oral Cavity and Oropharyngeal Cancer: Descriptive Analysis

Funcionalidade de Idosos com Câncer de Cavidade Oral e Orofaríngea: Análise Descritiva

Funcionalidad de Personas Mayores con Cáncer de Cavidad Bucal y Orofaringe: Análisis Descriptivo

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ABSTRACT

Introduction: With population aging, the incidence of cancer in older adults has increased, including oral cavity and oropharyngeal cancer, which impacts functionality in this population. **Objective:** To assess the functionality of older adults diagnosed with oral cavity and oropharyngeal cancer. **Method:** Cross-sectional study with all incident cases of oral cavity and oropharyngeal cancer in older adults treated at the National Cancer Institute between 2017 and 2018, with confirmed diagnosis regardless of clinical stage. Sociodemographic data, lifestyle habits, and oncological treatment information were collected. Functionality was assessed using Katz Index (activities of daily living – ADLs) and Lawton and Brody scale (instrumental activities of daily living – IADLs). Statistical analyses included descriptive measures, chi-square tests for associations between categorical variables, and Student's t-test for comparisons between continuous variables. Multiple correspondence analysis (MCA) was applied to identify multivariate association patterns ($p<0.05$). **Results:** A total of 163 participants were evaluated (70.6% men; 29.4% women). Functional dependence in ADLs was found in 14% of the participants and in 48% for IADLs. Low education level was associated with dependence in ADLs ($p<0.05$), and men presented greater dependence in IADLs ($p<0.05$). MCA revealed that smoking and alcohol consumption explained 25.45% of ADL dependence and 29.79% of IADL dependence. **Conclusion:** A high prevalence of dependence in IADLs was observed. Low education, male sex, smoking, and alcohol consumption were important factors associated with higher functional dependence in this population. These findings reinforce the importance of functional assessment of older adults prior to oncological treatment.
Key words: Head and Neck Neoplasms/epidemiology; Aged/statistics & numerical data; Geriatric Assessment/statistics & numerical data; Functional Status; Quality of Life.

RESUMO

Introdução: Com o envelhecimento populacional, observa-se aumento da incidência de câncer em idosos, incluindo câncer de cavidade oral e orofaringe, com impacto na funcionalidade desses indivíduos. **Objetivo:** Avaliar a funcionalidade de indivíduos idosos com diagnóstico de câncer de cavidade oral e orofaringe. **Método:** Estudo transversal com todos os casos incidentes de câncer de cavidade oral e orofaringe em idosos no Instituto Nacional de Câncer, entre 2017 e 2018, com diagnóstico confirmado, independentemente do estadiamento clínico. Foram coletados dados sociodemográficos, hábitos de vida e informações sobre tratamento oncológico. Funcionalidade foi avaliada pelas escalas de Katz (atividades de vida diária – AVD) e de Lawton e Brody (atividades instrumentais de vida diária – AIVD). Nas análises estatísticas, foram calculadas medidas de frequência simples e de tendência central. Foram utilizados testes para avaliar associação entre variáveis categóricas (qui-quadrado) e comparação entre variáveis contínuas (*t* de Student). Análise de correspondência múltipla (ACM) foi utilizada para identificação de padrões multivariados de associação ($p<0,05$). **Resultados:** Foram avaliados 163 participantes (70,6% homens; 29,4% mulheres). Dependência funcional para AVD foi identificada em 14% dos participantes e 48% para AIVD. Baixa escolaridade foi associada à dependência para AVD ($p<0,05$) e homens apresentavam maior dependência em AIVD ($p<0,05$). ACM revelou que tabagismo e etilismo explicaram 25,45% da dependência em AVD e 29,79% em AIVD. **Conclusão:** Observou-se importante dependência em AIVD. Baixa escolaridade, sexo masculino, tabagismo e etilismo são importantes fatores associados à maior dependência funcional nessa população. Esses achados reforçam a importância da avaliação da funcionalidade de idosos prévia ao tratamento oncológico.
Palavras-chave: Neoplasias de Cabeça e Pescoço/epidemiologia; Idoso/estatística & dados numéricos; Avaliação Geriátrica/estatística & dados numéricos; Estado Funcional; Qualidade de Vida.

