

UNIVERSIDADE FEDERAL DA PARAÍBA
CENTRO DE CIÊNCIAS DA SAÚDE
PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA

**DETERMINAÇÃO SOCIOECONÔMICA E ANÁLISE
DE VALORAÇÃO EM SAÚDE PARA O CÂNCER DE
BOCA**

Aldelany Ramalho Freire

SAPIENTIA AEDIFICAT

2023

ALDELANY RAMALHO FREIRE

**DETERMINAÇÃO SOCIOECONÔMICA E ANÁLISE DE
VALORAÇÃO EM SAÚDE PARA O CÂNCER DE BOCA**

**SOCIOECONOMIC DETERMINATION AND HEALTH UTILITY
ANALYSIS FOR ORAL CANCER**

Tese apresentada ao Programa de Pós-Graduação em Odontologia, da Universidade Federal da Paraíba, como parte dos requisitos para obtenção do título de Doutora em Odontologia – Área de Concentração: Ciências Odontológicas.

Orientador: Prof. Dr. Yuri Wanderley Cavalcanti

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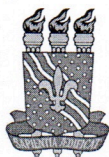
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ATA DA DEFESA PÚBLICA DE TESE DO DOUTORADO

NÚMERO DA DEFESA: 008

2023

Aos dezesseis dias do mês de junho do ano de 2023, às 14:00 horas, no laboratório de odontologia digital do Programa de Pós-graduação em Odontologia e através de uso de recursos à distância, reuniram-se os membros da banca examinadora composta pelas professores doutores: Yuri Wanderley Cavalcanti (Orientador(a) e Presidente), Edson Hilan Gomes de Lucena (membro interno ao Programa de Pós-graduação em Odontologia – UFPB), Simone Alves de Sousa (membro interno ao Programa de Pós-graduação em Odontologia – UFPB), Cassiano Francisco Weege Nonaka (membro externo ao Programa de Pós-graduação em Odontologia – UFPB) e Paulo Sávio Angeiras de Goes (membro externo ao Programa de Pós-graduação em Odontologia – UFPB), a fim de argüem o (a) doutorando (a) Aldelany Ramalho Freire, com relação ao seu trabalho final de curso de doutorado (Tese), sob o título “DETERMINAÇÃO SOCIOECONÔMICA E ANÁLISE DE VALORAÇÃO EM SAÚDE PARA O CÂNCER DE BOCA”. Aberta a sessão pelo presidente da mesma, coube a(o) candidata(o), na forma regimental, expor o tema de sua Tese, dentro do tempo regulamentar. Em seguida, foi questionado pelos membros da banca examinadora, sendo as explicações necessárias fornecidas e as modificações solicitadas registradas. Logo após, os membros da banca examinadora reuniram-se em sessão secreta, tendo chegado ao seguinte julgamento, que, de público, foi anunciado: 1º Examinador (membro externo): Conceito “Aprovado”; 2º Examinador (membro externo): Conceito “Aprovado”; 3º Examinador (membro vinculado ao PPGO): Conceito “Aprovado”; 4º Examinador (membro vinculado ao PPGO): Conceito “Aprovado” e 5º Examinador (Orientador(a) e presidente): Conceito “Aprovado”. O que resultou em conceito final igual: “APROVADO”, o que permite a(o) candidata(o) fazer jus ao título de Doutor em Odontologia. Os documentos utilizados para avaliação da(o) candidata(o) durante o processo aqui descrito apresentam-se como prova documental do mesmo e, como tal, serão anexadas a esta ata para arquivamento. Nada mais havendo a tratar, foi lavrada a presente ata, que será assinada pelo presidente, pelos demais membros da banca e pela(o) candidata(o).

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ATA DA DEFESA PÚBLICA DE TESE DO DOUTORADO
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A Comissão Examinadora do Trabalho Final (Tese) de Curso de Doutorado do Programa de Pós-graduação em Odontologia da Universidade Federal da Paraíba, em sessão pública, após apreciação da apresentação oral e arguição do trabalho:

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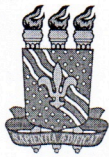
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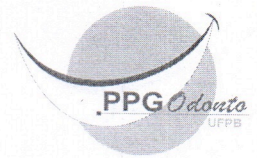
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ATA DA DEFESA PÚBLICA DE DISSERTAÇÃO DE MESTRADO
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João Pessoa, 16 de junho de 2023.

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DEDICATÓRIA

*Aos meus pais, **Aldenir e Josineuda**, cujo amor e cuidado me fizeram ter
confiança para navegar por esse mundo afora.
Minha eterna gratidão por ser filha de vocês.
Nós conseguimos!*

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RESUMO

A elucidação do papel dos fatores socioeconômicos sobre o acometimento dos indivíduos pelo câncer de boca pode subsidiar a implantação de políticas públicas de proteção social. Estudos de economia da saúde são úteis para garantir o uso racional dos recursos perante os contextos sociais dos usuários, tornando as políticas implantadas mais efetivas. Objetivou-se investigar a influência de fatores socioeconômicos sobre taxas de câncer de boca, além de realizar uma análise de valoração em saúde acerca da doença. Trata-se de estudo quantitativo, analítico, com cinco planos de análise (PA). O PA 1 avaliou o efeito de fatores socioeconômicos na frequência de diagnósticos de alterações de mucosa oral e no número de hospitalizações por câncer de boca e orofaringe no Brasil. O PA 2 avaliou a influência de indicadores socioeconômicos e investimentos sobre taxas de mortalidade por câncer bucal na América Latina. O PA 3 verificou o efeito da cobertura de serviços públicos de saúde bucal e indicadores socioeconômicos na frequência de hospitalizações e mortalidade pelo câncer no Brasil. O PA 4 avaliou o impacto de características sócio-demográficas sobre a prevalência de câncer de boca em estágio clínico avançado no Brasil. Nestes estudos ecológicos, os dados foram provenientes de sistemas de informação oficiais, de acesso público. Foram calculadas associações significativas entre variáveis independentes e desfechos, utilizando modelos de regressão multivariada e considerando $p < 0,05$ e IC95%. O PA 5 consistiu em estudo de campo de valoração em saúde para o câncer de boca, verificando a influência do contexto socioeconômico e de saúde bucal, por meio de Aposta Padrão (AP) e Disponibilidade a Pagar (DAP). Regressões multivariadas de Poisson e Binomial Negativa foram desenvolvidas, considerando $p < 0,05$ e IC95%. Nos resultados do PA 1, verificou-se maior frequência de diagnósticos de alterações de mucosa oral em cidades mais desenvolvidas ($B=11,298$; $p < 0,001$) e com maior desigualdade ($B=11,614$; $p < 0,001$), ao mesmo tempo em que cidades com maior desigualdade ($B=8,159$; $p < 0,001$), maior proporção de saneamento básico inadequado ($B=0,09$; $p=0,001$), menor expectativa de anos de estudo ($B=-0,718$; $p < 0,001$) e maiores taxas de analfabetismo ($B=0,191$; $p < 0,001$) tiveram maior frequência de pacientes hospitalizados com câncer de boca e orofaringe. Para o PA 2, indivíduos do sexo masculino, com 60 anos ou mais (RP =14,7), residentes em países com maior desigualdade (RP=1,05), maior gasto com saúde per capita (RP =1,09) e maiores

investimentos em pesquisa e desenvolvimento (RP=1,81), foram associados à maior taxa de mortalidade por câncer bucal na América Latina. No PA 3 foi verificado que cidades brasileiras com maiores população e Índice de Desenvolvimento Humano, mais desiguais e com menor cobertura de serviços de saúde bucal tiveram maior risco de ocorrência de casos e de frequência de óbitos pelo câncer de boca ($p<0,001$). O PA 4 demonstrou uma maior prevalência de câncer de boca em estágio clínico avançado no Brasil em indivíduos com maior escolaridade (OR=2,46; OR=3,05), ausência de parceiro (OR=14,20) e mais velhos (OR=4,08; OR=14,87). Quanto à valoração em saúde para o câncer de boca, no PA 5, participantes mais jovens ($B=-0,250$; $p=0,023$) e com menor escolaridade ($B=-0,767$; $p<0,001$) demonstraram menor AP para um possível tratamento. Para a DAP, indivíduos do sexo masculino ($B=-1,821$; $p<0,001$), com menor renda ($B=-1,396$; $p=0,016$) e maior impacto da saúde bucal na qualidade de vida ($B=-0,066$; $p<0,001$) estariam dispostos a pagar menos por um tratamento. Conclui-se que os fatores socioeconômicos estão fortemente associados ao diagnóstico, hospitalizações e óbitos pelo câncer de boca, sendo a desigualdade, escolaridade, oferta de serviços de saúde bucal, sexo e idade fatores de relevância. Além disso, o contexto socioeconômico influencia nas preferências e decisões dos indivíduos em relação aos cuidados de saúde e tratamentos para o câncer de boca.

Palavras-chave: Neoplasias bucais; Determinantes Sociais da Saúde; Cobertura de Serviços de Saúde; Equidade em Saúde; Economia da Saúde.

ABSTRACT

The elucidation of the role of socioeconomic factors on the involvement of individuals by oral cancer can support the implementation of public policies for social protection. Health economics studies are useful to ensure the rational use of resources, given the social contexts of users, making implemented policies more effective. The objective was to investigate the influence of socioeconomic factors on oral cancer rates, in addition to performing a health valuation analysis about the disease. This is a quantitative, analytical study, with five analysis plans (AP). AP 1 evaluated the effect of socioeconomic factors on the frequency of diagnoses of oral mucosa alterations and the number of hospitalizations for oral and oropharyngeal cancer in Brazil. AP 2 assessed the influence of socioeconomic indicators and investments on oral cancer mortality rates in Latin America. AP 3 verified the effect of coverage of public oral health services and socioeconomic indicators on the frequency of hospitalizations and cancer mortality in Brazil. AP 4 assessed the impact of socio-demographic characteristics on the prevalence of oral cancer at an advanced clinical stage in Brazil. In these ecological studies, the data came from official information systems, with public access. Significant associations between independent variables and outcomes were calculated using multivariate logistic regression models, considering $p < 0,05$ and 95%CI. AP 5 consisted of a field study of health utility analysis for oral cancer, verifying the influence of socioeconomic context e oral health status, through Standard Gamble (SG) and Willingness to Pay(WTP). Multivariate Poisson and Negative Binomial regressions were developed, considering $p < 0.05$ and 95%CI. Results of AP 1 demonstrated a higher frequency of diagnoses of mucosal changes and hospitalization of patients with oral cancer in more developed cities ($B=11,298$; $p < 0,001$) and with greater inequality ($B=11,614$; $p < 0,001$) in Brazil, while cities with greater inequality ($B=8,159$; $p < 0,001$), higher proportion of inadequate basic sanitation ($B=0,09$; $p=0,001$), lower expectation of years of schooling ($B=-0,718$; $p < 0,001$) and higher illiteracy rates ($B=0,191$; $p < 0,001$) had a higher frequency of hospitalized patients with oral and oropharyngeal cancer. In AP 2, male individuals, aged 60 years or older ($PR=14,7$), residing in countries with greater inequality ($PR=1,05$), higher per capita health spending ($PR = 1,09$) and higher investments in research and development ($PR = 1,81$), were associated with a higher mortality rate from oral cancer in Latin America. The AP 3 verified that

Brazilian cities with larger population and Human Development Index, more unequal and with lower coverage of oral health services had a higher risk of occurrence of cases and frequency of deaths from oral cancer. Regarding AP 4, a higher prevalence of oral cancer in advanced clinical stage in Brazil was observed in individuals with higher education, no partner and older ($p < 0,001$). For health utility analysis of oral cancer (AP 5) younger participants ($B = -0,250$; $p = 0,023$) and those with less schooling ($B = -0,767$; $p < 0,001$) showed lower SG for a possible treatment. For WTP, male individuals ($B = -1,821$; $p < 0,001$) with lower income ($B = -1,396$; $p = 0,016$) and greater impact of oral health on quality of life ($B = -0,066$; $p < 0,001$) would be willing to pay less for a treatment. It is concluded that socioeconomic factors are strongly associated with diagnoses, hospitalizations and deaths due to oral cancer, with inequality, low education, offer of oral health services, gender and age being relevant factors. In addition, the socioeconomic context influences in preferences and decisions of individuals regarding health care and treatments for oral cancer.

Keywords: Mouth Neoplasms; Social Determinants of Health; Health Services Coverage; Health Equity; Health Care Economics and Organizations.

LISTA DE ABREVIATURAS E SIGLAS

AP – Aposta Padrão;

CDB – Carga de Doença Bucal;

CEP – Comitê de Ética em Pesquisa;

CNS/MS – Conselho Nacional de Saúde/Ministério da Saúde;

DAP – Disponibilidade a Pagar;

EED – Experimentos de Escolha Discreta;

IC – Intervalo de Confiança;

IDH – Índice de Desenvolvimento Humano;

PA – Plano de análise;

RP – Razão de Prevalência;

SPSS – Statistical Package for Social Sciences;

SUS – Sistema Único de Saúde;

INCA – Instituto Nacional do Câncer;

KMO – Kaiser-Meyer-Olkin;

OHIP-14 – Oral Health Impact Profile-14;

TCLE – Termo de Consentimento Livre e Esclarecido;

VC – Valoração Contingente.

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1. INTRODUÇÃO

O câncer de boca corresponde à 16ª neoplasia mais frequente no mundo, e a redução de suas taxas de morbidade e mortalidade representa uma prioridade para a saúde pública mundial, especialmente nos países emergentes (MIRANDA-FILHO; BRAY, 2020). No Brasil, estima-se um risco de 15.100 casos novos para cada ano do triênio 2023-2025 (INCA, 2023). A doença é mais prevalente em indivíduos do sexo masculino, com faixa etária acima de 40 anos (LINS et al., 2019).

Tabagismo e alcoolismo são reportados como os principais fatores de risco da neoplasia (BEZERRA et al., 2018; CONWAY; PURKAYASTHA; CHESTNUTT, 2018; INCA, 2022). Exposição crônica à radiação solar, infecção pelo papilomavírus humano, desnutrição e imunossupressão também são fatores etiológicos relevantes (ROCHA et al., 2017; CONWAY; PURKAYASTHA; CHESTNUTT, 2018).

Ainda, a literatura tem discutido a influência do contexto social e econômico no qual os indivíduos estão inseridos sobre o adoecimento pelo câncer de boca (MOI et al., 2018). Nesse sentido, a seguinte discussão tem sido levantada: a privação socioeconômica pode ser considerada como fator de risco determinante para o câncer de boca? O conhecimento sobre o tema ainda é considerado limitado e alguns resultados controversos têm sido reportados (ROCHA et al., 2017).

O uso racional e eficiente dos recursos, de acordo com as preferências e as decisões dos indivíduos em relação aos cuidados de saúde, é fundamental para tornar as políticas públicas de saúde mais efetivas. Estudos em economia da saúde permitem um melhor planejamento das ações e programas. Destacam-se os estudos de valoração em saúde, que se propõem a analisar as preferências de indivíduos por determinados resultados de saúde, frente a condições de incerteza. Nessa perspectiva, a Disponibilidade a Pagar (DAP) e a Aposta Padrão (AP), implicam, respectivamente, no valor máximo investido e o sacrifício que estariam dispostos a fazer por uma intervenção (ACHARYA et al., 2019).

Portanto, este estudo se justifica pela necessidade de monitoramento constante das taxas de câncer de boca em países emergentes, bem como de elucidação sobre o papel determinante do contexto socioeconômico sobre a

doença. Dessa forma, busca-se subsidiar a tomada de decisões e a implantação de políticas públicas de proteção social intersetoriais e de combate ao câncer de boca, reduzindo assim sua morbimortalidade. Além disso, a análise de valoração em saúde pode auxiliar o planejamento e implantação dessas políticas, sendo também importante verificar se condições socioeconômicas individuais interferem nas preferências dos indivíduos, buscando mitigar as iniquidades em saúde existentes.

2. REVISÃO DA LITERATURA

O câncer de boca é uma doença complexa. Tal complexidade é exibida desde sua definição, uma vez que, mundialmente, não há um consenso sobre as estruturas anatômicas que a compõem. O Instituto Nacional do Câncer (INCA) considera as localizações anatômicas C00-C10, segundo CID-10, compreendendo lábio, cavidade oral, glândulas salivares e orofaringe (INCA, 2023). Além disso, a doença tem impacto significativo na qualidade de vida dos acometidos, os quais são frequentemente afetados por mutilações, limitações funcionais e dor crônica, necessitando de acentuada atenção por parte do sistema de saúde (VALDEZ; BRENNAN, 2018).

Estudos epidemiológicos, conduzidos em diferentes países, encontraram associações entre piores condições socioeconômicas e maiores taxas de câncer de boca (THEKKEPURAKKAL et al., 2018; SAKAMOTO et al., 2019; RAVAGHI et al., 2020). Nestes estudos, a desigualdade socioeconômica e a baixa escolaridade foram fatores frequentemente associados a piores indicadores da doença.

Um estudo reuniu dados de 21 países e verificou que a baixa escolaridade esteve associada a um risco aumentado de câncer de cabeça e pescoço, e um terço do aumento do risco não foi explicado por diferenças na distribuição de hábitos de consumo de cigarro e álcool, permanecendo elevado entre os indivíduos que nunca fumaram e que não bebem (CONWAY et al., 2015).

Outro estudo mais recente desenvolvido no Brasil encontrou associação entre maior nível de educação, maior Índice de Desenvolvimento Humano e maior Renda *per capita* com menor mortalidade por câncer de boca. Além disso, verificou que áreas com maior cobertura de política pública de distribuição de renda (Bolsa Família) apresentaram menor taxa de mortalidade pela doença (COSTA et al., 2022).

Uma revisão sistemática com meta-análise de estudos caso-controle previamente desenvolvida considerou a influência da renda familiar mensal, classe social e nível educacional sobre o risco de desenvolvimento do câncer de boca. Foi verificado que a privação socioeconômica pôde ser considerada como

fator de risco determinante, de magnitude comparável aos fatores relacionados ao estilo de vida (CONWAY et al., 2008).

É preciso considerar que o consumo de tabaco/álcool e hábitos de vida deletérios são mais elevados entre indivíduos em situação de vulnerabilidade socioeconômica, os quais também possuem dificuldade no acesso regular aos serviços de saúde (HERRERA-SERNA et al., 2019). Assim, a frequência de diagnósticos tardios é maior nesses grupos, resultando em casos mais graves e com maior mortalidade (FERLAY et al., 2015). Dessa forma, ainda não está totalmente elucidado se o contexto socioeconômico pode atuar como “a causa da causa”, influenciando comportamentos de risco (CONWAY; PURKAYASTHA; CHESTNUTT, 2018).

O esclarecimento do impacto de fatores socioeconômicos no acometimento da população pelo câncer de boca mostra-se essencial para o direcionamento de intervenções de saúde e o entendimento da proteção social como medida de saúde pública (ROCHA et al., 2017). A implantação de ações de combate às desigualdades sociais e de políticas públicas de prevenção, diagnóstico precoce e acesso ao tratamento podem contribuir para a redução das taxas de câncer na população e combate às iniquidades em saúde (FERREIRA et al., 2012).

As políticas públicas de saúde requerem ousadia racional e eficiente dos recursos, especialmente após os cenários recentes de limitação de investimentos governamentais em diversos países (ROSSI et al., 2019). Estudos de valoração em saúde (utilidade) permitem conhecer o sacrifício máximo que um indivíduo está preparado a fazer por determinado resultado de saúde. Assim, conhecer o risco tolerado pelos pacientes pode fornecer informações sobre o valor que eles atribuem a determinados problemas de saúde bucal, orientando a prestação da assistência à saúde (LEUNG; MCGRATH, 2010; ACHARYA et al., 2019).

O método da Aposta Padrão consiste na escolha entre viver com certeza em determinado estado de saúde (sendo hipoteticamente acometido por determinada doença) ou apostar em uma nova intervenção, cujo resultado é desconhecido (optar por um novo tratamento, com a possibilidade de retornar ao seu perfeito estado de saúde, ou ser mal sucedido, levando a sua morte). O participante deve, então, responder qual a taxa mínima de sucesso necessária para aceitação do

novo tratamento. A AP pode variar de 0 a 1 e, quanto menor o escore, menor o risco tolerado (TORRANCE, 1976; ACHARYA et al., 2019).