RESUMEN

Introducción: Con el envejecimiento poblacional se observa un aumento en la incidencia de cáncer en personas mayores, incluyendo el cáncer de cavidad oral y orofaringe, con impacto en la funcionalidad de estos individuos. **Objetivo:** Evaluar la funcionalidad de personas mayores con diagnóstico de cáncer de cavidad oral y orofaringe. **Método:** Estudio transversal con todos los casos incidentes de cáncer de cavidad oral y orofaringe en personas mayores atendidas en el Instituto Nacional del Cáncer entre 2017 y 2018, con diagnóstico confirmado, independientemente del estadio clínico. Se recopilaron datos sociodemográficos, hábitos de vida e información sobre tratamiento oncológico. La funcionalidad se evaluó mediante el índice de Katz (actividades básicas de la vida diaria – AVD) y la escala de Lawton e Brody (actividades instrumentales de la vida diaria – AIVD). En los análisis estadísticos se calcularon medidas descriptivas de frecuencia simple y tendencia central, y las pruebas ji al cuadrado para asociaciones entre variables categóricas y *t* de Student para comparaciones entre variables continuas. Se utilizó análisis de correspondencias múltiples (ACM) para identificar patrones multivariados de asociación ($p<0,05$). **Resultados:** Se evaluaron 163 participantes (70,6% hombres; 29,4% mujeres). La dependencia funcional en AVD se identificó en el 14% de los participantes y en el 48% para AIVD. Un bajo nivel educativo se asoció con dependencia en AVD ($p<0,05$), y los hombres presentaron mayor dependencia en AIVD ($p<0,05$). El ACM reveló que el tabaquismo y el consumo de alcohol explicaron el 25,45% de la dependencia en AVD y el 29,79% en AIVD. **Conclusión:** Se observó una importante prevalencia de dependencia en AIVD. El bajo nivel educativo, el sexo masculino, el tabaquismo y el consumo de alcohol fueron importantes factores asociados a una mayor dependencia funcional en esta población. Estos hallazgos refuerzan la importancia de la evaluación funcional de personas mayores antes del tratamiento oncológico.
Palabras clave: Neoplasias de Cabeza y Cuello/epidemiología; Anciano/estadística & datos numéricos; Evaluación Geriátrica/estadística & datos numéricos; Estado Funcional; Calidad de Vida.

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INTRODUCTION

Head and neck cancer is a rising challenge for health systems because of populational ageing and high morbimortality associated. Oral cavity cancer stands out in Brazil with 7,870 new cases estimated in 2025 in the Southeast region alone and more prevalent in men than in women[1]. Oropharynx is also a highly incident site, mainly associated with smoking and more recently with infection by human papilloma virus (HPV)[2,3].

The analysis of functionality in older adults with oral cavity and oropharynx cancer is particularly relevant because these tumors affect essential structures for vital functions as deglutition, speech and mastication, directly impacting the autonomy and quality of life[4]. Functionality is understood as the ability to perform basic and instrumental activities of daily living, a key indicator for the health of older adults[5,6].

Previous studies have demonstrated that loss of functionality in oncologic patients is associated not only with disease progression but also treatment adverse effects, increasing social vulnerability and dependence[7,8]. In addition, low education, smoking and alcohol use tend to aggravate the risk of functional decay, reinforcing the importance of early identification of these factors[9,10].

In this context, the functional evaluation is an important tool to guide the therapeutic choice, anticipate complications and plan more appropriate multiprofessional interventions[11].

The objective of this study is to analyze the functionality of older adults with oral cavity and oropharynx cancer and contribute for better understanding of the profile of this population.

METHOD

Cross-sectional study with secondary data of the thesis "*Clusters de sintomas e determinantes da definição de tratamento de pacientes idosos com câncer de cavidade oral e orofaringe, Rio de Janeiro, Brasil*"[8]. The inclusion criteria were all the new cases with confirmed diagnosis of malignant neoplasms of the oral cavity and oropharynx according to the International Statistical Classification of Diseases and Related Health Problem 10th revision (ICD-10) (codes C00-C10)[12], treated at "*Hospital do Câncer I (HC I)* of the National Cancer Institute (INCA) between April 2017 and September 2018, aged 60 years or older, regardless of clinical staging. The exclusion criteria were participants with clinical and psychological conditions who made them unable to respond to the instruments (dementia, blindness or deafness) diagnosed with cancer of the lip not originated from oral cavity and salivary glands and patients with history of oncologic treatment (except surgical treatment for non-melanoma skin cancer).