O método da Disponibilidade a Pagar consiste em avaliar a força de preferência de um indivíduo por uma intervenção, baseada no valor máximo (em dinheiro) que este estaria disposto a sacrificar para tal objetivo (SERVER; VERBIČ; SERVER, 2020).

A literatura aponta que a AP e DAP podem ser influenciadas por diferentes fatores, tais como experiência pessoal do paciente, nível cognitivo, aversão à perda, tendência em superestimar um possível sofrimento causado por novos tratamentos, entre outros fatores subjetivos (BLEICHRODT, 2001). Além disso, foi reportado que o contexto individual e socioeconômico, evidenciado especialmente pelo gênero, renda e escolaridade, também exerceram influência (ATCHISON, 2007; SRIVASTAVA; FEINE; ESFANDIARI, 2014; SENDI et al., 2017).

Um estudo recente empregou a Aposta Padrão para mensurar a valoração em saúde bucal na dentição permanente, comparando os valores obtidos para um grupo de profissionais da Odontologia e um grupo de pacientes, bem como entre gêneros. Foi verificado que os dentistas apresentaram maiores valores de utilidade (efetividade mínima) em todas as condições de saúde avaliadas. Não houve diferença estatisticamente significantes entre homens e mulheres (ALHARTHI et al., 2022).

Um estudo conduzido na Finlândia avaliou a Disponibilidade a Pagar por gastos odontológicos inesperados e de urgência. Os autores compararam a DAP para procedimentos realizados no setor privado e no serviço público odontológico, o qual disponibiliza tratamentos a preços mais baratos naquele país. Além disso, verificaram fatores que exerceram influência na DAP. Alta renda e ausência de necessidade subjetiva de tratamento estiveram positivamente associadas com maior probabilidade de pagar um preço mais alto. Os autores concluíram, ainda, que o acesso ao serviço público melhorou a equidade para pessoas com baixa renda (WIDSTRÖM; SEPPÄLÄ, 2012).

Estudos de utilidade em saúde voltados para o câncer de boca têm sido desenvolvidos na perspectiva de escolha de modalidades de tratamentos

disponíveis, nos quais as ferramentas de Aposto Padrão e Disponibilidade a Pagar são utilizadas (SOUZA et al., 2014; NOEL et al., 2015). Entretanto, não foram identificados na literatura estudos com a presente abordagem desenvolvida, a qual considera a doença em seu aspecto geral e enfatiza questões contextuais do indivíduo sobre suas preferências. Além disso, não há questionários sobre o tema validados para o Brasil.

3. OBJETIVOS

3.1. OBJETIVO GERAL

Investigar a influência de fatores socioeconômicos sobre taxas de câncer de boca, além de realizar uma análise de valoração em saúde acerca da doença.

3.2. OBJETIVOS ESPECÍFICOS

- Avaliar o efeito de fatores socioeconômicos na frequência de diagnósticos de alterações de mucosa oral e no número de hospitalizações por câncer de boca e orofaringe no Brasil;
- Avaliar a influência de indicadores socioeconômicos e investimentos sobre taxas de mortalidade por câncer bucal na América Latina;
- Verificar o efeito da cobertura de serviços públicos de saúde bucal e indicadores socioeconômicos na frequência de hospitalizações e mortalidade pelo câncer de boca no Brasil;
- Avaliar o impacto de características sócio-demográficas sobre a prevalência de câncer de boca em estágio clínico avançado no Brasil;
- Analisar a valoração em saúde para o câncer de boca por meio de Aposta Padrão e Disponibilidade a Pagar;
- Verificar a influência do contexto individual e socioeconômico sobre a Aposta Padrão e Disponibilidade a Pagar para o tratamento do câncer de boca.

4. ARTIGO 1

O manuscrito a seguir foi submetido para publicação no periódico “Brazilian Oral Research” e aceito na data de 20/10/2020.

Diagnosis of mucosal changes and hospitalized oral cancer patients in Brazil: influence of socioeconomic factors

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Abstract: This study aimed to analyze the influence of socioeconomic factors on the frequency of diagnoses of oral mucosal changes and the number of hospitalized patients with oral and oropharyngeal cancer in Brazil. This cross-sectional study analyzed data from all Brazilian cities in the period 2011–2017. The frequency of diagnoses of oral mucosal changes and the number of hospitalized patients of oral and oropharyngeal cancer in Brazil were extracted from the Primary Care Information System (SIAB) and Brazilian National Cancer Institute (INCA) databases. The socioeconomic factors evaluated were the Gini coefficient of inequality, municipal Human Development Index (MHDI), inadequate basic sanitation rate, employment rate, illiteracy rate and expected years of schooling. Associated factors were examined using bivariate Spearman's correlations and multivariate Poisson regressions, and statistically significant ($p < 0.05$) correlations between study variables and regression coefficients were obtained. A higher frequency of diagnoses of mucosal changes was observed in cities with a higher Gini coefficient ($B = 11.614$; $p < 0.001$), higher MHDI ($B = 11.298$; $p < 0.001$), and higher number of hospitalized patients with oral and oropharyngeal cancer ($B = 0.001$, $p < 0.002$). Cities with higher Gini coefficients ($B = 8.159$, $p < 0.001$), higher inadequate basic sanitation rates ($B = 0.09$, $p = 0.001$), lower expected years of schooling ($B = -0.718$, $p < 0.001$), and higher illiteracy rates ($B = 0.191$, $p < 0.001$) had a higher frequency of hospitalized patients with oral and oropharyngeal cancer. In conclusion, more developed cities showed a higher frequency of diagnoses of mucosal changes. Greater inequality and worse socioeconomic conditions are associated with a higher frequency of hospitalized patients with oral and oropharyngeal cancer in Brazil.

Keywords: Mouth Neoplasms; Diagnosis, Oral; Socioeconomic Factors.

Introduction

Lip and oral cavity cancer is one of the most prevalent cancers worldwide; it was estimated to be the 16th most common type of cancer in 2018.^{1,2} Oropharynx and salivary gland cancer lesions are also frequent and among the thirty most incident cases of cancer in Brazil.² When considering lip, oral cavity, oropharynx and salivary gland cancer cases, Brazil has an age-standardized rate of 6.5 new cases per

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100,000 inhabitants.² The incidence of the disease is higher for males and individuals over 60 years of age.^{3,4,5} In recent decades, however, there has been a reduction in the number of affected men compared to women³ as well as an increase in the number of cases among young adults younger than 45 years old.^{4,6}

Several factors are associated with the prevalence of oral cancer, including nonmodifiable factors (such as sex and age) and modifiable factors (lifestyle).^{5,7} Smoking and alcohol consumption are considered the main risk factors.^{8,9,10} Infection by human papillomavirus, solar radiation, immunosuppression and unhealthy eating habits are also relevant etiological factors.^{7,8,11} Furthermore, the literature reports the influence of environmental factors resulting from the social and economic contexts of individuals.^{12,13}

Studies suggest that oral cancer is more prevalent among individuals exposed to unfavorable socioeconomic conditions and those living in socially disadvantaged areas marked by inequality^{8,12}. Thus, socioeconomic vulnerability acts as a risk factor comparable to those related to lifestyle¹³. The difficulty in regular access to health care and the greater prevalence of smoking and alcohol consumption, poor nutrition and greater exposure to occupational risk factors may explain this relationship.^{8,12,14,15} Recognition of the important role of socioeconomic factors in the development of oral cancer in a population is essential for targeting intersectoral interventions and reducing cancer rates.^{13,16,17}

Brazil is a developing country of continental size that is affected by social inequalities and a mixed population. Approximately 75% of the population is dependent on the public health system, but only 40% are registered for primary health care through the Family Health Strategy.¹⁸ Within the public healthcare sector in Brazil, measures are available for the diagnosis and treatment of cancer, but access to healthcare services is unequal.^{18,19,20}

Given the above, the aim of this study was to analyze the influence of socioeconomic indicators on the frequency of diagnoses of oral mucosal changes and the number of hospitalized patients with oral and oropharyngeal cancer in Brazilian cities. This study also included analysis of factors associated

with the frequency of hospitalization in those with cancer lesions in the following sites: lip and oral cavity (C-00 to C-06), salivary glands (C-07 to C-09) and oropharynx (C-10). Analysis of socioeconomic factors should contribute to the identification of risk factors, and such information can be used for adjusting public policies in Brazil as well as in other countries and populations.

Methodology

An observational, cross-sectional and ecological study was conducted for the period between 2011 and 2017. All Brazilian cities were included (n=5565). The main outcome variables for this study were the number of diagnoses of mucosal changes in the Primary Care Information System (SIAB - <http://tabnet.datasus.gov.br/cgi/defctohtm.exe?siab/cnv/siabobr.def>) and the number of hospitalized patients with oral and oropharyngeal cancer according to the Hospital-Based Cancer Registry database of the Brazilian National Cancer Institute (INCA-HRC - <https://irhc.inca.gov.br/RHCNet/visualizaTabNetExterno.action>).

The number of diagnoses of mucosal changes was obtained from the national database of the SIAB, which is linked to the primary care services of the Brazilian public health system. The diagnosis of mucosal changes consists of a clinical procedure in which the dentist of primary care detects oral lesions during routine examination or during campaigns. According to the SIAB, mucosal changes can be nonneoplastic proliferative processes, benign neoplasms, malignant neoplasms, infectious diseases (bacterial, fungal or viral), mucocutaneous diseases and oral manifestations of systemic diseases. This variable represents the sum of individuals with oral mucosa changes between 2011 and 2015 for each municipality.

The sum of cases of oral and oropharyngeal cancer involving hospitalization registered between 2011 and 2017 was retrieved from the INCA-HRC according to the municipality of residence. Cities that did not have any case of cancer within the period of study were set at zero frequency of cases but were not excluded from the analysis. The following cancer sites (C-00 to C-10) were considered: lip, base of

tongue, tongue, gingiva, floor of the mouth, palate, other unspecified parts of the mouth, parotid gland, other major salivary glands, tonsils, and oropharynx. The frequency of hospitalized patients with cancer located primarily in the lip and oral cavity (C-00 to C-06), salivary glands (C-07 to C-09) and oropharynx (C-10) was also retrieved from the INCA-HRC. All types of lesions were included, regardless of the degree of staging. A preliminary analysis of cancer data revealed that 90.2% of the cases corresponded to cases of squamous cell carcinoma.

The independent variables comprised socioeconomic information regarding the Gini coefficient of inequality, municipal Human Development Index (MHDI), inadequate basic sanitation rate (percentage of residences without water and sewage supply within the city), employment rate for individuals older than 18 years of age (percentage of employed individuals above 18 years old), illiteracy rate for individuals aged 15 years old or older (percentage of individuals above 15 years who do not know to write and read), and expected years of schooling (average years of schooling expected for a population). Data were obtained from the panel of socioeconomic indicators of Brazilian cities available at the Human Development Atlas of Brazil (<http://atlasbrasil.org.br>), which is linked to the United Nations Development Program (UNDP). These data correspond to the year 2010.

The data were tabulated and analyzed using IBM Statistical Package for Social Sciences (IBM SPSS, v. 24, IBM, Chicago, USA). Bivariate correlations between dependent and independent variables were obtained using Spearman's correlation test ($p < 0.05$). Bivariate and multivariate Poisson regressions were performed considering the number of diagnoses of mucosal changes and the number of hospitalized patients with oral and oropharyngeal cancer as dependent variables. The number of inhabitants in the Brazilian cities (2010 population, according to <http://atlasbrasil.org.br>) was used to weight the effect of multivariate regressions. All independent variables were included in the crude multivariate Poisson regression model, followed by a stepwise backward approach. Only variables with a p -value < 0.20 were included in the adjusted multivariate Poisson regression model.

Variables with a p -value < 0.05 in the adjusted model were considered statistically significant. The incident rate ratio (IRR) and confidence interval (95%CI) were obtained for the crude and adjusted models. Regression coefficient B was used to estimate the effect of each independent variable on the dependent variable, considering $p < 0.05$.

Adjusted multivariate Poisson regression models were also obtained for each group of cancer sites using similar modeling and adjustment approaches. The number of hospitalized patients with cancer in the lip and oral cavity (C-00 to C-06), salivary glands (C-07 to C-09) and oropharynx (C-10) were analyzed according to the independent variables under study by using the population size as the weighting effect and the stepwise backward modeling approach.

The procedures for the diagnosis of mucosal changes and the number of hospitalized patients with oral and oropharyngeal cancer were spatially distributed according to the cartographic database of the Brazilian territory (available at <http://datasus.saude.gov.br/cadastrros-nacionais/294-download-mapas-tabwin>). The total number of records for the period was exported to the cartographic database according to the code for each municipality. The distribution considered the stratification of values into quartiles. The free software Tabwin/DATASUS was used to map the frequency distribution.

Results

The number of cities that registered diagnoses of oral mucosal changes between 2011 and 2015 was 3,815 (68.6%). Between 2011 and 2017, 4,252 cities (76.4%) registered at least one case of oral and oropharyngeal cancer involving hospitalization. The descriptive data for cities included in the multivariate analysis are presented in Table 1.

Cities without data for "Inadequate basic sanitation rate" and "Illiteracy rate for individuals 15 years of age or older" were excluded from the analysis. The final sample consisted of 5008 cities. Bivariate correlation analysis showed that the number of diagnoses of oral mucosal changes in primary healthcare had a significant correlation ($p < 0.05$) with the number of hospitalized patients with oral and oropharyngeal

Table 1. Descriptive data of dependent, independent and weight variables considered for analysis.

Variables	n	mean	SD	min.	max.
Dependent variables					
Diagnosis of oral mucosal changes (absolute frequency)	5008	76.78	473.63	0	17690
Hospitalized patients with oral and oropharyngeal cancer (absolute frequency)	5008	9.92	61.83	0	3723
Cancer cases according to primary sites					
Oral cavity (C-00 to C-06) (absolute frequency)	5008	8.74	50.65	0	2649
Salivary Glands (C-07 to C-09) (absolute frequency)	5008	2.01	12.74	0	690
Oropharynx (C-10) (absolute frequency)	5008	2.45	15.73	0	799
Covariate independent variables					
Gini's inequality coefficient	5008	0.50	0.06	0.29	0.80
Municipality's Human Development Index	5008	0.65	0.07	0.42	0.85
Inadequate basic sanitation rate (%)	5008	9.99	13.08	0.01	85.36
Employment rate for individuals over 18 years of age (%)	5008	62.93	9.08	21.18	95.60
Illiteracy rate for individuals 15 years of age or older (%)	5008	16.79	9.91	44.40	0.95
Expected years of schooling (years)	5008	9.38	1.07	4.34	12.83
Scale Weight					
Population (absolute frequency)	5008	36,440.55	212,484.47	805	11,253,503

n: sample size considered for analysis; SD: standard deviation; min.: minimum value; max.: maximum value.

Table 2. Spearman's bivariate correlation matrix for dependent and independent variables.

Variables	Diagnosis of oral mucosal changes			Hospitalized patients with oral and oropharyngeal cancer		
	ρ	p-value	n	ρ	p-value	n
Diagnosis of mucosal changes in primary care	-	-	5008	0.304	< 0.001	5008
Hospitalized patients with oral and oropharyngeal cancer	0.304	< 0.001	5008	-	-	5008
Gini's inequality coefficient	0.090	< 0.001	5008	-0.067	< 0.001	5008
Municipality's Human Development Index	0.068	< 0.001	5008	0.329	< 0.001	5008
Inadequate basic sanitation rate	0.030	0.037	5008	0.233	< 0.001	5008
Employment rate for individuals over 18 years of age	0.016	0.251	5008	0.194	< 0.001	5008
Illiteracy rate for individuals 15 years of age or older	0.018	0.206	5008	0.308	< 0.001	5008
Expected years of schooling	0.009	0.505	5008	0.112	< 0.001	5008

ρ : Spearman's correlation coefficient; p-value < 0.05 indicates a statistically significant correlation; N: sample size considered for analysis.

cancer and with the Gini coefficient of inequality, MHDI and inadequate basic sanitation (Table 2). The number of hospitalized patients with oral and oropharyngeal cancer reported by the INCA showed a statistically significant correlation ($p < 0.05$) with all studied variables (Table 2).

Multivariate Poisson regression confirmed that Gini's inequality coefficient, the MHDI and the number of hospitalized patients with oral and oropharyngeal

cancer had a statistically significant association ($p < 0.05$) with the number of diagnoses of oral mucosal changes (Table 3). A higher frequency of diagnoses of mucosal changes was observed in cities with higher inequality, a higher MHDI, and a higher frequency of hospitalized patients with oral and oropharyngeal cancer.

According to the multivariate regression model (Table 4), cities with higher inequality, a higher

Table 3. Bivariate and multivariate Poisson regressions to determine the effect of independent variables (socioeconomic factors) on the frequency of oral mucosal changes, as based on the records of primary care services of the Brazilian public healthcare system.

Variables	Bivariate		Crude multivariate model				Adjusted multivariate model			
	p-value	IRR (95%CI)	B	p-value	IRR	95%CI	B	p-value	IRR	95%CI
Gini's inequality coefficient	< 0.001	6.17×10^7 (1.51×10^7 – 2.52×10^8)	12.484	0.001	264107.53	233.59 – 29.86×10^7	11.614	<0.001	110610.14	998.65 – 1.22×10^7
Municipality's Human Development Index	< 0.001	1.37×10^{11} (2.59×10^6 – 2.29×10^{15})	8.844	0.246	6.935.501	0.002 – 21.38×10^9	11.298	<0.001	80699.15	509.48 – 5.27×10^6
Inadequate basic sanitation	0.065	1.233 (0.987–1.540)	0.006	0.892	1.006	0.922–1.097				
Employment rate for individuals over 18 years of age	< 0.001	1.069 (1.031–1.107)	-0.021	0.479	0.980	0.925–1.037				
Expected years of schooling	0.001	1.789 (1.262–2.536)	0.191	0.578	1.210	0.618–2.372				
Illiteracy rate for individuals 15 years of age or older	0.017	1.333 (1.052–1.688)	0.023	0.617	1.023	0.935–1.119				
Hospitalized patients with oral and oropharyngeal cancer	< 0.001	1.001 (1.001–1.001)	0.001	<0.001	1.001	1.001–1.001	0.001	<0.001	1.001	1.001–1.001

B: regression coefficient; SE: standard error; p-value: statistical significance; IRR: incident rate ratio; 95%CI: 95% confidence interval (upper-lower).

inadequate basic sanitation rate, lower expected years of schooling and a higher illiteracy rate are likely to present a higher frequency of cancer cases (Table 4). The diagnosis of oral changes in primary care was statistically significant, but it did not significantly affect the number of cancer cases (95%CI: 1,000–1,000). Income concentration and worse socioeconomic conditions are likely associated with an increase in the number of hospitalized patients with oral and oropharyngeal cancer in Brazil.

The effect of socioeconomic variables on the frequency of cancer primarily located in the lip and oral cavity, salivary glands and oropharynx is shown in Table 5. Similar to that observed in Table 4, higher inequality, a higher inadequate basic sanitation rate, lower expected years of schooling and a higher illiteracy rate were associated with a higher frequency of cancer cases within those cancer sites (Table 5). Major effects were observed for the Gini inequality coefficient and expected years of schooling.

Many cities in Brazil did not register diagnoses of mucosal changes (Figure 1A). A higher frequency

of cancer was registered along the coast, mainly for cities from the Northeast, Southeast and South regions (Figure 1B). The regional distribution of cancer cases according to cancer sites is presented in Figure 2 (A to C). A lower frequency of cases was reported for the North and Central-West regions.