Data were obtained from patients enrolled after screening with confirmed diagnosis and those who met the eligibility criteria were interviewed by skilled investigators utilizing standardized forms.

The functionality of activities of daily living (ADL) and instrumental activities of daily living (IADL) was defined as dependent variable. Katz and Lawton and Brody scales were applied to classify the participants as independent or dependent. Katz's scale[9] evaluates functionality in activities of basic self-care as diet and personal hygiene, ranging from 0 to 6; the individual who is unable to perform at least one of the activities without help is considered functional dependent. Lawton and Brody[5] scale evaluates the independence in more complex activities as use of telephone and shopping. The scores range from 8 to 24 points, an individual is dependent if help is needed to perform one or more activities. The participants were classified as independent if they did not need help to perform the activities evaluated and dependent if they needed help in one or more activities according to the guidelines of both scales validated to Brazil[5,8,9].

The independent variables were sociodemographic data (age, sex, education, marital status, cohabitation and family income), life habits (smoking and alcohol use), clinical data (anatomic location of the cancer – oral cavity and oropharynx, clinical staging according to TNM[13]). The sociodemographic and life style data were obtained through a proprietary instrument elaborated for the study and clinical information drawn from the participants' charts.

Descriptive analyzes were performed considering simple frequency, central tendency measures and standard-deviation. Pearson's chi-square test was applied to analyze the categorical variables and, when necessary, Fisher's exact test. Student's *t* test (parametric) and the Mann-Whitney (non-parametric) tests were utilized to compare the groups according to the distribution of the variables.

The bivariate analyzes estimated the prevalence ratio (PR) with confidence interval of 95% (CI95%) for all the variables listed in Tables 1 and 2. Poisson's regression was utilized for the multivariate analysis with robust variance, including variables with $p<0.20$ in the bivariate analysis in the final model and those considered clinically. In addition, the multiple correspondence analysis (MCA) was adopted to identify patterns of association among categorical variables which met the criteria earlier determined. In the final models, the clinical variables were not included because, further to non-statistical significance, even when inserted in the models, they did not change the result significantly. The software Jamovi[14] (version 2.3.28) was utilized for all the analyzes with level of significance of 5%.

The Ethics Committee of "*Escola Nacional de Saúde Pública Sergio Arouca (Ensp)*" and of INCA approved the study, report number 1,828, 823 (CAAE (submission for ethical review): 59949816.9.0000.5240) and report number 1,998,450 (CAAE (submission for ethical review): 64569817.1.0000.527), respectively, in compliance with Directive 466/2012[15] of the National Health Council. All the participants were briefed about the risks and benefits of the study and signed the Informed Consent Form (ICF).

RESULTS

163 individuals have been evaluated, 115 men (70.6%) and 48 women (29.4%). The mean age was 67 years (±7.40), higher among dependent (68.7 ±8.43). 54.0% (n=88) had up to 65 years old, 76.7% had low education, 54.6% had no spouse, 81.0% lived with more than one individual and 66.9% earned more than two minimum wages. 106 patients (65.0%) had cancer in the oral cavity, more concentrated on the tongue and hard palate and 57 patients (35.0%) had oropharynx cancer classified according to ICD-10[12] obtained from enrollment charts. Cases of cancer on the lip not originated in the oral cavity and salivary glands and other clinical conditions or diagnoses that did not characterize malignant lesions were excluded earlier according to the study criteria.

57.0% of the participants were at clinical staging IV portrayed in Table 1 below.

Table 2 shows the performance of ADL and IADL. Pearson's chi-square test was utilized to analyze associations among categorical variables and Fisher exact test when applicable.