Discussion

The results from this study suggest that socioeconomic aspects have a significant effect on access to preliminary diagnosis and hospital admission of patients with oral and oropharyngeal cancer in Brazil. Socioeconomic characteristics of Brazilian cities should be interpreted as a modulating factor for the frequency of diagnoses of oral mucosal changes and for the number of cancer cases involving hospitalization. Factors related to the fluctuation of primary care services are diverse,^{18,20} and etiological aspects of oral and oropharyngeal cancer have been extensively discussed.^{4,7,9,10,11} The results from this study suggest that less privileged and

Table 4. Bivariate and multivariate Poisson regressions to determine the effect of independent variables (socioeconomic factors) on the frequency of hospitalized patients with oral and oropharyngeal cancer, as based on the records of the Brazilian National Cancer Institute.

Variable	Bivariate		Crude multivariate model				Adjusted multivariate model			
	p-value	IRR (95% CI)	B	p-value	IRR	95% CI	B	p-value	IRR	95% CI
Gini's inequality coefficient	< 0.001	1.55×10 ⁷ (3.21×10 ⁶ –7.52×10 ⁹)	8.492	0.001	4874.50	27.417–8.66×10 ⁵	8.159	< 0.001	3.494.019	149.212–8.18×10 ⁴
Municipality's Human Development Index	< 0.001	1.39×10 ¹³ (1.09×10 ⁸ –1.78×10 ¹⁸)	-2.785	0.659	0.062	2.658×10 ⁻⁷ –1.43×10 ⁴				
Inadequate basic sanitation	0.008	1.549 (1.119–2.146)	0.093	0.013	1.097	1.020–1.180	0.090	0.001	1.095	1.040–1.152
Employment rate for individuals over 18 years of age	0.001	1.070 (1.028–1.114)	-0.030	0.344	0.971	0.913–1.032				
Expected years of schooling	0.010	1.763 (1.144–2.717)	-0.563	0.002	0.569	0.402–0.807	-0.718	< 0.001	0.488	0.352–0.675
Illiteracy rate for individuals 15 years of age or older	0.001	1.698 (1.255–2.298)	0.223	< 0.001	1.250	1.107–1.412	0.191	< 0.001	1.211	1.105–1.326
Diagnosis of mucosal changes in primary care	< 0.001	1.001 (1.001–1.001)	0.000	< 0.001	1.001	1.001–1.001	0.000	0.001	1.001	1.001–1.001

B: regression coefficient; SE: standard error; p-value: statistical significance; IRR: incident rate ratio; 95%CI: 95% confidence interval (upper-lower).

Table 5. Multivariate Poisson regression adjusted models ($p < 0.05$) to determine the effect of independent variables (socioeconomic factors) on the frequency of oral cancer primarily located in the lip and oral cavity (C-00 to C-06), salivary glands (C-07 to C-09) and oropharynx (C-10), as based on the records of the Brazilian National Cancer Institute.

Variable	Lip and oral cavity (C-00 to C-06)				Salivary glands (C-07 to C-09)				Oropharynx (C-10)			
	B	IRR	95%CI		B	IRR	95%CI		B	IRR	95%CI	
Gini's inequality coefficient	9.938	20701.49	730.88	586,346.35	13.160	519,420.49	11,549.57	2,3359,976.38	8.396	4,428.67	197,898	99,107.03
Municipality's Human Development Index												
Inadequate basic sanitation	0.097	1.101	1.059	1.145	0.134	1.143	1.055	1.237	0.105	1.111	1.062	1.161
Employment rate for individuals over 18 years of age												
Expected years of schooling	-0.388	0.679	0.522	0.882					-0.684	0.505	0.406	0.627
Illiteracy rate for individuals 15 years of age or older	0.161	1.175	1.085	1.272	0.190	1.209	1.086	1.346	0.237	1.268	1.162	1.383
Diagnosis of mucosal changes in primary care	0.000	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000	1.000	1.000	1.000

B: regression coefficient; IRR: incident rate ratio; 95% CI: 95% confidence interval.

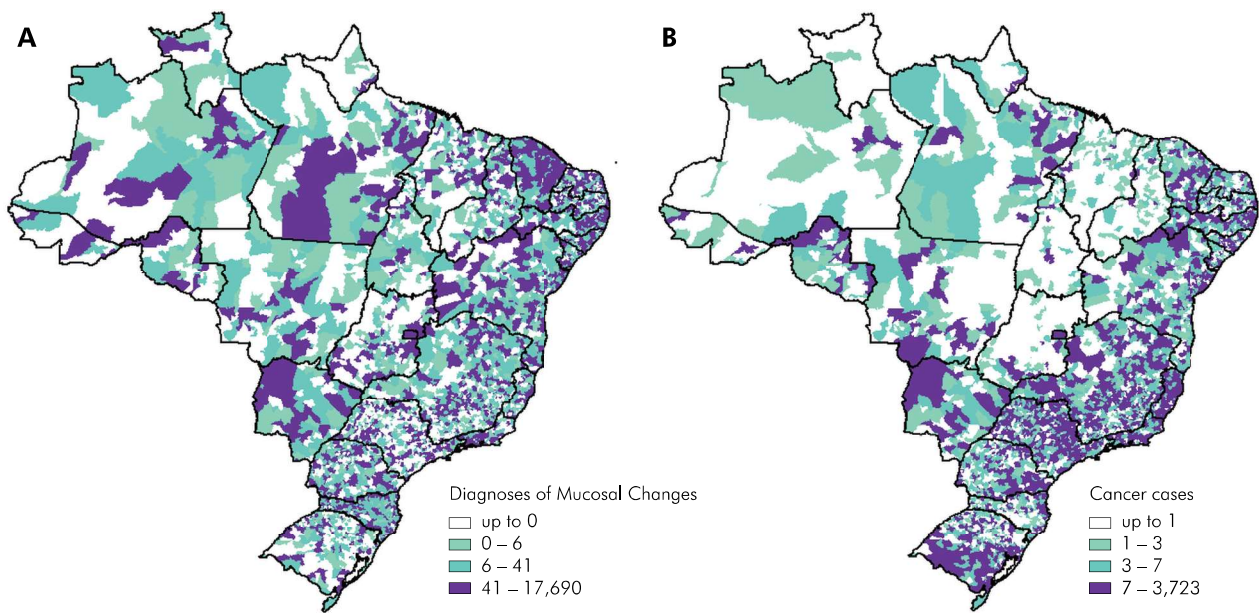


Figure 1. A: Frequency distribution into quartiles of diagnoses of mucosal changes among Brazilian cities. B: Frequency distribution into quartiles of hospitalized patients with oral and oropharyngeal cancer among Brazilian cities.

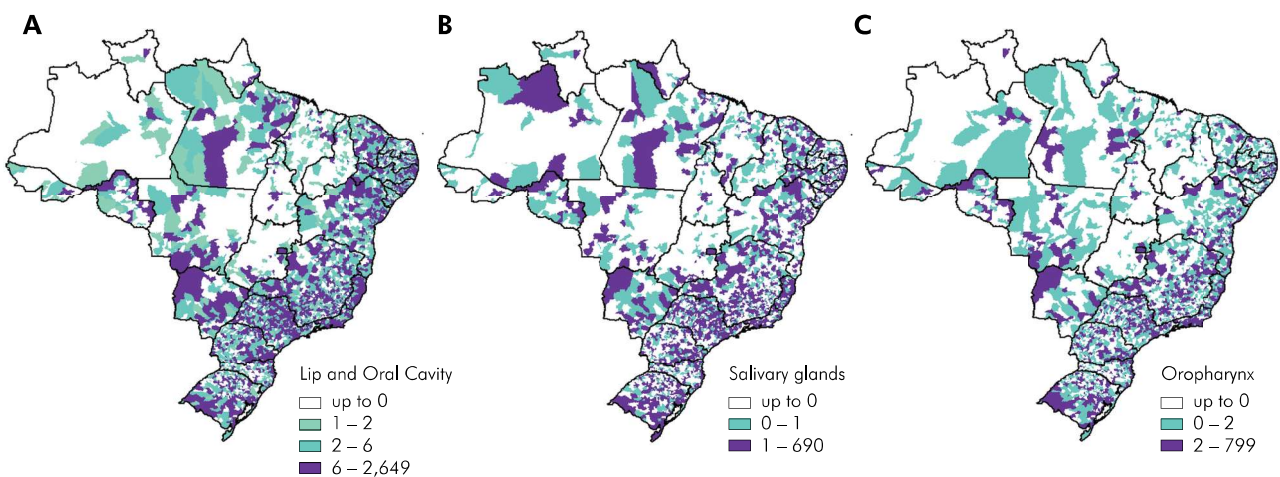


Figure 2. Frequency distribution into quartiles of hospitalized patients with cancer in the lip and oral cavity (A), salivary glands (B) and oropharynx (C) among Brazilian cities.

vulnerable populations are less likely to have access to preliminary diagnosis and to hospital treatment. Nevertheless, the results should be interpreted with care, as the study was based on a secondary source of information under a cross-sectional design.

The offer of diagnostic procedures for oral mucosal changes was initially proposed by the Brazilian Ministry of Health to encourage the monitoring and planning of policies and actions aimed at health

promotion, prevention and early diagnosis in primary care. However, the Brazilian primary care information system has undergone recent changes, and many professionals still do not know it thoroughly or have not received the training necessary to understand the nature of this type of notification.²¹ This scenario can lead to inefficient registration, even though this source of data is still reliable for monitoring Brazilian public health services.²²

To our knowledge, data for the diagnosis of oral mucosal changes have not been used before for discussing the access of a population to oral cancer preliminary diagnosis. Data from this study suggest that more unequal and more developed cities may also have a greater number of records of diagnoses of oral mucosal changes. This is probably due to a better-structured network of health care services, mainly in larger and more populated cities²³. Although the frequency of diagnoses of oral mucosal changes seems well distributed among the Brazilian macroregions, many cities did not register any case of oral mucosal change between 2011 and 2015.

It is important to highlight that an absence of registered diagnosis of oral mucosal changes does not mean an absence of cases, a lower frequency of oral mucosal examination, or inefficiency of the healthcare network. Indeed, it is probably due to a lack of registration or low coverage of primary care within the municipality.^{23,24} Overall, the frequency of diagnoses of oral mucosal changes might not be reliable for monitoring the frequency of early diagnosis of oral cancer. Nevertheless, this parameter is unique and may provide some evidence regarding population access to oral mucosal examination as a preventive measure for oral cancer in Brazilian primary care.

Although statistically significant bivariate correlations between the number of diagnoses of oral mucosal changes and the frequency of hospitalized cancer cases were detected in the present study, it is not possible to affirm that those variables are strictly associated. In fact, adjusted multivariate models demonstrated very limited associations between those variables.

The frequency of hospitalization of patients with oral and oropharyngeal cancer obtained from the INCA-HRC may not be considered as a measure of cancer prevalence in Brazil. Although the absolute frequency of cases is not the best parameter for evaluation, it is uniquely related to the cancer frequency in Brazil. The INCA-HRC does not currently provide age-standardized rates for each municipality in different periods of time, which would be recommended.^{1,2} Thus, the data used in this study correspond to the absolute frequencies of hospitalized patients retrieved from the INCA-HRC. To reduce the

influence of hospital-based data, the authors used the population size to weight the effects, in addition to harvesting the number of cases according to the municipality of residence.

The absence of records should not be interpreted as a lack of realistic cases because not all cases of cancer in Brazil are linked to the INCA-HRC. For example, the lower frequency of cases recorded for the North and Central-West regions may be associated with a lower proportion of cancer treatment units, which are more concentrated in the Northeast (19.1%), Southeast (46.3%) and South (23.5%) regions.²⁵ Therefore, it is important to assume that eventually, cases of cancer may not be registered due to the limited access of the population to health services.

The healthcare network for cancer patients in Brazil is preferentially part of the public healthcare system, and it is mostly located in capitals and better-developed centers.^{25,26} The absence of a statistical association between the MHDI and the frequency of hospitalized cases of cancer is probably because we analyzed data based on the municipality of residence. Nevertheless, other relevant socioeconomic aspects were significantly associated with a higher frequency of cases, irrespective of the primary site of cancer.

The effect of socioeconomic factors on the frequency of oral cancer primarily located in the lip and oral cavity (C-00 to C-06), salivary glands (C-07 to C-09) and oropharynx (C-10) is novel, as previous studies have analyzed those different primary sites as a single entity.^{5,13,17,19} This study found similar socioeconomic factors associated with the frequency of hospitalized patients with cancer in the lip and oral cavity, salivary glands and oropharynx. Overall, the inequality coefficient was the most significant socioeconomic variable, considering both the general number of hospitalized cancer patients and those stratified by primary site.

The impact of socioeconomic inequality has been discussed in a previous meta-analysis, which considered unjust differences regarding monthly household income, occupational social class and educational level.¹² According to this previous review, socioeconomic inequalities are potentially associated with lifestyle risk factors in a complex manner.¹² Data from our study confirm that higher education and access to better living conditions (access to water and

sewage supply) have a general impact on the frequency of hospitalization of patients with oral cancer.

The influence of the MHDl on oral cancer rates in Brazil varies; some found an inversely proportional effect,^{5,13,17} whereas others suggest a positive association²⁷. In the present study, despite showing a positive correlation with hospitalized patients with oral and oropharyngeal cancer in bivariate analysis, the effect of the variable MHDl was lower than that of other socioeconomic factors that seem to have greater strength of association from the perspective of Brazilian cities. Although they may be considered developed, many cities have strong income concentration, segregation and social inequalities.²⁸ In this sense, the factors included in the analysis comprise aspects such as education and income, which themselves are part of the MHDl. Therefore, exclusion of the MHDl from the adjusted model does not suggest a problematic analysis or a collinearity issue.

The results and inferences of the present study should be analyzed carefully, considering the cross-sectional design and the secondary data source. Regardless, the data from this study are representative of the Brazilian population and are from all of its cities for the last decade. Oral and oropharyngeal cancer is a complex disease, and several etiological and modifying factors must be taken into account. Further analyses of other countries and socioeconomic contexts may corroborate the findings of this study.

Conclusion

A higher frequency of diagnoses of mucosal changes was observed in more developed cities and those with inequality. Greater inequality and worse socioeconomic conditions are associated with a higher frequency of hospitalized patients with oral and oropharyngeal cancer in Brazil.

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5. ARTIGO 2

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RESEARCH ARTICLE

Open Access



Socioeconomic indicators and economic investments influence oral cancer mortality in Latin America

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Abstract

Background: It is necessary to recognize the influence of socioeconomic factors on oral cancer indicators in Latin American countries. This study aimed to analyze the influence of socioeconomic indicators and economical investments on oral cancer mortality rates in Latin American countries.

Methods: This cross-sectional study considered the age-standardized mortality rate (ASR) of oral cancer within the period 2000–2015. The oral cancer mortality rate (for both sexes and age groups 40–59 and 60 years old or more), socioeconomic aspects (Gini Inequality Index, unemployment rate and Gross Domestic Product (GDP) per capita) and investments in different sectors (%GDP invested in health per capita and by the government, %GDP invested in education by the government and %GDP invested in research and development) were considered. Tweedie multivariate regression was used to estimate the effect of independent variables on the mortality rate of oral cancer, considering $p < 0.05$.

Results: This study showed that being male and aged 60 or over (PR = 14.7) was associated with higher mortality rate for oral cancer. In addition, greater inequality (PR = 1.05), higher health expenditure per capita (PR = 1.09) and greater investment in research and development (PR = 1.81) were associated with a higher mortality rate from oral cancer.

Conclusion: Socioeconomic factors and economical investments influence the mortality rate of oral cancer in Latin American countries. This emphasizes oral cancer is a socioeconomic-mediated disease.

Keywords: Oral cancer, Mortality, Latin America, Socioeconomic factors

Background

Oral cancer has high rates of morbidity and mortality around the world, and is therefore considered a growing public health problem [1, 2]. The disease's treatment often has a significant impact on the quality of life of individuals, which is affected by mutilations, functional limitations and chronic pain [3].

Oral cancer has a complex and multifactorial etiology, with tobacco and alcohol consumption being the most relevant factor [4, 5]. In recent decades, the discussion on the role of socioeconomic factors as determinants for the disease has intensified, suggesting that socioeconomically vulnerable individuals are at increased risk for oral cancer and its complications [6–8]. The greater exposure to risk factors, limited access to health services and consequent low frequency of early diagnosis might explain the relationship between socioeconomic factors and incidence of oral cancer [9, 10].

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Latin America has shown recent advances in the health conditions of its population, with a reduction in infant mortality and an increase in life expectancy [11]. However, strong social inequalities and segmentation in their health systems still persist, in which a large part of the population (non-wage earners) does not have full access to health services [12, 13]. In addition, the organization of health services and government investments differ between countries, contributing to great inequity in health in the region [12–14].

In this scenario, Latin America is characterized as a region with a high incidence of oral and oropharynx cancer [15]. Between 2018 and 2025, a 22.4% increase in the number of new cases of the disease in the region is expected. As for mortality, the expected growth is 24.1% for the same period [16]. Cuba, Brazil, Puerto Rico and Uruguay occupy, in that order, the first positions regarding the highest age-standardized incidence rates (ASR) [16]. Cuba and Brazil also lead the most recent estimates regarding mortality by the disease in the region [16].

Therefore, it is necessary to recognize the influence of socioeconomic factors on oral cancer indicators in Latin American countries. Thus, policies to combat social inequalities and public health measures for prevention, early diagnosis and treatment can be targeted, seeking to reduce cancer rates in the population [17]. However, it appears that several Latin American countries have adopted austerity policies, which limit investments and public spending. This situation can result in an increase in inequality and worsening in the epidemiological panorama of the population [18, 19].

Thus, the aim of this study was to analyze the influence of socioeconomic indicators and government investments on oral cancer mortality rates in Latin American countries.

Methods

Study design

An observational cross-sectional retrospective study was carried out, considering the time period between the years 2000 and 2015 (totaling 16 years analyzed). The sample units of this study were the countries located in Latin America and the Caribbean, whose data regarding mortality from oral cancer, socioeconomic aspects and government investments were available in international databases.

Data collection

The data referring to the number of deaths from oral cancer (considering the category lip, oral cavity and pharynx) of each country, for both sexes and the age groups of 40–59 years and 60 years or more, were collected from the World Health Organization Cancer Mortality Database (<http://www-dep.iarc.fr/WHODb/WHODb.htm>),

considering each year of the period between 2000 and 2015. The Gini inequality coefficient, unemployment rate, Gross Domestic Product (GDP) per capita, GDP percentage invested in health per capita, GDP percentage invested in health by the government, GDP percentage invested in education by the government and GDP percentage invested in research and development were extracted from the World Bank indicator system (<https://data.worldbank.org/indicator>).

Constitution of the model

The response variable (dependent) of this study was the oral cancer mortality rate, expressed through the standardized mortality rate. The independent variables were: sex, age, period (year), Gini inequality coefficient, unemployment rate, Gross Domestic Product (GDP) per capita, GDP percentage invested in health per capita, GDP percentage invested in health by the government, GDP percentage invested in education by the government and GDP percentage invested in research and development.

Statistical analysis

The data were put in charts and analyzed using the IBM Statistical Package for Social Sciences program (IBM SPSS, v. 24, IBM, Chicago, IL). Tweedie's Multivariate Regression was used to estimate the effect of independent variables on the mortality rate among Latin American countries. The model was adjusted by gradually removing variables with a p -value > 0.20. The effect of the independent variables was verified through the measures of prevalence ratio (PR) and confidence interval (CI95%), considering p -value < 0.05.

Results

Descriptive data regarding the oral cancer standardized mortality rate for each Country is presented in Table 1. Descriptive data regarding the socioeconomic parameters of Latin American countries considered for this study is presented in Table 2. Factors associated to the standardized mortality rate of oral cancer (mouth, lip and oropharynx) are presented in Table 3. The adjusted model did not account for the effect of year and unemployment rate, since those variables presented p -value > 0.20 during model adjustment. Gross Domestic Product per capita, Government Health Expenditure (as %GDP) and Government Education Investments (as %GDP) did not influence the oral cancer mortality rate within the adjusted model. Male population with 60 years or more is associated with higher mortality of oral cancer. Greater inequality (greater Gini index), higher health expenditure per capita (as %GDP) and higher investments on research and development (%GDP) are

Table 1 Standardized mortality rate and tendency of oral cancer in Latin American Countries, considering the period between 2000 and 2015, according to populations' sex and age

	Female				Male			
	40 to 59 years		60 years and above		40 to 59 years		60 years and above	
	Mean (SD)	Tendency	Mean (SD)	Tendency	Mean (SD)	Tendency	Mean (SD)	Tendency
Argentina	1.02 (0.13)	=	4.38 (0.33)	=	5.36 (1.02)	↓	16.72 (1.47)	↓
Brazil	1.58 (0.12)	=	7.25 (0.47)	↓	11.50 (0.44)	↓	29.80 (1.16)	=
Chile	0.56 (0.18)	↑	3.14 (0.42)	=	1.99 (0.42)	↓	11.28 (1.23)	↓
Colombia	0.86 (0.21)	=	6.38 (0.92)	↓	1.87 (0.23)	=	11.42 (1.36)	↓
Ecuador	0.59 (0.17)	=	3.86 (0.93)	=	0.99 (0.25)	=	5.88 (1.30)	=
Guatemala	1.04 (0.44)	=	5.35 (1.67)	=	1.82 (0.87)	↓	10.78 (2.57)	↓
Mexico	0.73 (0.09)	↓	3.87 (0.39)	=	1.78 (0.17)	=	9.54 (0.94)	↓
Nicaragua	0.52 (0.35)	=	2.54 (1.01)	↑	2.01 (0.80)	=	8.50 (2.11)	=
Panama	0.81 (0.70)	=	6.03 (1.74)	↓	2.40 (1.19)	↑	15.17 (2.91)	=
Paraguay	0.55 (0.39)	=	3.58 (1.32)	=	4.34 (0.86)	=	17.11 (3.44)	=
Peru	0.82 (0.24)	↑	3.60 (1.15)	↑	0.90 (0.28)	↑	5.40 (0.77)	=

Mean (SD): Mean and Standard Deviation of Standardized mortality rate. ↑: Increasing tendency. =: Stable tendency. ↓: Decreasing tendency. Tendency was defined according to the World Health Organization Cancer Mortality Database (<http://www-dep.iarc.fr/WHODb/WHODb.htm>)

associated with higher oral cancer mortality rate among Latin American Countries.

Discussion

The results of this investigation demonstrate that socio-economic factors and government investments influence mortality by oral cancer in Latin American countries. The results of this study reaffirm the higher prevalence of oral cancer among male individuals, over 60 years old [15, 20–22]. Also, it revealed that social inequalities are related with the increase of oral cancer mortality in these countries. Although government investments in

health and education have not influenced standardized mortality rates, investments per capita in health and spending on research and development seem to be the result of the expansion of austerity policies and less government accountability for the population's health problems.

The choice of the evaluation period for this study is justified by the fact that the years 2000 to 2015 corresponded to the most recent time interval in which the largest number of Latin American countries presented data available on the analyzed databases. During this period, mortality by oral cancer among the countries

Table 2 Descriptive data regarding the socioeconomic parameters of Latin American countries considered for this study, considering the period between 2000 and 2015

	Gross Domestic Product (GDP) per capita		Gini Index		Unemployment rate		Health expenditure per capita(%GDP)		Government Health Expenditure (as %GDP)		Government Education Investments (as % GDP)		Investments on Research and Development (as %GDP)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Argentina	8408.903	3259.514	46.78	4.13	11.504	4.007	8.071	0.588	5.020	1.002	4.72	0.72	0.487	0.084
Brazil	7052.029	3541.317	55.87	2.87	8.467	1.124	8.805	1.360	3.301	0.631	4.97	0.87	1.077	0.104
Chile	9098.673	4085.495	50.69	2.95	8.660	1.631	7.035	0.548	3.946	0.425	3.94	0.51	0.331	0.029
Colombia	4466.826	2164.274	54.89	2.07	12.639	3.291	5.759	0.307	4.119	0.259	4.26	0.40	0.204	0.061
Ecuador	3573.372	1599.684	51.12	4.20	4.221	0.764	6.319	1.693	2.617	1.199	2.74	1.83	0.195	0.152
Guatemala	2382.026	778.592	53.66	2.05	2.970	0.334	6.153	0.309	2.083	0.095	2.27	0.72	0.041	0.010
Mexico	8208.664	1873.468	47.36	2.13	4.012	0.937	5.530	0.402	2.621	0.338	4.83	0.36	0.410	0.091
Nicaragua	1312.002	363.456	48.99	4.07	6.491	1.216	6.340	1.010	3.128	0.764	3.22	0.92	0.073	0.024
Panama	6703.067	3242.234	53.98	2.50	3.664	0.736	6.740	0.264	4.393	0.293	3.62	0.46	0.216	0.100
Paraguay	3106.709	1674.421	52.23	2.77	6.580	2.230	6.012	1.025	2.742	0.848	4.14	0.64	0.077	0.018
Peru	3707.913	1794.793	49.13	4.15	4.479	1.016	4.803	0.252	2.600	0.320	3.03	0.36	0.106	0.029

GDP Gross Domestic Product, SD Standard Deviation

Table 3 Factors associated to the oral cancer (mouth, lip and oropharynx) standardized mortality rate in Latin American countries^a, between 2000 and 2015. Tweedie multiple regression analysis was used to estimate the effect of socioeconomic factors and economic investments on the mortality of oral cancer

Parameter	Unadjusted Model (all variables)					Adjusted Model (variables with $p < 0.20$)				
	B	p-value	PR	95% CI		B	p-value	PR	95% CI	
				Lower	Upper				Lower	Upper
Male, 60 years or more	2.690	< 0.001	14.737	13.550	16.028	2.691	< 0.001	14.747	13.560	16.037
Female, 60 years or more	1.681	< 0.001	5.370	4.912	5.871	1.681	< 0.001	5.370	4.914	5.869
Male, 40 to 59 years	1.237	< 0.001	3.446	3.095	3.836	1.238	< 0.001	3.449	3.098	3.839
Female, 40 to 59 years			Ref.					Ref.		
Year (2000 to 2015)	-0.004	0.337	0.996	0.988	1.004					
Gross Domestic Product (GDP) <i>per capita</i>	-6.385E-6	0.303	1.000	1.000	1.000	-8.587E-6	0.132	1.000	1.000	1.000
Gini Index	0.046	< 0.001	1.047	1.037	1.056	0.047	< 0.001	1.048	1.039	1.057
Unemployment rate	0.000	0.967	1.000	0.990	1.010					
Health expenditure <i>per capita</i> (%GDP)	0.088	< 0.001	1.092	1.048	1.138	0.082	< 0.001	1.085	1.044	1.129
Government Health Expenditure (as %GDP)	0.027	0.264	1.027	0.980	1.077	0.032	0.126	1.032	0.991	1.075
Government Education Investments (as % GDP)	0.048	0.044	1.050	1.001	1.100	0.045	0.063	1.046	0.998	1.096
Investments on Research and Development (as %GDP)	0.567	< 0.001	1.763	1.439	2.160	0.594	< 0.001	1.811	1.496	2.192

Statistical significance of the adjusted model was set at 5%. ^aLatin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Nicaragua, Panama, Paraguay and Peru. GDP Gross Domestic Product, B Regression Coefficient, PR Prevalence ratio, 95% CI 95% Confidence interval

included was stable. Previous studies have shown great variability in the trend of mortality from oral cancer in Latin America in the last decades [15, 23, 24]. This is probably due to the absence or discontinuity of records in some countries, in addition to the singularities of each country, especially regarding the distribution of risk factors in the region.

In this study, the Gross Domestic Product (GDP) showed no association with mortality from oral cancer, suggesting that this condition is not influenced by the amount of wealth in the countries. The comparison between Cuba and Brazil could illustrate this finding: despite the great difference in the economic organization and wealth of these countries, both lead the indicators of mortality from oral cancer in Latin America. However, it is important to consider that Latin countries are marked by strong socioeconomic inequalities, which was evidenced in this study through the Gini Index, which was positively associated with mortality.

Thus, although there is no difference between poor and rich countries, inequality is an important factor. The same is true for the unemployment rate, which, despite not being part of the association model, is an important indicator of inequality and may have been included in the Gini Index. A similar study found no association between this index and mortality from oral cancer in Latin America [10]. However, the authors of the aforementioned study suggested that a regional analysis may not be able to detect this association, making it necessary to conduct national studies to better explain this relationship.

Government investments in education and health have not influenced the mortality rate and may suggest that in these countries investments in social policies and health systems are still low and insufficient, unable to meet the demands of the population and contribute to the improvement of their health condition [25]. A positive association was verified between oral cancer mortality and health expenditure per capita, which means that the countries that spent more on health also had higher mortality. This finding suggests that health care in the private sector has higher cost for population and not adequate efficiency [11].

Another intriguing finding refers to the positive association between investment in research and development and mortality from oral cancer. This association was probably influenced by the fact that Brazil is the country with the highest investment in research and development, also presenting the highest mortality rate from oral cancer among the countries analyzed. Although there is investment in the sector, it does not seem to positively influence the population's health, and it is necessary to analyze this finding individually for each country, along with its other characteristics. It is also important to reflect on the use of strategies so that the products of scientific health development in these countries become accessible to the majority of the population, thus providing a real impact on the indicators of cancer and other diseases [26].

Despite the recognition of socioeconomic conditions as determining factors for oral cancer, the presence of harmful habits related to lifestyle are the strongest

etiological factors [4, 27]. Latin countries in which public policies for the control of tobacco and alcohol consumption have been developed have shown less advances in mortality rates from oral cancer in the last decades [14]. Therefore, socioeconomic factors must always be analyzed in the light of the population's habits that are involved. In addition, policies to control risk factors must be implemented in conjunction with policies to combat social inequalities. Based on that, campaigns to fight tobacco use, limit sun exposition, reduce alcohol ingestion, and extend access to healthcare should be outlined simultaneously with the reduction of social inequalities.

This study presents the proper limitations of a cross-sectional study based on data from an information system, being liable to failures due to the secondary origin of the data. However, databases and information systems considered world reference were used, seeking to ensure greater reliability. The analysis of the Latin American region also requires care in interpreting the results, since not all countries were included due to the lack of data, and the particularities of each country must be considered. As previously discussed, the presence of habits that represent risk factors for oral cancer should be studied in conjunction with socioeconomic determinants. Therefore, it is suggested to conduct further studies that consider both aspects.

The analysis of oral cancer mortality in Latin America from the perspective developed in this study proposes important reflections on the austerity policies in public health investments that are being implemented in the region. Previous experiences in European countries have demonstrated the damage these policies have to the living and health conditions of the population, worsening socioeconomic inequities, intensifying unemployment, violence, social unprotectedness, decreasing access and coverage of health services, among others [28, 29]. Neoliberal measures have threatened the main universal health system in the world, Brazil's Unified Health System [19]. The scientific debate on the new health challenges in Latin America is necessary, aiming at the preservation of achievements resulting from past social struggles, such as social protection, strengthening of health systems, improvement in health indicators and achieving international development goals [28].

In conclusion, this manuscript highlights socioeconomic factors and economical investments influence the mortality rate of oral cancer in Latin American countries. This emphasizes oral cancer is a socioeconomic-mediated disease. Austerity policies may play a significant role on the mortality rate of oral cancer in Latin America.

Abbreviations

95% C.I.: 95% Confidence Interval; ASR: Age-Standardized Incidence Rates; B: Regression Coefficient; GDP: Gross Domestic Product; PR: Prevalence Ratio; SD: Standard Deviation; WHO: World Health Organization

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Authors' contributions

ARF, FCAC, EHGL and YWC conceptualized and designed the study. ARF, DEWGF and ECFA collected data. FCAC, GAPJ, SAS, EHGL and YWC analyzed and interpreted data. ARF, DEWGF, ECFA, GAPJ and SAS drafted the manuscript. FCAC, EHGL and YWC revised the manuscript for important intellectual content. All authors approved the final version of the manuscript.

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Availability of data and materials

The datasets generated during the current study can be provided by the corresponding author under reasonable request. Data were extracted from the following websites: <https://www-dep.iarc.fr/WHODb/WHODb.htm> and <https://data.worldbank.org/indicator>.

Ethics approval and consent to participate

This study extract data from public information systems. No approval from ethical committee is necessary.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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6. ARTIGO 3

O manuscrito a seguir foi submetido para publicação no periódico “International Journal of Environmental Research and Public Health” e aceito na data de 09/12/2020.



Article

Influence of Public Oral Health Services and Socioeconomic Indicators on the Frequency of Hospitalization and Deaths due to Oral Cancer in Brazil, between 2002–2017

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Abstract: *Background:* Oral cancer is a frequent neoplasm worldwide, and socioeconomic factors and access to health services may be associated with its risk. *Aim:* To analyze effect of socioeconomic variables and the influence of public oral health services availability on the frequency of new hospitalized cases and mortality of oral cancer in Brazil. *Materials and Methods:* This observational study analyzed all Brazilian cities with at least one hospitalized case of oral cancer in the National Cancer Institute database (2002–2017). For each city were collected: population size, Municipal Human Development Index (MHDI), Gini Coefficient, oral health coverage in primary care, number of Dental Specialized Centers (DSC) and absolute frequency of deaths after one year of the first treatment. The risk ratio was determined by COX regression, and the effect of the predictor variables on the incidence of cases was verified by the Hazard Ratio measure. Poisson regression was used to determine factors associated with higher mortality frequency. *Results:* Cities above 50,000 inhabitants, with high or very high MHDI, more unequal (Gini > 0.4), with less oral health coverage in primary care (<50%) and without DSC had a greater accumulated risk of having 1 or more cases ($p < 0.001$). Higher frequency of deaths was also associated with higher population size, higher MHDI, higher Gini and lower oral health coverage in primary care ($p < 0.001$). *Conclusions:* The number hospitalization and deaths due to oral cancer in Brazil was influenced by the cities' population size, the population's socioeconomic status and the availability of public dental services.

Keywords: oral cancer; socioeconomic factors; health services coverage; primary health care; health-care disparities; health systems



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1. Introduction

Oral cancer represents one of the most frequent neoplasms worldwide, with greater prominence in developing countries, although the incidence varies between different regions [1,2]. In Brazil, 10.70 new cases are estimated for every 100,000 men and 3.71 for every 100,000 women, in each year of the 2020–2022 triennium [3]. According to this estimate, the disease will represent the fifth most common type of cancer among men, and the thirteenth among women by 2022 [3].

Smoking and alcoholism are considered the main risk factors for oral cancer [4,5]. Other aspects such as human papillomavirus infection, solar radiation and genetics are also part of its complex etiology [2,5,6]. In addition, socioeconomic factors are strongly associated with the risk of oral cancer [7,8]. In general, individuals with worse socioeconomic status are more exposed to behavioral risk factors (such as tobacco and alcohol consumption) and have limited access to health services throughout their lives, which contributes to less prevention and late diagnosis of oral cancer [9,10].

In Brazil, the public oral health services coverage has undergone a marked expansion since 2004, with the implementation of the National Oral Health Policy (NOHP) [11].

This policy provided an increase in access to oral health in primary care, in addition to implementing specialized dental care services throughout the country, through the creation of the Dental Specialized Centers (DSC) [12]. NOHP prioritized oral cancer care at different levels of care, fostering prevention actions, active screening, and early diagnosis [12,13].

Since Brazil is a country marked by socioeconomic inequalities and with a large part of the population that depends on its public health system (Unified Health System—SUS) [14], it is necessary to evaluate the factors associated to oral cancer under the view of their socioeconomic determinants and the population's access to public health services. Thus, it is possible to develop evidence to encourage the implementation of public health policies to combat social inequalities and to strengthen the oral health service network in Brazil, and in similar populations.

Nonetheless individual factors such as sex, age, alcohol and tobacco consumption are remarkably associated to the incidence of oral cancer [7–10], other environmental socioeconomic variables should be investigated with regards their role on oral cancer incidence. Recent investigations from our research group have demonstrated the impact of socioeconomic factors and public oral health services on the rate of oral cancer hospitalization in Brazil [15,16]. Higher inequality rates, lower sanitation levels and poor education are associated with higher hospitalization rates [15]. In addition, higher availability of public oral health services contributed to lower oral cancer hospitalization rates and lower frequency of stage IV lesions [16].

However, a retrospective longitudinal analysis considering the variation on the oral cancer hospitalization rates within the last decades are still necessary. Also, the effect of both socioeconomic factors and public oral health services availability on the frequency of hospitalization and deaths due to oral cancer still need to be addressed. Studying factors associated to both hospitalization and mortality to oral cancer could help policy makers interfere more efficiently to reduce both morbidity and mortality of oral cancer in Brazil.

This study aimed to analyze the effect of socioeconomic variables and the influence of public oral health services availability on the frequency of hospitalization and deaths due to oral cancer in Brazil, under the macro-perspective of Brazilian cities.

2. Materials and Methods

An observational study was carried out with a retrospective cohort design. This study was based on a Brazilian information system that registers the cancer hospitalization information. Authors analyzed data regarding the perspective of the Brazilian cities. The sample units of the study were composed of Brazilian cities that registered, between 2002 and 2017, at least one hospitalized case of oral cancer ($n = 4516$).

The number of hospitalized cases of oral cancer was obtained from the Hospital Cancer Registry database of the National Cancer Institute (HRC-INCA—<https://irhc.inca.gov.br/RHCNet/visualizaTabNetExterno.action>) and was extracted according to the city of residence, for each year of the study. Only new cases of oral malignant tumors were considered, taking into account the year of the first diagnosis. Primary locations C00 to C06 (lip, base of tongue, tongue, gums, floor of mouth, palate, and other unspecified parts of the mouth) were considered. Final sample size consisted of 72,256 observations, between 2002 and 2017, within 4516 Brazilian cities, which resulted in 79,891 hospitalized cases of oral cancer. The number of deaths due to oral cancer primarily located on lip and oral cavity (C00 to C06), in the period between 2002 and 2017, was also collected for each city. The number of deaths consisted on the number of individuals who died within one year after the first treatment.

Data on total population, Municipal Human Development Index (MHDI) and Gini Coefficient were obtained from the panel of socioeconomic indicators of Brazilian cities, available in the Human Development Atlas of Brazil (<http://atlasbrasil.org.br>), linked to the United Nations Development Program (UNDP). The data were extracted with reference to the year 2010. The population size variable was distributed in the following categories: up to 30 thousand inhabitants, 30 to 50 thousand inhabitants, 50 to 100 thousand inhabitants

and above 100 thousand inhabitants. The MHDI was classified as: low and very low (up to 0.599), medium (between 0.600 and 0.699), and high (equal to or greater than 0.700). The Gini coefficient was categorized as: less unequal (up to 0.4), and more unequal (above 0.4).

Data on oral health coverage in primary care and the number of Dental Specialized Center (DSC) were obtained from public reports from the “e-Gestor AB” portal, from the Ministry of Health’s Primary Care Secretariat, from 2002 to 2017 (<https://egestorab.saude.gov.br/paginas/acesoPublico/relatorios/relatoriosPublicos.xhtml>). Oral health coverage in primary care was categorized in up to 50% and above 50%. The cities were classified according to the presence or absence of DSC.

The data were organized and analyzed using the IBM Statistical Package for Social Sciences program (IBM SPSS, v. 24, IBM, Chicago, IL, USA). COX’s regression was used to determine the city’s risk ratio for having a new hospitalization due to oral cancer, between the years 2002 and 2017. The predictive variables of the model were: population size, MHDI, Gini coefficient, coverage of oral health in primary care and presence of DSC. The level of statistical significance was set at 5%. The model adjustment was assessed by the Omnibus test ($p < 0.05$). The effect of the predictor variables on the incidence of cases was verified by the Hazard Ratio (HR) measure, considering the 95% confidence interval. Accumulated risk curves were obtained for the adjusted model, as well as for each of the studied predictive variables.

In addition, the effect of socioeconomic factors and public oral health services availability on the number of deaths due to oral cancer was analyzed using multiple Poisson regression. The variable “presence of DSC” did not present statistical significance to be included in the model ($p > 0.20$). Therefore, the predictive variables of the model were: population size, MHDI, Gini coefficient and coverage of oral health in primary care. The level of statistical significance was set at 5%. The model adjustment was assessed by the Omnibus test ($p < 0.05$). The effect of the predictor variables on the incidence of cases was verified by the Incident Rate Ratio (IRR), considering the 95% confidence interval. A forest plot was used to graphically represent the magnitude of effect of each independent variable on the number of deaths due to oral cancer, according to the multiple Poisson regression model.