83.5% of the interviewees (n=141) were classified as independent and 13.5% (n=22) as ADL-dependent. While analyzing the independent, it is possible to observe a progressive decline of this condition, given the age-range: 52.5% were aged up to 65 years, 31.2% were in the age range of 66-75 years, 16.3% were older than 75 years and 69.5% were males. Of the 22 (13.5%) ADL-dependent, 63.6% were aged up to 65 years, 77.3% were males and 59.1% had low education. In addition, 31.8% lived with spouse and 72.7% lived with companion. 77.3% earned up to two minimum wages and 22.7% earned more than two minimum wages. While evaluating the differences among independent and ADL-dependent, it was possible to identify that the variable education was the only with statistical significance (*p*=0.036), suggesting that education can be associated with high ADL-dependence for older patients with oral cavity and oropharynx cancer and PR of 1.85 (CI95%: 1.10–3.11).

The MCA (Figure 1) revealed association of ADL-dependent with smoking and alcohol use. The categories

Table 1. Sociodemographic and clinical characteristics of the study population (n=163)

Sociodemographic variables	Total 163 (100%)
Age	
Up to 65 years	88 (54.0)
66 to 75 years	51 (31.3)
More than 75 years	24 (14.7)
Sex	
Male	115 (70.6)
Female	48 (29.4)
Education	
Low	125 (76.7)
High	38 (23.3)
Marital status	
With spouse	49 (30.1)
Without spouse	89 (54.6)
Widow/widower	25 (15.3)
Cohabitation	
Lives alone	31 (19.0)
Lives with companion	132 (81.0)
Family income	
Up to two minimum salaries	109 (66.9)
More than two minimum salaries	54 (33.1)
Clinical variables Tumor site	
Oral cavity	105 (65.0)
Oropharynx	57 (35.0)
Staging	
I	9 (5.1)
II	20 (12)
III	41 (25.3)
IV	93 (57.0)

Table 2. Performance of ADL and IADL according to sociodemographic characteristics

Variables	Total	ADL			IADL		
	Total N (%) 163 (100%)	Independent N (%) 141(83.5%)	Dependent N (%) 22 (13.5%)	p	Independent N (%) 85 (52.1%)	Dependent N (%) 78 (47.9%)	p
Age				0.328			0.957
Up to 65 years	88 (54.0)	74 (52.5)	14 (63.6)		45 (52.9)	43 (55.1)	
66 to 75 years	51 (31.3)	44 (31.2)	7 (31.8)		27 (31.8)	24 (30.8)	
Older than 75 years	24 (14.7)	23 (16.3)	1 (4.5)		13 (15.3)	11 (14.1)	
Sex				0.457			0.040
Male	115 (70.6)	98 (69.5)	17 (77.3)		54 (63.5)	61 (78.2)	
Female	48 (29.4)	43 (30.5)	5 (22.7)		31 (36.5)	17 (21.8)	
Education				0.036			0.296
Low education	125 (76.7)	112 (79.4)	13 (59.1)		68 (80.0)	57 (45.6)	
High education	38 (23.3)	29 (20.6)	9 (40.9)		17 (20.0)	21 (26.9)	
Marital status				0.964			0.088
With spouse	49 (30.1)	42 (29.8)	7 (31.8)		25 (29.0)	25 (30.8)	
Without spouse	89 (54.6)	77 (54.6)	12 (54.5)		42 (49.4)	47 (60.3)	
Widow/widower	25 (15.3)	22 (15.6)	3 (13.6)		18 (21.2)	7 (9.0)	
Cohabitation				0.289			0.387
Lives alone	31 (19.0)	25 (17.7)	6 (27.3)		14 (16.5)	17 (21.8)	
Lives with companions	132 (81.0)	116 (82.3)	16 (72.7)		71 (83.5)	61 (78.2)	
Family income				0.265			0.201
Up to two minimum wages	109 (66.9)	92 (65.2)	17 (77.3)		53 (62.4)	56 (71.8)	
> two minimum wages	54 (33.1)	49 (34.8)	5 (22.7)		32 (37.6)	22 (28.2)	

"smoking_yes" and "alcohol-user_yes" were close to the category "dependent", suggesting that tobacco and alcohol use increases the possibility of functional dependence. On the other hand, independence was more correlated to males. The dimensions 1 and 2 explained 25.45% and 21.10% of the variance, respectively, suggesting that tobacco and alcohol use is an important factor for high functional dependence. The association indicates that those who smoke and use alcohol have increased likelihood of being ADL-dependent. In addition, independent functionality appears to be correlated with males, based on the proximity of the category "male" with "independent", pointing out that males have more odds of being independent in their activities of daily living.