3. Results

Out of the 79,891 cases analyzed, 95.6% were of squamous cell carcinoma. Other malignant tumors consisted of mucoepidermoid carcinoma, adenocarcinoma and cystic adenoid carcinoma. The frequency of cases according to oral sites was the following: lip (9.6%), base of tongue (16.5%), tongue (26.5%), gums (3.2%), floor of mouth (13.0%), palate (14.8), and other unspecified parts of the mouth (16.4%).

Table 1 presents the descriptive data of the number of hospitalized cases of oral cancer in Brazil, according to the year, population size, municipal human development index, Gini coefficient, oral health coverage in primary care and the presence of Dental Specialties Centers. There is an increase in the average number of hospitalized cases of oral cancer in Brazil in the mid-2000s, followed by stability and a drop in the last years analyzed. The averages of the number of cases are higher in the municipalities with highest MHDI and Gini’s coefficient, oral health coverage in primary care up to 50% and with presence of DSC.

Cox’s multiple regression (Table 2) demonstrated that all variables that were studied had a significant effect on the number of hospitalized cases of oral cancer in Brazil. Cities above 50 thousand inhabitants, with high or very high MHDI, more unequal (Gini > 0.4), with less oral health coverage in primary care ($< 50\%$) and without the presence of DSC had a greater accumulated risk of having 1 or more hospitalized cases of oral cancer, in the period between 2002 and 2017. Cumulative risk curves for each variable under study are shown in Figure 1. Cumulative risk curves observed in Figure 1 reaffirm the statistical results reported in Table 2. Cities with more than 50 thousand inhabitants, with high or very high MHDI, with higher Gini index, and with lower coverage of public oral health

services had all an increased cumulative risk for higher number of hospitalized cases of oral cancer.

Table 1. Descriptive statistics of hospitalized cases of oral cancer in Brazil, according to year, population size, Municipality's Human Development Index (MHDI), Gini's coefficient, Oral Health coverage in primary care, and Presence of Dental Specialized Center (DSC).

Variables		Hospitalized Cases of Oral Cancer						
		Mean	SD	Median	Max.	Min.	n	%
Year	2002	0.74	7.25	0	406	0	4516	6.3
	2003	0.75	6.73	0	344	0	4516	6.3
	2004	0.86	7.49	0	406	0	4516	6.3
	2005	0.96	7.37	0	398	0	4516	6.3
	2006	0.97	6.95	0	383	0	4516	6.3
	2007	1.06	7.07	0	366	0	4516	6.3
	2008	1.10	7.32	0	408	0	4516	6.3
	2009	1.20	8.05	0	436	0	4516	6.3
	2010	1.27	7.33	0	383	0	4516	6.3
	2011	1.33	8.52	0	477	0	4516	6.3
	2012	1.29	8.41	0	484	0	4516	6.3
	2013	1.35	8.27	0	474	0	4516	6.3
	2014	1.37	8.60	0	478	0	4516	6.3
	2015	1.37	7.37	0	394	0	4516	6.3
	2016	1.16	4.62	0	192	0	4516	6.3
	2017	0.90	3.81	0	149	0	4516	6.3
Population Size	Up to 30 thousand inhabitants	0.38	0.75	0	30	0	57,088	79.0
	30 to 50 thousand inhabitants	1.09	1.41	1	9	0	6496	9.0
	50 to 100 thousand inhabitants	1.99	2.13	1	19	0	4704	6.5
	Above 100 thousand inhabitants	10.54	29.31	5	484	0	3968	5.5
Municipality's Human Development Index (MHDI)	Low or very low MHDI (up to 0.59)	0.33	0.67	0	7	0	17,520	24.2
	Average MHDI (between 0.60 and 0.69)	0.54	1.18	0	30	0	28,608	39.6
	High or very high MHDI (above 0.7)	2.24	12.00	0	484	0	26,128	36.2
Gini's coefficient	Less unequal (<0.4)	0.48	1.04	0	19	0	5968	8.3
	More unequal (>0.4)	1.16	7.62	0	484	0	66,288	91.7
Oral Health coverage in primary care	Up to 50%	1.82	10.78	0	484	0	32,333	44.7
	Above 50%	0.53	1.37	0	50	0	39,923	55.3
Presence of Dental Specialized Center (DSC)	Without DSC	0.63	2.97	0	406	0	64,304	89.0
	With DSC	4.96	19.94	1	484	0	7952	11.0

SD: standard deviation, Max.: Maximum value, Min.: Minimum value, n: absolute frequency, %: relative frequency.

Table 2. Multiple Cox regression that determined cumulative risk of each explanatory variable on the frequency of hospitalized cases of oral cancer in Brazil, between 2002 and 2017.

	B	p-Value	HR	95% CI	
				Lower	Upper
Population size		<0.001			
Up to 30 thousand inhabitants			Reference		
30 to 50 thousand inhabitants	0.000	0.998	1.000	0.972	1.029
50 to 100 thousand inhabitants	0.223	<0.001	1.250	1.215	1.287
Above 100 thousand inhabitants	0.369	<0.001	1.446	1.400	1.492
Municipality's Human Development Index (MHDI)		<0.001			
Low or very low MHDI			Reference		

Table 2. Cont.

	B	p-Value	HR	95% CI	
				Lower	Upper
Average MHD	0.017	0.064	1.017	0.999	1.036
High or very high MHD	0.166	<0.001	1.180	1.158	1.203
Gini's coefficient		<0.001			
Less unequal (<0.4)			Reference		
More unequal (>0.4)	0.071	<0.001	1.074	1.048	1.101
Oral Health coverage in primary care		<0.001			
Up to 50%	0.260	<0.001	1.296	1.278	1.315
Above 50%			Reference		
Presence of Dental Specialized Center (DSC)		<0.001			
Without DSC	0.142	<0.001	1.153	1.132	1.174
With DSC			Reference		

B: regression coefficient, p-value: statistical significance, HR: hazard ratio, 95% CI: 95% confidence interval.

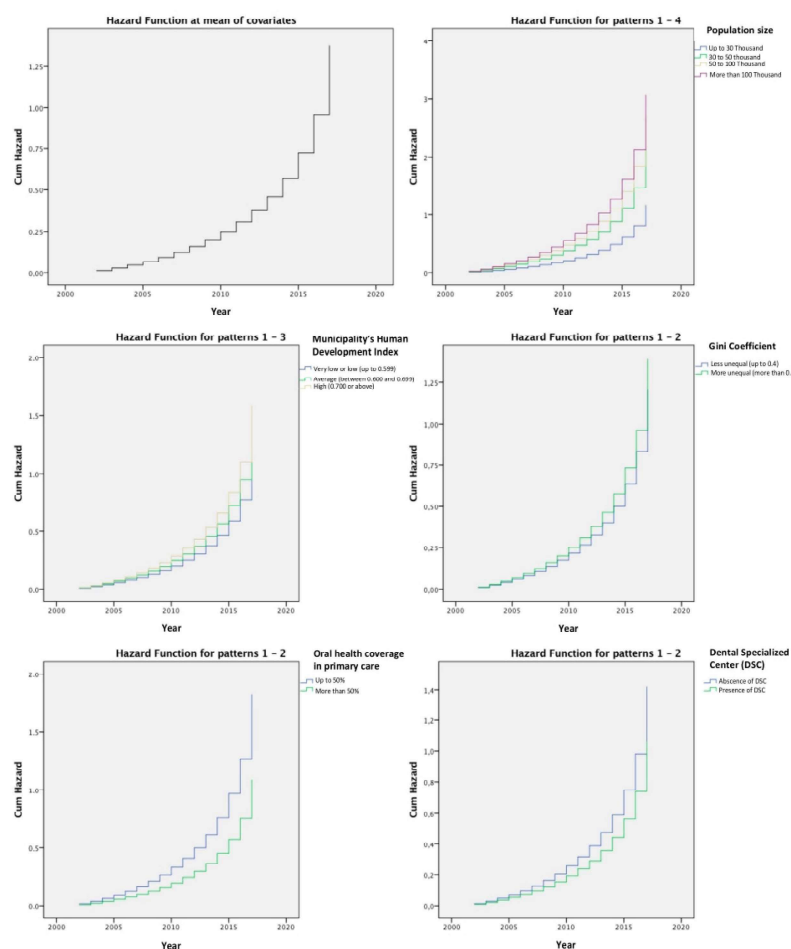


Figure 1. Cumulative risk curves of the mean effect of all variables (A) and for each category of each of the independent variables.

The descriptive data regarding the number of deaths due to oral cancer, considering the period between 2002 and 2017, is presented in Table 3. Total number of deaths within the period under study consisted of 6735, which represents a mortality rate of 8.43%, within 4511 cities (Table 3). Higher mean values of deaths were detected in more populous, more developed and more unequal cities (Table 3). Cities with lower oral health coverage in primary care also presented higher mean number of deaths due to oral cancer (Table 3).

Table 4 presents the multiple Poisson regression, which analyzed the effect of population size, MHDI, Gini Index and oral health coverage in primary care on the number of deaths due to oral cancer. Higher frequency of deaths is associated with higher population size, higher MHDI, higher Gini and lower oral health coverage in primary care ($p < 0.001$).

Table 3. Descriptive statistics of the deaths due to oral cancer in Brazil, according population size, Municipality's Human Development Index (MHDI), Gini's coefficient and Oral Health coverage in primary care, within the period between 2002 and 2017.

Variables		Number of Deaths due to Oral Cancer						
		Mean	SD	Median	Max.	Min.	n	%
Population Size	Up to 30 thousand inhabitants	0.51	1.01	0	11.00	0	3563	79.0
	30 to 50 thousand inhabitants	1.35	1.95	1.00	10.00	0	406	9.0
	50 to 100 thousand inhabitants	2.41	3.23	1.00	17.00	0	294	6.5
	Above 100 thousand inhabitants	14.75	40.82	5.00	484.00	0	248	55.0
Municipality's Human Development Index (MHDI)	Low or very low MHDI (up to 0.59)	0.51	0.96	0	11.00	0	1092	24.2
	Average MHDI (between 0.60 and 0.69)	0.88	1.95	0	28.00	0	1787	39.6
	High or very high MHDI (above 0.7)	2.82	16.70	0	484.00	0	1632	36.2
Gini's coefficient	Less unequal (<0.4)	0.45	1.24	0	13.00	0	373	8.3
	More unequal (>0.4)	1.59	10.62	0	484.00	0	4138	91.7
Oral Health coverage in primary care	Up to 50%	1.70	11.04	0	484.00	0	3821	84.7
	Above 50%	0.34	0.88	0	11.00	0	690	15.3

SD: standard deviation, Max.: Maximum value, Min.: Minimum value, n: absolute frequency of cities, %: relative frequency.

Table 4. Multiple Poisson regression that determined rate ratio of each explanatory variable on the frequency of deaths due to oral cancer in Brazil, between 2002 and 2017.

	B	p-Value	IRR	95% CI	
				Lower	Upper
Population size		<0.001			
Up to 30 thousand inhabitants			Reference		
30 to 50 thousand inhabitants	0.804	<0.001	2.235	1.900	2.628
50 to 100 thousand inhabitants	1.333	<0.001	3.794	3.192	4.509
Above 100 thousand inhabitants	3.018	<0.001	20.458	15.308	27.341
Municipality's Human Development Index (MHDI)		<0.001			
Low or very low MHDI			Reference		
Average MHDI	0.212	0.010	1.237	1.052	1.453
High or very high MHDI	0.567	<0.001	1.762	1.488	2.087
Gini's coefficient		<0.001			
Less unequal (<0.4)			Reference		
More unequal (>0.4)	0.679	<0.001	1.971	1.405	2.767
Oral Health coverage in primary care		<0.001			
Up to 50%	0.488	<0.001	1.629	1.357	1.956
Above 50%			Reference		

B: regression coefficient, p-value: statistical significance, IRR: incident risk ratio, 95% CI: 95% confidence interval.

Figure 2 illustrates the magnitude of effect of each independent variable on the number of deaths due to oral cancer, according to the multiple Poisson regression model. The characteristic "Population size above 100 thousand inhabitants" presented the higher magnitude of effect. Overall, the model demonstrated that all variables under analysis resulted in a significative increase on the number of deaths (Figure 2).

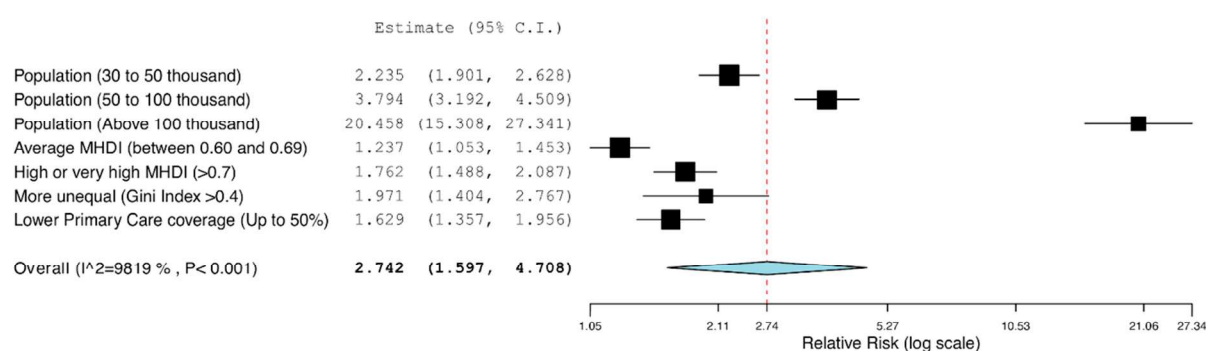


Figure 2. Forest plot that illustrates the magnitude of effect of each independent variable on the number of deaths due to oral cancer. Overall effect consists the average effect of all variables.

4. Discussion

The findings of this investigation demonstrated that population size, socioeconomic status and availability of public oral health services influence the risk of hospitalization and the number of deaths due to oral cancer in Brazil. Two previous studies have developed similar analysis of oral cancer rates, involving socioeconomic characteristics and public oral health coverage in the SUS [13,15]. In these studies, different theoretical models were proposed, involving, for example, the work process in primary care and analysis by Brazilian regions and states. The present study considered a more comprehensive period and all cities of the country as sample units, which represented a higher sample size. Also, analysis on the factors associated to the number of deaths within this period contributes to the innovative perspective of this investigation.

It was shown that cities with large populations and high MHDl had a higher frequency of hospitalization and deaths due to oral cancer. In general, larger, and more developed cities have a better structured health service network, with greater encouragement and training of professionals for active disease tracking [17,18]. In addition, the population of those cities has higher life expectancy, which increases the proportion of the risk group for advanced age, in addition to greater access to diagnosis and hospitalization [19,20]. Also, it was expected that larger cities, with larger population, presented major number of cases [16]. Inverse associations between MHDl and oral cancer were found in studies that evaluated mortality rates [9,10,20]. These findings show that the largest number of hospitalized cancer cases is concentrated in more developed regions. Analyses on the number of deaths due to oral cancer revealed that socioeconomic factor that interfered with the frequency of oral cancer hospitalization, also influenced the frequency of deaths due to oral cancer. Once more developed and more populous areas may also have more inequality, this study reveals the impact of revealing the impact of social inequalities on the hospitalization and death due to oral cancer [21].

Nevertheless, results of the present study also demonstrated that cities with higher oral health coverage in primary care had lower number of hospitalization and lower number of deaths due to oral cancer. This corroborates a previous study from our research group, which highlighted the contribution of Brazilian National Oral Health Policy in reducing the frequency of hospitalization due to oral cancer [16]. In addition, investing in public oral health services may be an alternative to reduce social inequalities in health, and then also provide dignity and access to oral cancer prevention and treatment.

This analysis revealed that cities with strong inequality in the income distribution have a higher risk of presenting hospitalized cases of oral cancer. Socioeconomically disadvantaged individuals are often diagnosed with lesions in advanced clinical stages and with cervical metastases, which require complex treatments performed in the hospital setting [8,16]. Previous studies that used regions and states as sample units found no association between the Gini coefficient and oral cancer rates [13,17]. However, other

studies with more specific and similar populations, considering cities and neighborhoods, demonstrated a positive association in this aspect, corroborating the present study [22,23]. So, this divergence of findings can be explained by the fact that only more homogeneous samples are able to detect a positive association between income inequality and oral cancer.

The average number of hospitalized cases of oral cancer increased as of 2004, coinciding with the implementation of the NOHP in Brazil. This can be explained by the increased frequency of diagnoses in SUS, as well as referral to hospital units and registration of cases in the information systems [24]. The scenario observed before this policy was characterized by a curative and individualized dental care model, centered on private services [25]. With its implementation, prevention started guiding oral health care, and procedures for detecting changes in the oral mucosa and biopsies started to be recommended in primary care and in the DSC [26].

The lower coverage of oral health in primary care and the absence of DSC are related to the higher risk of hospitalization and death due to oral cancer, according to the findings of this investigation. Studies have also found similar impacts of these variables on oral cancer mortality rates in Brazil in recent decades [13,16,17]. A recent investigation showed that the severity of hospitalized oral cancer cases was negatively associated with the expansion of the oral public health service network [16]. The lack of access to health services is one of the main factors related to the delay in the diagnosis of oral cancer, which often results in the need for more aggressive and mutilating treatments, reducing the individual's survival [27].

Since the dentist in primary care acts as the entrance to the health system and the longitudinal character of this assistance in the SUS, it is able to develop educational actions to combat behavioral risk factors and self-detection of lesions through oral self-examination [28]. The DSC complement the assistance offered in primary care, representing the reference unit for suspected cases [29]. The relation between a greater number of DSC and a lower number of hospitalized cancer cases may indicate advances in terms of problem-solving, suggesting a higher frequency of cases detected in early stages, and reducing demand in hospital units. Results from this study shows that cities with lower oral health coverage in primary care may have higher number of deaths. This reaffirms the role of NOHP in contributing for the reducing the frequency of hospitalization and deaths due to oral cancer. Additional studies should be conducted to verify the effects of the organization of the oral cancer care network in the country.

Despite the advances observed, some barriers still make it difficult to address the issue of oral cancer in Brazil. Some problems, such as insufficient coverage, unequal distribution of health care units and a decrease in government investments in health in recent years, with the advance of austerity policies [14,17] are inherent to the health system as a whole. The lack of training and insecurity of professionals in relation to the diagnosis of malignant lesions and biopsies should also be highlighted [26]. Furthermore, the global Covid-19 pandemic in 2020, which required social distancing measures, as well as its long-term impacts can contribute to the increase of cases that are diagnosed later [30].

The present study has some limitations. The use of secondary data reduces the researchers' control over the registration of information systems, which may represent a bias. Due to its observational design, this study suggests associations, but it is not the most appropriate for establishing cause and effect relationships. The study considered population data, and the phenomenon of ecological fallacy may occur if its findings are interpreted at individual levels. Oral cancer is a complex disease, strongly influenced by behavioral risk factors, which are not fully explained by individuals' socioeconomic characteristics. Future studies must be developed considering these aspects as well. The use of official information systems, analysis at a city level throughout Brazil, the large sample size used, and the long period of analysis are strengths of this investigation.

Taking this into account, the expansion of oral health coverage in primary and specialized care, especially in the sense of equity, prioritizing populations in socioeconomic vulnerability, are essential strategies for improving the epidemiological scenario of oral

cancer in Brazil [13,26]. In this sense, some urgent measures are highlighted, such as the increase in government investments in health, the implementation of public policies to combat social inequalities, the control of behavioral risk factors for oral cancer, the training of oral health professionals in the early identification of precancerous lesions and the expansion of health education measures for the general population.

This study highlights the relevance of socioeconomic factors and health services organization on the number of hospitalization and on the number of deaths due to oral cancer. This highlights that oral cancer is also social-determined disease. Based on that, a community-level approach to improve socioeconomic status and the availability of public health services may help to reduce the incidence of oral cancer. Future investigations should explore both the effect of individual and environmental variables on the incidence of hospitalization and deaths due to oral cancer.

5. Conclusions

The number of hospitalizations and deaths due to oral cancer in Brazil is influenced by cities' population size, the population's socioeconomic status and the availability of public dental services. Cities with 50,000 inhabitants or more, high MHDI, greater inequality in the distribution of income, with less oral health coverage in primary care and without the presence of a DSC had a greater cumulative risk of having 1 or more hospitalized cases of oral cancer. Higher frequency of deaths is associated with higher population size, higher MHDI, higher Gini and lower oral health coverage in primary care.

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7. ARTIGO 4

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Socio-demographic characteristics are related to the advanced clinical stage of oral cancer

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Abstract

Background: Social determinants may be associated with the onset and progression of the clinical stage of oral cancer. Aim: To evaluate the impact of socio-demographic characteristics on the prevalence of advanced clinical stage of oral cancer.

Material and Methods: Information about 51,116 cases of oral cancer, from all Brazilian states, between 2000 and 2012, was obtained from the Cancer Registry Information System. The clinical stage of oral cancer (dependent variable) was classified as initial (stages I and II) or advanced (stages III and IV). The relationship between the clinical stage of oral cancer and the following independent variables was analyzed: sex, age, schooling, marital status, family history of cancer, and origin of referral. Analyses on frequency distribution and multivariate binary logistic regression model were performed ($\alpha < 0.05$).

Results: Compared to individuals with no schooling, those who attended elementary to high school (OR=2.461) and college education (OR = 3.050) had a higher prevalence of advanced cases of oral cancer. Individuals without a partner (OR = 14,209) demonstrated a higher prevalence compared to married individuals. Subjects aged 20-44 years (OR = 4.081) and 45-64 years (OR = 14.875) had a higher prevalence compared to those aged 15-19 years. The variables gender, family history of cancer and origin of referral integrated the binary model of logistic regression, but did not present statistical significance.

Conclusions: Socioeconomic factors may be related to the advanced clinical stage of oral cancer.

Key words: Mouth neoplasms, neoplasm staging, social determinants of health.

Introduction

Oral malignancies are frequently found worldwide and within the Brazilian population, being the 12th most frequent tumor in Brazil (1). These are classified according to the TNM staging system recommended by the International Union Against Cancer (UICC) in four subtypes: I, II, III and IV. Classifications I and II corresponds to the initial stage with absence of metastasis; whilst stages III and IV correspond to advanced stages, in which metastatic components and detected (2,3).

The histological staging, the degree of tumor invasion and the occurrence of cervical metastases correspond to the factors that determine the prognosis of the disease and the postoperative management (1,2). The histological grade of the tumor evidenced by analyzes of lesion specimens, through a biopsy, can provide important information regarding the biological activity of the tumor cells, which directs the treatment to be instituted (4).

In addition to the biological factors of oral cancer, such as cellular aggressiveness, tumor size and presence of cervical metastases, socio-demographic health characteristics may also influence the incidence and severity of oral neoplasms (5-7). Oral squamous cell carcinoma is the most prevalent cancer type affecting oral tissues and advanced stage diagnosis of oral cancer negatively affects patient survival (8). Based on that, determining factors associated with advanced stage lesions are imperative to improve life expectancy of affected individuals.

Studies have suggested that there is a higher prevalence of head and neck cancer in socioeconomically vulnerable individuals, compared to those more privileged and with full access to medical services (9,10). Harmful habits such as smoking and drinking are considered risk factors for the development of oral cancer (2). In addition, these habits are more prevalent among the low-income population (11). Lack of dental insurance coverage also affects individuals' access to routine exams, resulting in delayed diagnosis, as most signs of oral cancers can be found through preventive dental clinical examination (12).

Individuals with low income and no health insurance are diagnosed when the disease is in a more advanced stage of aggression, usually tumors in larger size and associated with cervical metastases. Otherwise, those who have health insurance usually present the disease at an early stage, and consequently these have a better prognosis of survival (13).

Given the need for studies to verify the association of socioeconomic factors with the prevalence and progression of the clinical stage of oral cancer, the present study aimed to evaluate the distribution of cases of oral cancer and its relationship with social and economic factors in Brazil, from 2000 to 2012.

Material and Methods

A cross-sectional study was carried out using secondary data from the Hospital Registry of Cancer Information System, linked to the National Cancer Institute of Brazil (<https://irhc.inca.gov.br>). This information system assembles data from all cases of cancer under diagnosis and treatment in Brazil. This dataset was extracted from a public information system, which does not require Ethical Committee approval. Patients gave informed consent at the moment of the consultation. Data collection was carried out between August and October 2017. Data from all cases of oral cancer was retrieved from the period between 2000 and 2012, and the following information was used: clinical stage of cancer, age group, schooling, marital status, family history of cancer, and origin of referral.

The information collected was based on the International Classification of Diseases for Oncology (ICD-10), in which the following cancer sites were selected: lips (C00), tongue base (C01), tongue (C02), gum (C03), mouth (C04), palate (C05), other non-specific parts of the mouth (C06), parotid gland (C07), other major salivary glands (C08), tonsils (C09) and oropharynx (C10). The histological type of cancer was not considered for analysis; however the prevalence of oral squamous cell carcinoma was set at 85%.

A total number of 74,842 cases of oral cancer were obtained, from which the inconsistent with no information data were removed. Final sample consisted of 51,116 cases of oral cancer, which were statistically analyzed. A multivariate binary logistic regression model was created, in which the clinical stage of oral cancer corresponded to the dependent variable. The clinical stage of cancer was categorized according to the TNM classification in: initial stage (I and II) - score 0, and advanced stage (III and IV) - score 1. The independent variables corresponded to the following variables: age group, schooling, marital status, family history of cancer, and origin of referral.

Data were tabulated and statistically analyzed using the software Statistical Package for Social Sciences (SPSS, v. 20, IBM, Chicago, IL), in which a multivariate binary logistic regression model was constructed ($\alpha < 0.05$). Variables with $p\text{-value} < 0.05$ were considered statistically significant. The odds ratio and the 95% confidence interval were considered for the interpretation of results. Multivariate logistic regression calculated the chance of independent variables interfere with the prevalence of advanced stage of oral cancer.

Results

There was a higher prevalence of advanced stages of oral cancer in males (78.4%), within the age group 45-64 years (57.2%), with elementary schooling (59.1%), and under single marital status (46%). According to the

origin of the referral to the cancer diagnosis service, the highest prevalence (59.4%) was from the Brazilian Public Health System (SUS).

The highest prevalence of advanced stage of oral cancer was associated with age groups 20-44 years (OR = 4.081, *p-value* <0.001) and 45-64 years (OR = 14.875, *p-value* <0.001). Individuals over 65 years had a lower prevalence of advanced cases of cancer (OR = 0.019, *p-value* <0.001) compared to adolescents (15-19 years).

The schooling significantly interfered with the prevalence of advanced stage oral cancer; being observed that individuals with no schooling presented less frequency of advanced cases of cancer. In addition, the unmarried individuals (single, widowed and separated) presented higher chance to present advanced stage of oral cancer (OR = 14.209, *p-value* <0.001).

The variables family history of cancer and origin of referral integrated the multivariate binary logistic regression model, but did not present statistical significance with the prevalence of advanced cases of oral cancer (Table 1).

Discussion

Prevalence of oral cancer is high and estimative in Brazil correspond to 11,200 new cases in men and the 3,500 new cases in women for each year (1). In addition, oral cancer is the tenth most frequent causes of death in the world (14,15). The present study demonstrates that socio-demographic characteristics are associated with a higher prevalence of advanced-stage lesions of oral cancer, some of them being schooling and age, already described in the literature in previous studies (3,16-18). Our research team has previously demonstrated that alcohol and tobacco consumption significantly impact the prevalence of advanced stage oral cancer lesions (2). Our previous data show that tobacco is a significant risk factor for advanced stage lesions, being alcohol a modifying factor for smokers. This means that alcohol alone did not impact the prevalence of advanced stage oral cancer, whilst its association with tobacco increased significantly the prevalence of advanced stage lesions (2). The effect of deleterious habits was not considered

Table 1: Distribution of the components of the sample according to the clinical stage (I / II or III / IV) and variables included within the adjusted multivariate logistic regression model (Age group, schooling, marital status, family history of cancer, and referral origin).

Independent variables		Clinical Stage n (%)		Wald	p-value	Odds Ratio (OR)	95% C. I.	
		I or II	III or IV				Lower	higher
Age group	15-19 years	54(0.1)	29(0.1)	1992.893		1.00		
	20-44 years	1678(3.3)	4140(8.1)	304.092	<0.001	4.081	3.484	4.780
	45-64 years	6487(12.7)	22731(44.5)	1222.133	<0.001	14.875	12.785	17.305
	Over 65 years	4783(9.4)	11214(21.9)	703.727	<0.001	0.019	0.014	0.025
Schooling	None	1609(3.1)	4856(9.5)	413.845		1.00		
	Elementary to High School	7759(15)	22416(43.9)	201.710	<0.001	2.431	2.150	2.748
	College	488(1)	827(1.6)	228.357	<0.001	3.050	2.640	3.525
	No information	3146(6.2)	10015(19.6)	18.737	<0.001	1.409	1.206	1.645
Marital status	Married	3940(7.7)	12083(26.3)	1273.334		1.00		
	Single / Widowed / Divorced	2670(5.2)	10410(20.4)	1099.983	<0.001	14.209	12.146	16.621
	No information	6392(12.5)	15621(30.6)	0.087	0.768	0.981	0.864	1.114
Referral origin	Private Practice	879(1.7)	2328(4.6)	18.115		1.00		
	Public Service	4448(8.7)	25936(50.7)	0.004	0.951	525102.397	0.000	3.885E+189
	Own account	262(0.5)	623(1.2)	0.004	0.952	424941.113	0.000	3.144E+189
	No information	7413(14.5)	9227(18.1)	0.004	0.951	0.000	0.000	1.423E+178
Family history of cancer	No	2473(4.8)	12190(23.8)	233.653		1.00		
	Yes	1404(2.7)	3409(6.7)	0.004	0.952	0.000	0.000	6.007E+118
	No information	9125(17.9)	22515(44)	0.003	0.955	0.000	0.000	1.201E+119

in this analysis; but those should be considered together with the socioeconomic variables explored in the present study for the formulation of public health policies.

In the present study, we focused on the impact of socio-demographic characteristics. We choose not including deleterious habits in this study because it would significantly reduce the final sample size. As many of the registries do not include information on deleterious habits, roughly 30,000 cases would not be included in this analysis. The present study considered a final sample of 51,116 cases, in contrast with the previous study, which included 21,160 cases (2). Hereby, other important associated factors are explored in this study and they should account for public policies formulations directed to the prevention and early diagnosis of oral cancer (19).

Oral cancer is most often diagnosed at advanced stage, a fact contributes for lower patient survival and that can be justified by the lack of early diagnosis (8). As confirmed by the literature, most types of oral cancer consist of squamous cell carcinoma and the late diagnosis is frequently associated with the lack of knowledge of the signs, symptoms and causes of this disease (8). In the present study, squamous cell carcinoma consisted of 85% of all cases and diagnosis confirmation is frequently obtained in the advanced stage of the lesion, which contributes for lower patient survival (5-8).

The higher prevalence of advanced stage of oral cancer for individuals without partners (Unmarried, Single, Widowed, Divorced). can be explained by the fact that people engaged in marital relationships have more self-care and also a health support given by the partner, who tends to perceive the changes in the spouse and alerts him/her. The spouse would also act as an encouragement agent, which would guarantee greater chances of success in invasive treatments (20-23).

According to the age group, the group aged 45 to 64 years presented the higher prevalence for the development of advanced oral cancer. This fact can be explained due to cellular aging and the decrease of the regenerative capacity of the cells, together with greater exposure to carcinogenic factors, which would make them more susceptible to the development of tumors. However, it is important to point out that there is an increasing tendency for oral cancer to occur in the younger population (24).

According to the educational level, it was verified that the highest prevalence of oral cancer in advanced stages was in the group with higher education. This finding is in conflict with other literature results, which indicate that socioeconomically disadvantaged groups are related to higher rates of unemployment, low income and little access to education (25). However, the level of schooling should be considered alongside other factors related to the incidence of cancer, such as excessive consumption of alcohol, tobacco, sedentary lifestyle

and irregular diet (26,27). In the present study, 25.8% of the sample presented inaccurate data on schooling ("no information"). In addition, 58.9% of the sample is concentrated in elementary to middle school. These aspects may have significantly influenced statistical probabilities and results should be analyzed with care.

This study presents data on socioeconomic factors that are associated with a higher prevalence of advanced cases of oral cancer. However, results should be analyzed with care, since analysis was based on secondary data, which may present failures related to their collection and feeding on the information system. Although several studies in the literature have used a cross-sectional approach to investigate cause and effect associations, it is recognized this is not the best study design for such purpose.

Regarding future perspectives, we suggest new assessments using other parameters to also estimate the effects of socioeconomic factors associated with the prevalence of the advanced stage of oral cancer. It is essential to consider that this study is representative of the Brazilian population, since, it includes data from the Information System of Cancer Hospital Records, over a 12-year period. Brazil has a continental and mixed population and the results of this study can serve as the basis for the population of other countries.

The present study demonstrates that socioeconomic factors may be related to the advancement of the clinical stage of oral cancer. Therefore, the importance of recognition of its clinical signs and early diagnosis should be better disseminated to the population to reduce the prevalence of unfavorable prognoses.

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Conflict of interest

None declared.

8. ARTIGO 5

O manuscrito a seguir foi submetido para publicação no periódico “BMC Public Health” e encontra-se em análise.

A INFLUÊNCIA DO CONTEXTO SOCIOECONÔMICO NA VALORAÇÃO EM SAÚDE, FRENTE AO CÂNCER DE BOCA

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RESUMO

Estudos de valoração em saúde são relevantes para identificar preferências dos indivíduos e fatores que podem interferir na escolha e adoção de determinada terapia, frente a um problema de saúde. **Objetivo:** Realizar uma análise de valoração da saúde para o câncer de boca, verificando a influência do contexto socioeconômico e de saúde bucal sobre as preferências dos indivíduos. **Metodologia:** Realizou-se um estudo observacional transversal, de pesquisa de campo, por meio das análises de Aposto Padrão (AP) e Disponibilidade a Pagar (DAP) para um tratamento hipotético, que levaria à melhora de um câncer de língua, em diferentes circunstâncias. Foram coletados: sexo, faixa etária, renda familiar, escolaridade, Carga de Doença Bucal (CDB) e impacto da saúde bucal na qualidade de vida (OHIP-14), por meio de um questionário digital, aplicado para 280 indivíduos. Regressões multivariadas de Poisson e Binomial Negativa foram desenvolvidas, verificando o efeito das variáveis independentes sobre a AP e DAP, considerando $p < 0,05$ e IC95%. **Resultados:** Para neoplasia em língua, sem metástase, indivíduos mais jovens ($B = -0,250$; $p = 0,023$) e com menor escolaridade ($B = -0,767$; $p < 0,001$) apresentaram menor AP. Menor DAP foi

verificada para sexo masculino ($B=-1,945$; $p<0,001$), menor renda ($B=-1,237$; $p=0,039$) e maior impacto da saúde bucal na qualidade de vida ($B=-0,062$; $p=0,001$). Na suposição de ocorrência de metástase, nenhuma variável teve associação com AP, sendo verificada menor DAP em homens ($B=-1,821$; $p<0,001$), com menor renda ($B=-1,396$; $p=0,016$) e maior impacto da saúde bucal na qualidade de vida ($B=-0,066$; $p<0,001$). **Conclusão:** Aspectos socioeconômicos influenciam na valoração da saúde para o câncer de boca. Indivíduos mais jovens e com menor escolaridade aceitariam menores riscos para obter melhora, em caso de não haver piora ou agravamento do quadro (sem metástase). Homens, com menor renda e mais impacto da saúde bucal na qualidade de vida pagariam menos pelo tratamento do câncer de boca.

Palavras-chave: Neoplasias bucais. Economia da Saúde. Fatores Socioeconômicos.

Introdução

O câncer bucal figura entre as neoplasias mais frequentes no mundo, com incidência crescente. Dados globais apontam que, em 2020, foram estimados cerca de 530 mil novos casos da doença. No mesmo ano, ocorreram 6192 óbitos por câncer de boca no Brasil. Atualmente, são estimados 15100 novos casos, por ano, no país até 2025, sendo 10900 em homens^{1,2}.

A doença apresenta grande heterogeneidade quanto à etiologia, evolução clínica e prognóstico, os quais são influenciados em grande parte pela estrutura anatômica atingida^{3,4}. De forma geral, os fatores de risco mais relevantes são o tabagismo e o alcoolismo, especialmente quando associados^{2,5}. Lesões localizadas na língua apresentam pior prognóstico, com maior risco de metástase⁶.

Estudos de prevalência demonstram a estreita relação entre o contexto socioeconômico dos indivíduos e o câncer de boca^{7,8,9}. Observam-se maiores taxas, especialmente, em indivíduos com menor nível de escolaridade e em locais com maior desigualdade econômica^{10,11,12}. Dessa forma, faz-se necessária a elucidação sobre o papel determinante desse contexto sobre a doença, visando o

direcionamento de políticas públicas intersetoriais de combate às iniquidades em saúde.

O uso racional e eficiente dos recursos, de acordo com o cenário socioeconômico de usuários dos sistemas de saúde, é fundamental para tornar as políticas implantadas mais efetivas. Nessa perspectiva, estudos em economia da saúde são úteis, permitindo um melhor planejamento das ações e programas¹³.

Destacam-se os estudos de valoração em saúde, que se propõem a analisar as preferências de indivíduos por determinados resultados de saúde, frente a condições de incerteza, implicando o sacrifício que estariam dispostos a fazer para adotar uma intervenção (Aposta Padrão – AP) e o valor máximo que considerariam investir (Disponibilidade a Pagar - DAP)¹⁴.

A Aposta Padrão permite conhecer e mensurar a preferência de um indivíduo por determinado desfecho de saúde, na qual ele poderá escolher entre viver com certeza em determinada condição ou apostar em uma nova intervenção, na qual existem riscos desconhecidos¹⁴. A presença de incertezas influenciando a escolha é uma vantagem da AP, pois se assemelha ao observado na vida real para a maioria dos processos de tomada de decisão relativos à saúde¹⁵.

A Disponibilidade a Pagar consiste em avaliar a força de preferência de um indivíduo por um tratamento de saúde, baseada no valor máximo (*out-of-pocket*) que este estaria disposto a sacrificar para tal. A Valoração Contingente (VC) e os Experimentos de Escolha Discreta (EED) são os principais métodos usados para estimar medidas de DAP. Os EED consideram atributos ou características, que podem receber diferentes valores para os usuários. Diante da possibilidade de um atributo poder ser ignorado durante o processo de escolha, o método VC é considerado como o mais indicado. Neste, cenários hipotéticos de tratamentos de saúde são apresentados e o indivíduo deve responder o quanto estaria disposto a pagar por essa intervenção ou tratamento¹³.

Não foram identificados na literatura estudos desenvolvidos no Brasil sobre Disponibilidade a Pagar e Aposta Padrão para o câncer de boca, bem como não há questionários sobre o tema validados no país.

Assim, o objetivo deste estudo foi realizar uma análise de valoração da saúde para o câncer de boca, verificando a influência do contexto socioeconômico e de saúde bucal sobre as preferências dos indivíduos.

Materiais e Métodos

Realizou-se um estudo observacional, do tipo transversal, quantitativo e analítico, consistindo em pesquisa de campo sobre valoração da saúde, por meio da Disponibilidade a Pagar e Aposta Padrão. Todos os preceitos nacionais (Resolução CNS/MS Nº 466/2012) e internacionais (Declaração de Helsinque) relacionados à ética em pesquisa envolvendo seres humanos foram respeitados. A pesquisa foi submetida ao Comitê de Ética em Pesquisa da Universidade Federal da Paraíba, e aprovada, conforme protocolo 28166820.5.0000.5188.