Among the interviewees, 85 (52.1%) were IADL-independent as shown in Table 2. The mean age of the dependent was 69 years (±9.08), slightly higher than the 65-year independent (±4.64). The 78 (47.9%) participants classified as IADL-independent had the following characteristics: 14.1% claimed they were older than 75 years, 21.8% were women, 45.6% had low education, 30.8% lived with spouses and 9% were widow/widowers,

78.2% lived with one or more individuals and 28.2% earned more than two minimum wages.

The results indicated that IADL-independent individuals tend to be younger older adults, without spouse and family income higher than two minimum wages, while IADL-dependent tend to be older than 75 years of age, low education, with spouse and living with companions. The variable sex presented significant association (*p*=0.040) and dependence was more prevalent in women with PR=1.65; CI95%: 1.08–2.51.

Figure 2 shows that MCA indicates that the axes (Dim 1 and Dim 2) explain 29.79% and 23.65% of the variation among the data, respectively. IADL-dependent individuals are strongly associated with alcohol-use and smoking, suggesting that the use of these substances is a significant factor for high functional dependence and that those who use alcohol and smoke are likely to be more ADL-dependent.

On the other hand, IADL-independent were more frequently associated with non-smoking and non-alcohol use and females. The analysis revealed that women were more likely to be IADL-independent while males were more associated with functional dependence, most of all in combination with smoking and alcohol use.