O tamanho da amostra foi calculado por meio de cálculo amostral para populações finitas. Considerando uma população estimada de 1.000.000, nível de significância de 95%, erro amostral de 5%, proporção esperada de 90% e efeito do desenho de 2,0, obteve-se um mínimo de 277 participantes. Considerando um acréscimo de 20% para eventuais perdas, foi definida uma amostra representativa de 347 indivíduos. Esta foi constituída por indivíduos de ambos os sexos, com idade igual ou superior a 18 anos, usuários ou não de serviços públicos de saúde, residentes em qualquer estado brasileiro, que aceitaram participar do estudo após consentimento informado. Os participantes foram convidados para a pesquisa por meio de mídias digitais. Os dados foram coletados por meio de questionários digitais (Google Forms - <<https://forms.gle/BETXZiMj6tc1cUoE9>>).

Foram coletados dados relativos ao contexto socioeconômico do participante: sexo, faixa etária, renda familiar e nível de escolaridade. Além disso, informações referentes à Carga de Doença Bucal (CDB), que corresponde ao número de problemas bucais apresentados pelo indivíduo (cárie, doença periodontal, dentes perdidos e necessidade de prótese) também foram coletadas. A CDB pode variar entre 0-4, com um maior escore indicando a pior situação possível¹⁶.

Os participantes responderam, ainda, a frequência com que experimentaram problemas de saúde bucal nos últimos 6 meses, avaliados pela

versão validada para o Brasil do Oral Health Impact Profile (OHIP-14)¹⁷. Os escores foram obtidos pela soma dos valores atribuídos aos 14 itens da escala, podendo variar entre 0 e 56 pontos. Quanto maior a pontuação atingida, maior o impacto da Saúde Bucal na qualidade de vida.

Foi aplicado o questionário de Aposta Padrão, no qual os participantes foram solicitados a imaginar que seriam acometidos por uma lesão de câncer na língua, em dois diferentes cenários: sem metástase e com metástase. A metástase foi definida como: “lesão em estágio avançado, podendo se espalhar para outras partes do corpo”. Nesse contexto, foi sugerida a existência de um suposto tratamento para o câncer, cuja taxa de sucesso seria desconhecida, podendo levar à cura ou à morte. Os participantes deveriam responder qual a probabilidade mínima de sucesso necessária para aceitação do novo tratamento. Esse parâmetro foi considerado a efetividade necessária para adotar o tratamento nas situações hipotéticas descritas. Os escores obtidos foram revertidos para o cálculo da AP.

Assim, se a taxa mínima de sucesso exigida pelo respondente foi de 80% para aceitar o novo tratamento, considera-se que o risco de erro aceito (“aposta”) foi de 20%, pontuando a AP em 0,2. A AP pode variar de 0 a 1 e, quanto menor o escore, menor o risco tolerado e maior a utilidade/valoração em saúde¹⁴. Para fins estatísticos, os valores de AP foram transformados em percentuais que variaram de 0 a 100, a fim de possibilitar o uso da Regressão de Poisson.

Ainda, foi aplicado um questionário de Disponibilidade a Pagar, baseado no modelo de preferência declarada¹⁸. Os participantes foram instruídos a informar o valor de pagamento privado (*out-of-pocket*) que estariam dispostos a pagar em um tratamento para obter a cura do câncer, considerando dois diferentes cenários: lesão na língua sem ou com metástase. A metástase foi definida como: “lesão em estágio avançado, podendo se espalhar para outras partes do corpo”. Os respondentes informaram um valor numérico inteiro, sem intervalos.

Foi realizado um estudo piloto com 32 participantes, o qual foi reaplicado para os mesmos indivíduos após duas semanas. A consistência interna dos questionários foi calculada por meio do coeficiente Alfa de Cronbach, sendo encontrado o valor de 0,941 (consistência interna muito alta). O teste de

adequação da amostra de Kaiser-Meyer-Olkin (KMO) resultou em um escore de 0,846 e o teste de esfericidade de Bartlett apresentou significância estatística ($p < 0,001$), indicando boa correlação entre as variáveis.

Os dados foram tabulados e analisados no programa IBM Statistical Package for Social Sciences (IBM SPSS, v. 24, IBM, Chicago, IL). Foram obtidas as frequências de todas as variáveis individuais para caracterização da amostra. Regressões múltiplas de Poisson foram desenvolvidas, considerando Aposto Padrão como variável dependente. Para análise dos fatores associados à Disponibilidade a Pagar, empregou-se modelo de regressão múltipla do tipo Binomial Negativa. As variáveis sócio-demográficas (sexo, escolaridade, faixa etária e renda), assim como o impacto da saúde bucal na qualidade de vida (OHIP-14) e a Carga de Doença Bucal (CDB) foram consideradas variáveis independentes em ambos os modelos de regressão. Foram consideradas estatisticamente significantes variáveis com $p\text{-valor} < 0,05$. Verificou-se que a remoção de variáveis sem significância estatística não modificaria as estimativas do modelo. Portanto, o modelo final incluiu todas as variáveis em estudo. Valores de razão de prevalência (RP) e intervalo de confiança (IC95%) foram obtidos. O Coeficiente de Regressão B foi utilizado para estimar o efeito de cada variável independente nas variáveis dependentes, considerando-se $p < 0,05$.

Resultados

Participaram da pesquisa 280 indivíduos, entre 18 e 79 anos, sendo 63,9% do sexo feminino. Dentre o universo da amostra, 93,6% possuíam nível superior e 39,3% referiram renda familiar superior a 5 salários mínimos. A amostra apresentou média de 7,48 para OHIP-14 e de 1,90 para CDB, indicando uma maioria com boas condições de saúde bucal, cujo impacto sobre a qualidade de vida é baixo.

A Tabela 1 demonstra os dados descritivos da Aposto Padrão e da Disponibilidade a Pagar, considerando a suposição de melhor e pior prognóstico. Na ocorrência de metástase, observa-se que os participantes tolerariam maior risco de insucesso no tratamento e pagariam mais para obter melhora no quadro.

Tabela 1 – Dados descritivos das variáveis desfecho do estudo.

Variável	Média	Desvio Padrão	Mediana	Q25-Q75
Aposta Padrão (Sem metástase)	32,47	26,25	30	10-50
Aposta Padrão (Com metástase)	41,52	29,52	40	10-60
Disponibilidade a Pagar (Sem metástase)	1285915	10317416	10000	4500-100000
Disponibilidade a Pagar (Com metástase)	1385566	10352586	17500	5000-100000

Diante do cenário de uma neoplasia localizada na língua, sem metástase, a análise estatística demonstrou que os indivíduos mais jovens ($B=-0,250$; $p=0,023$) e com menor escolaridade ($B=-0,767$; $p<0,001$) apresentaram menor Aposta Padrão para o tratamento hipotético, sendo mais resistentes ao risco de insucesso. Também se pode inferir que os indivíduos mais jovens tiveram uma probabilidade 22% menor de aceitarem menos riscos em relação aos mais velhos ($RP=0,779$). Indivíduos com formação escolar até o ensino médio apresentaram uma probabilidade 54% menor de aceitarem menos riscos em relação aos com nível superior ($RP=0,464$) (Tabela 2).

Tabela 2 – Regressão múltipla de Poisson para determinar o efeito das variáveis independentes na Aposto Padrão, diante de uma lesão maligna localizada na língua, sem metástase.

Parâmetro	B	Erro Padrão	p-valor	RP	I.C. 95%	
					Inferior	Superior
Sexo (Masculino)	0,126	0,0967	0,191	1,135	0,939	1,372
Sexo (Feminino)	Ref.			Ref.		
Escolaridade (Ensino Médio)	-0,767	0,2286	0,001	0,464	0,297	0,727
Escolaridade (Nível Superior)	Ref.			Ref.		
Faixa Etária (Até 30 anos)	-0,250	0,1100	0,023	0,779	0,628	0,966
Faixa Etária (Acima de 30 anos)	Ref.			Ref.		
Renda (Até 2 salários mínimos)	0,254	0,1331	0,057	1,289	0,993	1,672
Renda (Entre 2-5 salários mínimos)	0,006	0,1204	0,961	1,006	0,794	1,274
Renda (Acima de 5 salários mínimos)	Ref.			Ref.		
Escore OHIP-14	-0,004	0,0062	0,505	0,996	0,984	1,008
Escore Carga Doença Bucal	-0,033	0,0513	0,520	0,967	0,875	1,070

B: Coeficiente de Regressão; p-valor: Significância estatística; I.C. 95%: Intervalo de Confiança a 95%; Ref.: Categoria de referência.

Quanto à Disponibilidade à Pagar (Tabela 3), verificou-se que indivíduos do sexo masculino ($B=-1,945$; $p<0,001$), de menor renda ($B=-1,237$; $p=0,039$) e maior impacto de saúde bucal na qualidade de vida (OHIP) ($B=-0,062$; $p=0,001$) estariam dispostos a pagar menos pelo suposto tratamento. Observando os valores de RP, infere-se que: homens teriam probabilidade 86% menor de pagarem menos em relação às mulheres ($RP=0,143$); para indivíduos com menor renda, essa probabilidade seria 71% menor em relação aos de renda elevada ($RP=0,290$); já em indivíduos com maior OHIP, a probabilidade de pagar menos seria 6% menor ($RP=0,940$).

Tabela 3 – Regressão múltipla, do tipo Binomial Negativa, para determinar o efeito das variáveis independentes na Disponibilidade a Pagar diante de uma lesão maligna localizada na língua, sem metástase.

Parâmetro	B	Erro Padrão	p-valor	RP	I.C. 95%	
					Inferior	Superior
Sexo (Masculino)	-1,945	0,4518	<0,001	0,143	0,059	0,347
Sexo (Feminino)	Ref.			Ref.		
Escolaridade (Ensino Médio)	0,879	0,9600	0,360	2,409	0,367	15,816
Escolaridade (Nível Superior)	Ref.			Ref.		
Faixa Etária (Até 30 anos)	-0,024	0,6347	0,970	0,976	0,281	3,386
Faixa Etária (Acima de 30 anos)	Ref.			Ref.		
Renda (Até 2 salários mínimos)	-1,237	0,5986	0,039	0,290	0,090	0,939
Renda (Entre 2-5 salários mínimos)	-0,779	0,7832	0,320	0,459	0,099	2,129
Renda (Acima de 5 salários mínimos)	Ref.			Ref.		
Escore OHIP-14	-0,062	0,0186	0,001	0,940	0,906	0,975
Escore Carga Doença Bucal	-0,240	0,2331	0,303	0,787	0,498	1,242

B: Coeficiente de Regressão; p-valor: Significância estatística; I.C. 95%: Intervalo de Confiança a 95%; Ref.: Categoria de referência.

Na ocorrência de neoplasia na língua, com presença de metástase, verificou-se que nenhuma variável influenciou significativamente a Aposto Padrão (Tabela 4). A Tabela 5 demonstra que os homens ($B=-1,821$; $p<0,001$), de menor renda ($B=-1,396$; $p=0,016$) e com maior impacto de saúde bucal na qualidade de vida (OHIP) ($B=-0,066$; $p<0,001$) apresentaram menor Disponibilidade a Pagar, tal qual ocorreu no cenário anterior. A interpretação dos valores de RP demonstra que homens teriam probabilidade 84% menor de pagarem menos em relação às mulheres ($RP=0,162$); participantes com menor renda apresentaram probabilidade 75% menor de pagar menos em relação aos de renda elevada ($RP=0,248$); já em indivíduos com maior OHIP, essa probabilidade seria 6% menor ($RP=0,936$).

Tabela 4 – Regressão múltipla de Poisson para determinar o efeito das variáveis independentes na Aposto Padrão, diante de uma lesão maligna localizada na língua, com metástase.

Parâmetro	B	Erro Padrão	p-valor	RP	I.C. 95%	
					Inferior	Superior
Sexo (Masculino)	0,057	0,0847	0,502	1,059	0,897	1,250
Sexo (Feminino)	Ref.			Ref.		
Escolaridade (Ensino Médio)	-0,390	0,2052	0,057	0,677	0,453	1,012
Escolaridade (Nível Superior)	Ref.			Ref.		
Faixa Etária (Até 30 anos)	-0,108	0,1004	0,281	0,897	0,737	1,093
Faixa Etária (Acima de 30 anos)	Ref.			Ref.		
Renda (Até 2 salários mínimos)	0,122	0,1208	0,313	1,129	0,891	1,431
Renda (Entre 2-5 salários mínimos)	-0,006	0,1097	0,953	0,994	0,801	1,232
Renda (Acima de 5 salários mínimos)	Ref.			Ref.		
Escore OHIP-14	0,001	0,0053	0,840	1,001	0,991	1,012
Escore Carga Doença Bucal	0,004	0,0496	0,932	1,004	0,911	1,107

B: Coeficiente de Regressão; p-valor: Significância estatística; I.C. 95%: Intervalo de Confiança a 95%; Ref.: Categoria de referência.

Tabela 5 – Regressão múltipla, do tipo Binomial Negativa, para determinar o efeito das variáveis independentes na Disponibilidade a Pagar diante de uma lesão maligna localizada na língua, com metástase.

Parâmetro	B	Erro Padrão	p-valor	RP	I.C. 95%	
					Inferior	Superior
Sexo (Masculino)	-1,821	0,4451	<0,001	0,162	0,068	0,387
Sexo (Feminino)	Ref.			Ref.		
Escolaridade (Ensino Médio)	1,226	0,8919	0,169	3,407	0,593	19,566
Escolaridade (Nível Superior)	Ref.			Ref.		
Faixa Etária (Até 30 anos)	0,000	0,5959	1,000	1,000	0,311	3,215
Faixa Etária (Acima de 30 anos)	Ref.			Ref.		
Renda (Até 2 salários mínimos)	-1,396	0,5822	0,016	0,248	0,079	0,775
Renda (Entre 2-5 salários mínimos)	-0,870	0,7780	0,263	0,419	0,091	1,924
Renda (Acima de 5 salários mínimos)	Ref.			Ref.		
Escore OHIP-14	-0,066	0,0176	<0,001	0,936	0,904	0,969
Escore Carga Doença Bucal	-0,176	0,2097	0,400	0,838	0,556	1,264

B: Coeficiente de Regressão; p-valor: Significância estatística; I.C. 95%: Intervalo de Confiança a 95%; Ref.: Categoria de referência.

Discussão

O presente estudo demonstrou que os aspectos socioeconômicos possuem efeito significativo sobre a valoração da saúde para o câncer de boca. Verificou-se que os participantes da pesquisa estavam dispostos a enfrentar menor risco e menores custos para o tratamento do câncer de boca sem metástase. Foi evidenciado que, diante de um tumor com melhor prognóstico, indivíduos mais jovens e com menor escolaridade aceitariam um tratamento com menores riscos de insucesso; ao passo que os homens com menor renda e maior impacto da saúde bucal sobre sua qualidade de vida pagariam menos pelo tratamento. Em um quadro de pior prognóstico, as variáveis estudadas não

influenciaram quanto à aposta no tratamento, e foram observados os mesmos fatores de influência na Disponibilidade a Pagar do quadro clínico anterior.

A análise da utilidade em saúde reflete a forma como um indivíduo opta por uma escolha racional, quando não tem certeza do resultado. Nessa perspectiva, ele irá escolher a opção com a maior utilidade esperada. As preferências podem variar de acordo com diferentes fatores, tais como quadros clínicos hipotéticos de maior ou menor gravidade, comportamentos de saúde e aspectos socioeconômicos individuais¹⁴. Diante de um quadro de maior incerteza, como o tratamento de câncer de boca com metástase, os participantes da pesquisa sugeriram maior disposição a enfrentar os riscos e os custos do tratamento.

Estudos de utilidade em saúde voltados para o câncer de boca têm sido desenvolvidos na perspectiva de escolha de modalidades de tratamentos disponíveis, nos quais as ferramentas de Aposta Padrão e Disponibilidade a pagar são utilizadas^{19,20}. Entretanto, a literatura é escassa no que se refere à abordagem desenvolvida no presente artigo, que enfatiza aspectos contextuais do indivíduo sobre suas preferências. Trata-se, portanto, de um estudo pioneiro, o qual oportuniza diferentes possibilidades de investigações nesta perspectiva sobre o tema.

A Disponibilidade a Pagar é um dos métodos de avaliação econômica mais utilizados na Odontologia, empregada especialmente em relação à escolha por procedimentos odontológicos²¹. No presente estudo, a DAP foi menor entre os homens, resultado similar ao observado previamente em outras análises^{22,23}. Verifica-se que as mulheres tendem a apresentar maior valorização da saúde de forma geral, apresentando maior frequência na procura pelos serviços de saúde²⁴.

A renda é um fator modificador da DAP amplamente discutido na literatura. Relata-se que indivíduos com maiores renda e capacidade de pagamento tendem a se disponibilizar a pagar mais por serviços de saúde²⁵. Resultados de associação entre menor DAP e menor renda familiar, semelhantes aos do presente estudo, foram verificados por diferentes autores^{21,22,25}.

O Brasil conta com um sistema de saúde público universal e gratuito há mais de 30 anos (Sistema Único de Saúde - SUS), o qual disponibiliza tratamento para

o câncer de boca. Essa oferta gratuita pode influenciar a DAP reportada pelos participantes, especialmente na parcela que utiliza preferencialmente o SUS ou depende exclusivamente do sistema. Um estudo conduzido na Finlândia comparou a DAP para procedimentos odontológicos realizados no setor privado e no serviço público. Este último disponibiliza tratamentos a preços mais baratos naquele país. Foi verificado que quase a totalidade dos entrevistados (93,2%) se dispôs a pagar um preço menor que a tarifa reduzida cobrada no serviço público. No estudo citado, a renda elevada e a ausência de necessidade subjetiva de tratamento estiveram associadas a uma maior DAP²⁶.

Verificou-se que, um maior impacto de problemas bucais sobre a qualidade de vida (OHIP) reduziu a DAP dos participantes pela remissão do câncer. Trata-se de um achado inesperado, uma vez que a literatura relata que o nível de perturbação das atividades da vida cotidiana do paciente pelas doenças, reflete-se nos valores de utilidade em saúde²³. Entretanto, estudos reportam que indivíduos que apresentam maior impacto da saúde bucal sobre sua vida são também os de menor renda familiar^{16,27}. Assim, a renda pode ser o fator preponderante de maior peso sobre a redução da DAP, conforme discutido anteriormente.

Indivíduos com menor escolaridade foram mais resistentes ao suposto tratamento, apresentando menores escores de Aposto Padrão. Segundo a literatura, indivíduos com menos anos de estudo apresentam menor conhecimento acerca do câncer de boca, inclusive em relação a fatores de risco, sintomas e tratamento^{28,29}. Estudos apontam, ainda, que esse grupo apresenta diagnósticos de câncer mais tardios, com estágios avançados da doença e pior prognóstico³⁰. Assim, apesar da AP ser derivada da teoria da utilidade esperada, presumindo que um indivíduo seria racional e tomaria decisões para alcançar a máxima utilidade em saúde, isso pode nem sempre ser verificado, especialmente em populações com conhecimentos e atitudes de saúde ruins, bem como recursos de saúde escassos¹⁴.

Nesta investigação, indivíduos mais jovens tolerariam menor risco de insucesso no tratamento para o câncer de língua sem metástase. Um estudo que observou a AP em relação a condições gerais de saúde bucal corrobora nossos

achados¹⁴. Pode ser possível que os jovens apresentem maiores expectativas quanto à longevidade, refletindo numa maior valoração de sua saúde.

Diante de um suposto quadro de metástase, verificou-se que a média e mediana de AP foram mais altos, indicando maior tolerância ao risco de insucesso. Ainda, nenhuma variável dependente influenciou a Aposta Padrão nesse caso. Infere-se que, em situações de maior gravidade, os indivíduos mostram-se mais aflitos e dispostos a maior sacrifício pela melhora da condição. Além disso, os fatores subjetivos possuem ainda mais força, refletindo na redução da capacidade preditiva e na natureza individual da valoração da saúde²¹.