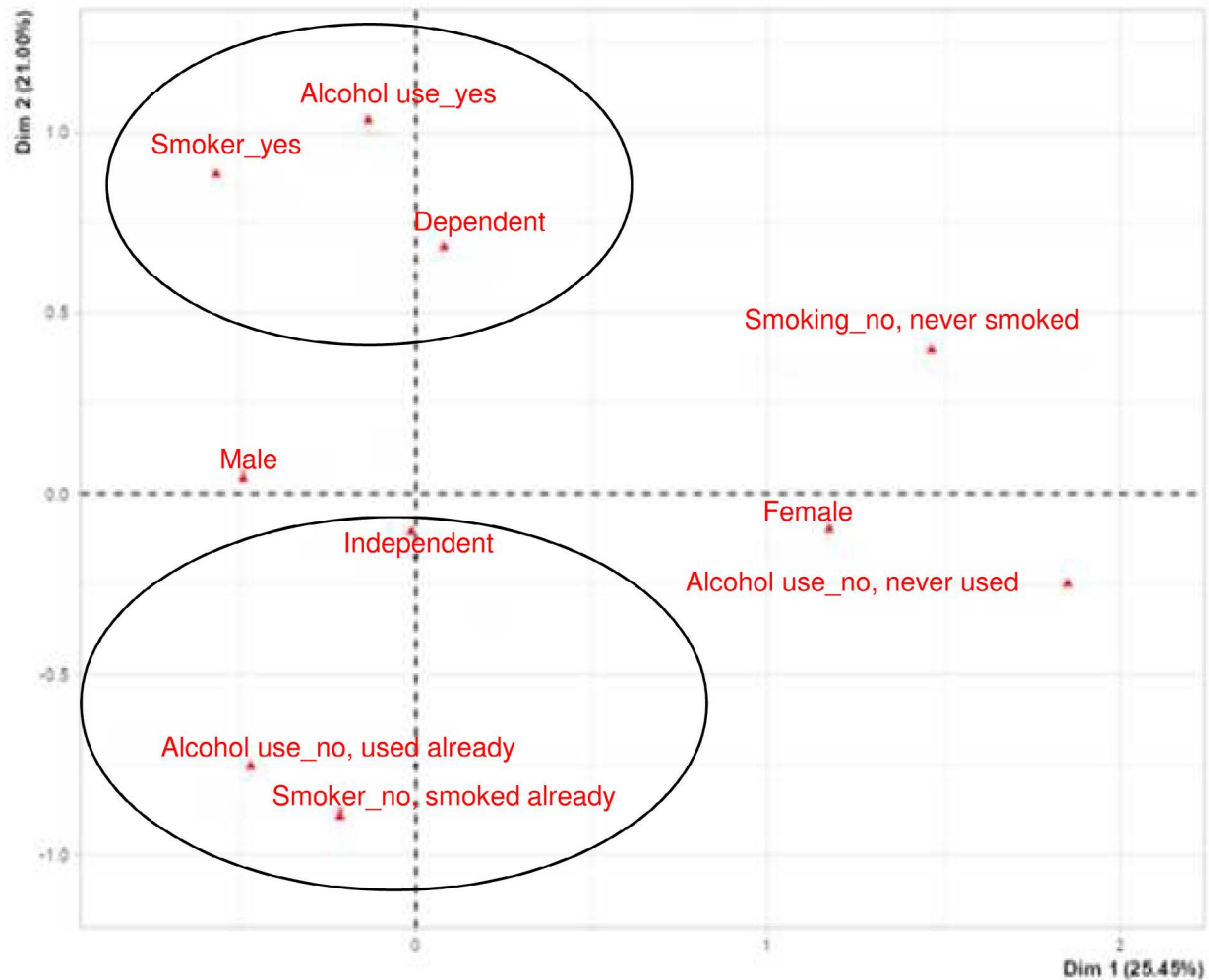## Representation of the categories

Figure 1. Representation of MCA in ADL

The descriptive analysis of Katz scale revealed high functional preservation for all the domains evaluated. The highest means corresponded to activities of standing up from bed/chair (mean = 0.96; SD = ±0.18) and use the bathroom (mean = 0.95; SD = ±0.20), followed by urinary continence (mean = 0.95; SD = ± 0.21) and diet (mean = 0.94; SD = ±0.22). Items like showering (mean = 0.93; SD = 0.25) and dressing (mean = 0.92; SD = 0.26) presented the lowest mean scores, indicating high relative compromise of these tasks. The total mean of the Katz scale was 5.67 (SD = ±1.05), reflecting predominance of ADL independence.

According to the Lawton and Brody[5] scale, which evaluates instrumental activities, it was found more independence in tasks as talking on the telephone (mean = 2.82; SD = ± 0.47), administration of medication (2.74; SD = 0.53) and financial activities (mean = 2.73; SD = ± 0.59). Activities demanding additional physical exertion as laundering (mean = 2.55; SD = ±0.77) and transportation (mean = 2.65; SD = ±0.59) presented lower means, indicating increased functional limitation. The mean total score of IADL was 21.50 (SD = ±4.02), suggesting additional compromise in this domain compared to ADL.

The internal consistency analysis revealed Cronbach's alpha of 0.81 for Katz scale and 0.84 for Lawton and Brody scale[5], showing good reliability of the instruments. In addition, there was moderate and statistically significant correlation among Katz scores (ADL) and Lawton and Brody[5] (IADL) (r = 0.34; $p<0.001$). This finding indicates that increased independence in basic activities is associated with increased independence in instrumental activities, reinforcing the converging validity between the instruments.

The multivariate analysis utilized Poisson's regression with robust variance to estimate PR and respective CI95%. The variables with statistical significance in the bivariate analyzes ($p<0.20$), besides those considered clinically and epidemiologically relevant, were included in the final model.
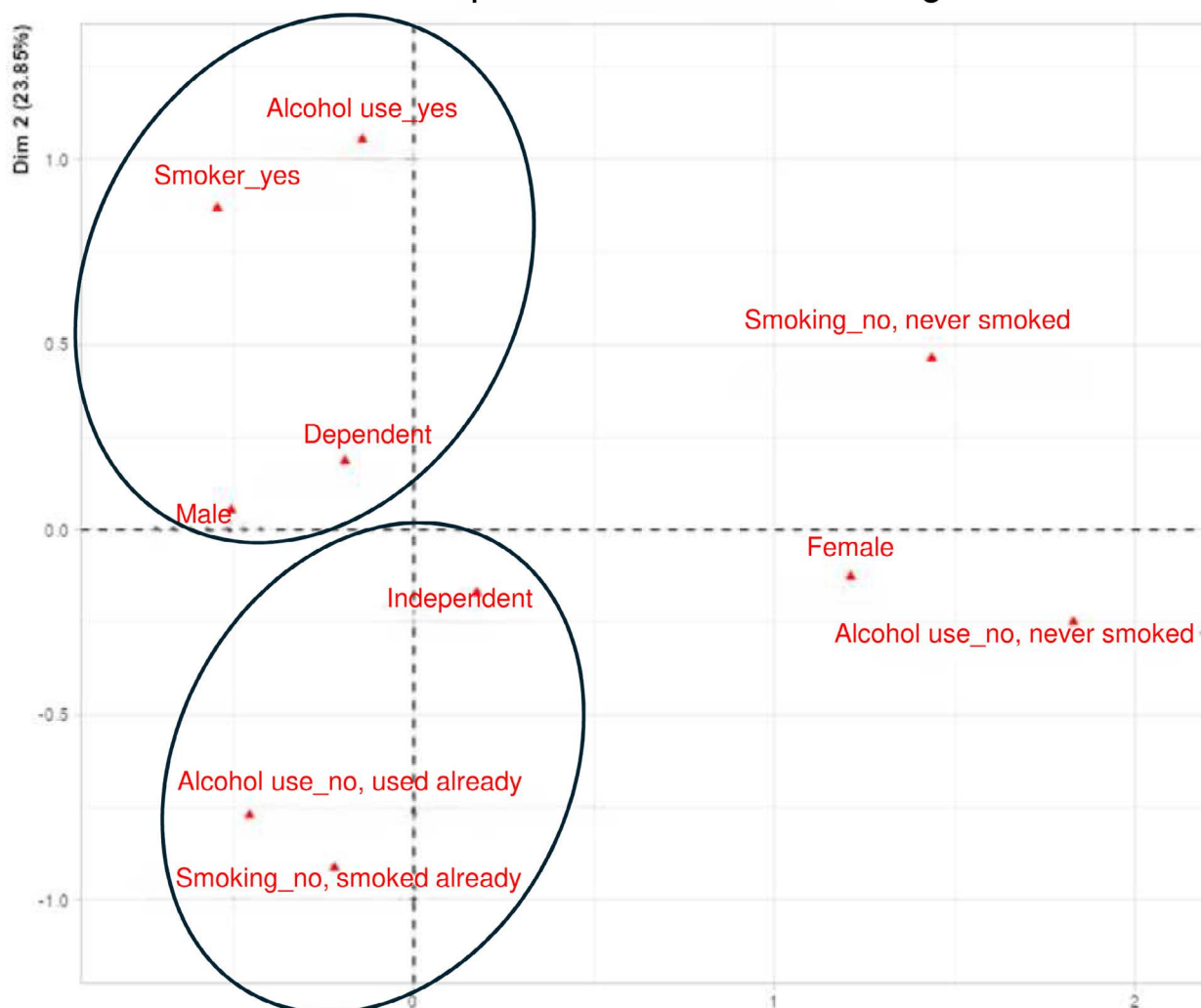
Representation of the categories

Figure 2. Representation of MCA in IADL

Low education was independently associated with functional dependence in ADL with PR of 1.85 (CI95% 1.12–3.04; *p*=0.016). Regarding IADL, women (PR=1.40; CI95% 1.01–2.00; *p*=0.045) and age above 75 years (PR=2.30; CI95% 1.45–3.65 *p*<0.001) were significantly associated with increased prevalence of dependence.

These findings reinforce the impact of sociodemographic factors as education, age and sex over the functionality of older adults with oral cavity and oropharynx cancer even after control of potential confounding variables.

DISCUSSION

It was found a significant prevalence of functional dependence in older adults with oral cavity and oropharynx cancer: 14% were ADL-dependent and 48% were IADL-dependent. These findings strengthen the importance of functionality evaluation of the patients since the ability of performing activities of the daily life is directly associated with the quality of life and autonomy of the older adult.

The predominance of males (70.6%) and mean age of 67 years observed in the present sample concur with the literature which indicates high incidence of these tumors in men, largely because of smoking, alcohol use, factors already described by Hamid[16] and Gatta, Capocaccia and Botta[17]. These factors are associated with functional dependence in ADL and IADL prior to the treatment, indicating negative impact of life style over the general health before oncologic treatment.

The relation between education and functional dependence found in the present study was also observed by Alves, Leimann, Vasconcelos[18] who emphasized the association between low educational level and worst quality of life in older adults with chronic diseases. 76.7% of the study sample had low education that can compromise

both the early detection of the disease and adherence to the treatment. Although family income and marital status had no statistical significance, there was more functional independence among those earning more than two minimum wages, suggesting that the socioeconomic condition can hold indirect influence over the functionality, mainly because of better access to health care.

The analysis of performance of ADL revealed decline of functional independence with ageing, a finding already reported by Duarte, Andrade, Lebrão[4] that tends to be potentialized in patients in oncologic treatment, given that the disease directly affects physical ability and quality of life. Alves, Leimann, Vasconcelos[18] have also found that loss of autonomy is associated with increased dependence in patients with chronic diseases, also applicable to oral cavity and oropharynx cancer.

Geriatric oncology studies indicate consistently that multidimensional geriatric evaluation (MGE), also known as comprehensive geriatric evaluation (CGE) is an essential tool to define the therapeutic conduct for older patients with cancer. The tool aims to qualify oncologic care and support customized therapeutic decisions by examining thoroughly and structurally functional, cognitive, dietary, psychological and social support domains, allowing the identification of hidden vulnerabilities and steer conduct adjustments before the treatment begins[19,20]. Mohile et al.[21] and Brunello, Sandri, Exterman[22] showed that the application of CGE not only helps the choice of the proper treatment but also contributes to reduce complications, optimize therapeutic adherence and preserve the quality of life. The significant prevalence of functional dependence, most of all in IADL identified in the present study, reinforces the appropriateness of this recommendation while revealing that functionality is already compromised in relevant part of the patient's baseline, justifying the systematic utilization of CGE to guide multiprofessional interventions.

The review conducted by Muhandiramge et al.[10] emphasizes the importance of regular functional evaluations to mitigate the functional decay in oncologic patients. The present results concur with this perspective since the prevalence of dependence, most of all in IADL reflects the impact of cancer on the patient's daily life, even without treatment, reinforcing the necessity of systematic functional follow-up in the course of oncologic evaluations.

The comparison with the study of Souza et al.[23] shows that the fragility and functional dependence can be intensified by the association between cancer and ageing, exceeding the effects already described in older adults with comorbidities and polypharmacy. Therefore, monitoring and rehabilitation strategies should consider not only age

and general clinical conditions but also the direct effect of the neoplasm over the functional autonomy.

Another remarkable aspect was the association between functional dependence and smoking/alcohol use. The studies of Alexandrino, Oliveira, Gomes[24] and Ringash et al.[25] pointed out that the interruption of alcohol use and smoking can favor the maintenance of the functionality strengthening the necessity that these risk factors be integrated into oncologic care.

The higher prevalence of functional dependence was observed in older individuals with low education, confirming previous findings about the vulnerability of this population[19]. Therefore, the functional evaluation of patients in treatment for oral cavity and oropharynx cancer should be considered as an essential tool to support multiprofessional interventions mainly targeted to the most susceptible groups to autonomy loss.

The cross-sectional design and the size sample are limitations of the study, potentially impeding the generalization of the results and the impossibility of establishing causal relations among the factors investigated and functional dependence. Longitudinal studies that follow up the evolution of the functionality in the course of the treatment are necessary in addition to the impact of rehabilitation programs and psychosocial support over the patients quality of life.

CONCLUSION

This study analyzed the functionality of older adults with oral cavity and oropharynx cancer in oncologic treatment. The results showed a significant prevalence of functional dependence, most of all in IADL associated with factors as advanced age, low education and hazardous life style as smoking and alcohol use. These findings strengthen the relevance of functional evaluation before the oncologic treatment as essential component of clinical management of this population for better understanding of the patients' profile and planning of multiprofessional strategies to minimize the effects of functional decay and its impact on the autonomy and quality of life of these older adults.

CONTRIBUTIONS

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

DATA AVAILABILITY STATEMENT

All content underlying the text is contained in the manuscript.

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None.

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