A análise descritiva da amostra deste estudo demonstrou que a maioria dos participantes possuía status socioeconômico privilegiado, com nível superior e renda elevada, além de boa saúde bucal, observada pelas médias baixas de OHIP e carga de doença bucal. Estudos anteriores demonstraram relação semelhante entre maior escolaridade/renda e melhores condições de saúde bucal^{16,31}. Entretanto, ressalta-se que essa não é a realidade encontrada na maioria da população brasileira¹⁶, sendo necessária cautela na interpretação dos achados do estudo.

A caracterização dessa amostra pode ser explicada pelo fato de que a divulgação da pesquisa e coleta de dados foram desenvolvidas em mídias digitais, nas quais esses grupos estão fortemente inseridos. Este fato representa uma limitação do estudo, resultando em um viés de seleção. Entretanto, esperou-se superar esse problema por meio de uma análise estatística robusta. Assim, os resultados podem ser considerados representativos para a atual amostra, considerando sua homogeneidade quanto ao elevado status socioeconômico.

É importante ressaltar que fatores subjetivos desempenham papel relevante na tomada de decisão em saúde: experiência pessoal do paciente, nível cognitivo, aversão à perda (tendência a preferir evitar perdas para adquirir ganhos equivalentes) e tendência em superestimar um possível sofrimento causado por novos tratamentos, ao invés de focar nos resultados finais de saúde^{14,32}. Outros fatores são a tendência ao negacionismo científico e descrença em modalidades terapêuticas desconhecidas, que se tornaram ainda mais latentes após o período pandêmico³³.

Apesar da natureza essencialmente quantitativa da atual metodologia proposta, a complexidade desta investigação vislumbra o apoio de outras metodologias, a exemplo da abordagem qualitativa. A cultura dos indivíduos envolve suas aspirações, crenças, valores, padrões de comportamento, e estão em constante processo de evolução³⁴. Esses aspectos influenciam comportamentos e escolhas em saúde. No entanto, sua quantificação é inviável. Assim, esse estudo abre uma gama de possibilidades de investigações futuras.

Estudos posteriores com metodologia similar devem ser desenvolvidos em outras populações, com amostras heterogêneas e em realidades socioeconômicas distintas, para fins de comparação entre os achados. Além disso, o desenvolvimento de estudos de valoração da saúde em pacientes acometidos e/ou com histórico de câncer oral, em um estudo tipo caso-controle, mostra-se promissor.

Conclusão

Aspectos socioeconômicos e o impacto das condições bucais sobre a qualidade de vida influenciam na valoração da saúde em relação ao câncer de boca. Indivíduos mais jovens e com menor escolaridade aceitariam menores riscos para obter melhora da doença. Homens, com menor renda e pior qualidade de vida devido aos problemas bucais pagariam menos pelo tratamento.

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9. DISCUSSÃO

Este estudo investigou a influência da realidade socioeconômica sobre o diagnóstico, hospitalizações e óbitos de indivíduos pelo câncer de boca, bem como sobre sua valoração em saúde frente à doença. Para tal, foram desenvolvidas diferentes frentes de análise.

No primeiro plano de análise (PA 1) foi possível verificar o modo com o qual o acesso ao diagnóstico, a estruturação da rede de assistência hospitalar e a frequência de hospitalizações pelo câncer de boca variam conforme as condições socioeconômicas dos municípios de residência dos pacientes. Observou-se que a presença de uma rede hospitalar melhor estruturada nos grandes centros urbanos contribuiu para uma maior frequência de diagnósticos de lesões em mucosa oral. Ao mesmo tempo, estas cidades tendem a apresentar acentuada concentração de renda (FERREIRA et al., 2012), o que se refletiu na associação estatística entre desigualdade e diagnósticos.

Esse efeito das disparidades demográficas sobre a assistência e as condições de saúde da população foi relatada em estudos prévios (CASOTTI et al., 2014; HERRERA-SERNA et al., 2019), e confirmada pelos resultados encontrados no terceiro plano de análise deste trabalho. O PA 3 demonstrou que uma menor cobertura de serviços públicos de saúde bucal na assistência primária e secundária impactou no aumento de casos e óbitos pelo câncer de boca. Estudos recentes desenvolvidos no Brasil também verificaram achados semelhantes (ROCHA et al., 2017; CUNHA; PRASS; HUGO, 2019; RAYMUNDO et al., 2021).

O segundo plano de análise (PA 2) desta pesquisa permitiu observar que a relação entre desigualdades sociais e câncer oral pode ser extrapolada para demais países emergentes da América Latina, mesmo diante da heterogeneidade desta região. Além disso, contribuiu para uma reflexão acerca da necessidade de responsabilização governamental da assistência à saúde e adoção de uma visão ampla sobre o combate ao câncer de boca. Este demanda a implantação de políticas públicas intersetoriais, e de proteção social. Ainda, mostrou uma possível ineficiência do setor privado, já relatada previamente na literatura (FRENK; GÓMEZ-DANTÉS, 2018), aqui evidenciada pela associação entre maior mortalidade e maiores gastos privados com saúde.

O PA 4 considerou a severidade dos casos de câncer de boca, e apresentou um resultado contrário em relação ao demonstrado pelos demais planos, contrariando também a literatura (CONWAY et al., 2008; CONWAY et al., 2015). Uma maior proporção de casos avançados esteve associada à maior escolaridade dos indivíduos. Apesar de esse achado ressaltar a necessidade do estudo dos diversos fatores de risco para o câncer em conjunto, a análise descritiva da amostra ilustra uma homogeneidade quanto aos níveis de escolaridade, com quase 60% dos participantes concentrados em uma mesma categoria (até ensino médio). Isto demanda, então, cautela na interpretação desse resultado.

Mesmo com o uso de sistemas de informação e bancos de dados oficiais, com grande tamanho amostral, os resultados demonstrados pelos estudos ecológicos dos PA 1-4 devem ser analisados com cuidado, por serem provenientes de dados secundários. Há possibilidade de erros relacionados à coleta desses dados e alimentação dos sistemas, muitas vezes decorrentes da falta de treinamento adequado dos profissionais responsáveis pelas notificações (GAVA et al, 2016). Além disso, os estudos possuem delineamento transversal, o qual não é o melhor desenho para investigação de associações do tipo causa e efeito.

A análise de valoração em saúde frente ao câncer de boca, apresentada no PA 5, é pioneira na literatura e pode fomentar diversas investigações posteriores. Verificou-se que, similarmente ao observado quanto às taxas de morbimortalidade do câncer de boca, o sexo, a renda e a escolaridade são fatores contextuais de destaque, os quais influenciam a utilidade em saúde e escolhas dos indivíduos. Esses achados estão em conformidade com o observado previamente por outros autores (SOUZA et al, 2014; VERNAZZA et al., 2014; NOEL et al., 2015; MCKENNA et al., 2016).

Esse estudo permitiu reconhecer que o contexto socioeconômico interfere nas decisões em saúde e preferências dos usuários, mesmo diante de uma doença grave. Assim, faz-se necessário que os gestores e profissionais de saúde considerem as particularidades da comunidade-alvo da ação, programa ou política a ser implantada, para que os recursos disponíveis possam ser direcionados com o máximo de eficiência (ACHARYA et al., 2019).

Ainda no PA 5, limitações decorrentes da composição da amostra (majoritariamente composta por indivíduos com nível socioeconômico alto) e da natureza quantitativa da abordagem metodológica proposta (a qual não é capaz de mensurar comportamentos e contextos culturais dos indivíduos) podem ser citadas. Os resultados desse estudo são válidos para o contexto tempo-espaço no qual a pesquisa foi realizada, por se tratar de um estudo de avaliação econômica (ALHARTH et al., 2022).

Este estudo servirá de base para investigações futuras, as quais poderão ser replicadas em diferentes populações, considerando outras características contextuais e fatores de risco. Além disso, o desenvolvimento de metodologia semelhante, propondo uma análise de valoração em saúde com pacientes acometidos pelo câncer de boca, em um estudo tipo caso-controle, mostra-se promissor.

10. CONCLUSÃO

Este estudo concluiu que os fatores socioeconômicos estão fortemente associados ao diagnóstico, hospitalizações e óbitos por câncer de boca, sendo a desigualdade, escolaridade, sexo e idade fatores de maior relevância. De modo geral, verificou-se que áreas com maior proporção de indivíduos do sexo masculino, mais velhos, com menor nível educacional, maior desigualdade socioeconômica e menor cobertura de serviços públicos de saúde bucal apresentam piores indicadores relacionados ao câncer de boca.

Além disso, o contexto socioeconômico e o impacto das condições bucais sobre a qualidade de vida influenciam na valoração em saúde para a doença. Indivíduos mais jovens e com menor escolaridade aceitariam menores riscos para obter melhora. Homens, com menor renda e impacto da saúde bucal na qualidade de vida pagariam menos por um novo tratamento.

O presente estudo pode contribuir para subsidiar o entendimento acerca do papel determinante do contexto socioeconômico sobre o câncer de boca, fornecendo evidências para incentivar a implementação de políticas públicas intersetoriais de combate às desigualdades socioeconômicas e iniquidades em saúde. Contribui também para o fortalecimento da saúde pública no Brasil e em populações semelhantes.

Ainda, por meio do estudo dos fatores que influenciam a valoração em saúde para o câncer de boca, buscou-se auxiliar o planejamento e condução dessas políticas. Foi evidenciado o fato de que as características dos grupos sociais e as preferências dos usuários devem ser consideradas, o que pode permitir o direcionamento dos recursos disponíveis de forma eficiente e racional.

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ANEXO A –CERTIDÃO DE APROVAÇÃO DO COMITÊ DE ÉTICA (UFPB)

CENTRO DE CIÊNCIAS DA SAÚDE DA UNIVERSIDADE FEDERAL DA PARAÍBA - CCS/UFPB 												
PARECER CONSUBSTANCIADO DO CEP												
DADOS DA EMENDA Título da Pesquisa: Análise econômica de utilidade do estado de saúde bucal e disponibilidade a pagar por atributos do cuidado em saúde bucal. Pesquisador: DEBORAH ELLEN WANDERLEY GOMES FREIRE Área Temática: Versão: 4 CAAE: 28166820.5.0000.5188 Instituição Proponente: Programa de Pós-graduação em Odontologia Patrocinador Principal: Financiamento Próprio												
DADOS DO PARECER Número do Parecer: 4.686.199 Apresentação do Projeto: Projeto de pesquisa desenvolvido por DEBORAH ELLEN WANDERLEY GOMES FREIRE pelo Programa de Pós-graduação em Odontologia da UFPB. Objetivo da Pesquisa: Objetivo Primário: Realizar uma análise econômica em saúde por meio da utilidade do estado de saúde bucal e da disponibilidade a pagar. Objetivo Secundário: Caracterizar o perfil socioeconômico da amostra; Calcular o impacto da saúde bucal na qualidade de vida; Analisar a valoração em saúde (utilidade) de usuários de serviços públicos de saúde, e respectivos fatores associados; Analisar a disponibilidade a pagar de usuários de serviços públicos de saúde, e respectivos fatores associados. Avaliação dos Riscos e Benefícios: Riscos: Cansaço ou aborrecimento ao responder questionários; Constrangimento ao se expor durante a realização de rápido exame intrabucal ou desconforto; Risco de quebra de sigilo. Benefícios: A análise da utilidade do estado de saúde bucal e a disposição a pagar por determinados atributos do cuidado podem subsidiar a tomada de decisões, o planejamento e a organização das equipes e do seu processo de trabalho, permitindo o uso racional e eficiente dos recursos de acordo com as necessidades e os atributos que são mais valorizados pelo usuário do serviço.												
<table style="width: 100%; border: none;"><tr><td style="width: 33%;">Endereço: UNIVERSITÁRIO S/N</td><td style="width: 33%;"></td><td style="width: 33%;"></td></tr><tr><td>Bairro: CASTELO BRANCO</td><td>CEP: 58.051-900</td><td></td></tr><tr><td>UF: PB</td><td>Município: JOÃO PESSOA</td><td></td></tr><tr><td>Telefone: (83)3216-7791</td><td>Fax: (83)3216-7791</td><td>E-mail: comitedeetica@ccs.ufpb.br</td></tr></table>	Endereço: UNIVERSITÁRIO S/N			Bairro: CASTELO BRANCO	CEP: 58.051-900		UF: PB	Município: JOÃO PESSOA		Telefone: (83)3216-7791	Fax: (83)3216-7791	E-mail: comitedeetica@ccs.ufpb.br
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Continuação do Parecer: 4.586.109

Comentários e Considerações sobre a Pesquisa:

A amostra será constituída por usuários de um Centro de Especialidades Odontológica localizado no município de João Pessoa-PB, com abrangência estadual com uma amostra de 347 indivíduos. Inicialmente será realizada uma entrevista padrão na qual serão coletados dados socioeconômicos, carga de doença bucal, queixa odontológica atual, autopercepção de saúde bucal e utilização de serviços odontológicos. Posteriormente serão aplicados questionários OHIP-14

Considerações sobre os Termos de apresentação obrigatória:

ANEXADOS.

Recomendações:

Recomendamos a leitura da RESOLUÇÃO Nº 466, DE 12 DE DEZEMBRO DE 2012 bem como a NORMA OPERACIONAL Nº 001/2013 do CONSELHO NACIONAL DE SAÚDE.

Conclusões ou Pendências e Lista de Inadequações:

Portanto considero este projeto APROVADO.

Este é meu parecer, salvo melhor juízo.

Considerações Finais a critério do CEP:

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_1708354_É1.pdf	30/03/2021 09:37:55		Aceito
Projeto Detalhado / Brochura Investigador	PROJETO_CEP_EMENDA_MODIFICA DO.pdf	30/03/2021 09:37:10	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Aceito
Outros	RESPOSTA_PENDENCIA_PARECER_4614719.pdf	30/03/2021 09:36:43	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_CEP_emenda.pdf	25/02/2021 11:03:36	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Aceito
Solicitação Assinada pelo Pesquisador Responsável	SOLICITACAO_DE_EMENDA.pdf	25/02/2021 11:02:22	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Aceito
Outros	RESPOSTA_PENDENCIA_PARECER_3922070.docx	24/03/2020 14:57:58	DEBORAH ELLEN WANDERLEY	Aceito

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CENTRO DE CIÊNCIAS DA
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Continuação do Parecer: 4.588.109

Outros	RESPOSTA_PENDENCIA_PARECER_3922070.docx	24/03/2020 14:57:58	FREIRE	Acelto
Declaração de concordância	CERTIDAO_DE_HOMOLOGACAO_DO_PROJETO_PPGO.pdf	24/03/2020 14:48:54	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Acelto
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_modificado.pdf	24/03/2020 14:44:38	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Acelto
Folha de Rosto	Folhaderosto.pdf	15/01/2020 13:36:21	DEBORAH ELLEN WANDERLEY GOMES FREIRE	Acelto

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

JOAO PESSOA, 03 de Maio de 2021

Assinado por:

Eliane Marques Duarte de Sousa
(Coordenador(a))

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ANEXO B – OHIP-14

	Quase sempre	Algumas vezes	Poucas vezes	Raramente	Nunca	Não sei	Não se aplica
1. Teve dificuldade em pronunciar alguma palavra por causa de problemas com os seus dentes, boca ou prótese dentária?							
2. Sentiu que o seu paladar piorou por causa de problemas com os seus dentes, boca ou prótese dentária?							
3. Teve dores na sua boca?							
4. Sentiu desconforto a comer algum alimento por causa de problemas com os seus dentes, boca ou prótese dentária?							
5. Tem-se sentido pouco à vontade por causa dos seus dentes, boca ou prótese dentária?							
6. Sentiu-se tenso por causa de problemas com os seus dentes, boca ou prótese dentária?							
7. Já deixou de comer algum alimento por causa de problemas com os seus dentes, boca ou prótese dentária?							
8. Teve de interromper refeições por causa de problemas com os seus dentes, boca ou prótese?							
9. Sentiu dificuldade em relaxar por causa de problemas com os seus dentes, boca ou prótese dentária?							
10. Tem-se sentido um pouco envergonhado por causa de problemas com os seus dentes, boca ou prótese dentária?							
11. Tem sido menos tolerante ou paciente com o(a) seu (sua) companheiro(a) ou família por causa de problemas com os seus dentes, boca ou prótese dentária?							
12. Teve dificuldade em realizar as suas atividades habituais por causa de problemas com os seus dentes, boca ou prótese dentária?							
13. Sentiu-se menos satisfeito com a vida em geral por causa de problemas com os seus dentes, boca ou prótese dentária?							
14. Tem sido totalmente incapaz de funcionar por causa de problemas com os seus dentes, boca ou prótese dentária?							

APÊNDICE A - TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO (TCLE)

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO (PARA MAIORES DE 18 ANOS OU EMANCIPADOS)

Convidamos o (a) Sr. (a) para participar como voluntário (a) da pesquisa ANÁLISE ECONÔMICA DE UTILIDADE DO ESTADO DE SAÚDE BUCAL E DISPONIBILIDADE A PAGAR POR ATRIBUTOS DE CUIDADO EM SAÚDE BUCAL, que está sob responsabilidade da pesquisadora Deborah Ellen Wanderley Gomes Freire, telefone (83) 99887-9822 e e-mail ellenwg.d@gmail.com e está sob orientação do Prof. Dr. Yuri Wanderley Cavalcanti, telefone (83) 99982-3170, e-mail yuri.wanderley@yahoo.com.br.

O trabalho ANÁLISE ECONÔMICA DE UTILIDADE DO ESTADO DE SAÚDE BUCAL E DISPONIBILIDADE A PAGAR POR ATRIBUTOS DE CUIDADO EM SAÚDE BUCAL terá como objetivo geral realizar uma análise econômica em saúde por meio da utilidade do estado de saúde bucal e da disponibilidade a pagar.

- Ao voluntário só caberá a autorização para responder aos formulários de pesquisa e não haverá nenhum risco ou desconforto.

- Ao pesquisador caberá o desenvolvimento da pesquisa de forma confidencial; entretanto, os resultados da mesma serão publicados junto à Comunidade Científica, cumprindo as exigências da Resolução 466/12 do Conselho Nacional de Saúde/Ministério da Saúde.

- O voluntário poderá se recusar a participar, ou retirar seu consentimento a qualquer momento da realização do trabalho ora proposto, não havendo qualquer penalização ou prejuízo para o mesmo.

- Será garantido o sigilo dos resultados obtidos neste trabalho, assegurando assim a privacidade dos participantes em manter tais resultados em caráter confidencial.

- Não haverá qualquer despesa ou ônus financeiro aos participantes voluntários deste projeto científico e não haverá qualquer procedimento que possa incorrer em danos físicos ou financeiros ao voluntário e, portanto, não

haveria necessidade de indenização por parte da equipe científica e/ou da Instituição responsável.

- Qualquer dúvida ou solicitação de esclarecimentos, o participante poderá contatar a equipe científica nos números e e-mails supracitados.

- Ao final da pesquisa, se for do seu interesse, poderá ter livre acesso ao conteúdo da mesma, podendo discutir os dados, com o pesquisador.

- Em caso de dúvidas relacionadas aos aspectos éticos deste estudo, você poderá consultar o Comitê de Ética em Pesquisa Envolvendo Seres Humanos da UFPB no endereço: (Centro de Ciências da Saúde - 1º andar Campus I - Cidade Universitária CEP: 58.051-900 - João Pessoa-PB, Tel.: (83) 3216-7791 – e-mail: comitedeetica@ccs.ufpb.br).

Deborah Ellen Wanderley Gomes Freire
(Pesquisadora Responsável)

APÊNDICE B - QUESTIONÁRIOS

QUESTIONÁRIO 1 - SOCIOECONÔMICO

1. Qual o seu sexo?

☐ Masculino

☐ Feminino

2. Qual a sua idade? _____

3. Qual o seu estado civil?

☐ Solteiro(a) ou não mora com companheiro(a)

☐ Casado(a) ou mora com companheiro(a)

☐ Divorciado(a)

☐ Viúvo(a)

4. Qual a sua renda familiar em reais? (Valor aproximado, sem vírgula)

5. Qual o seu nível de escolaridade?

☐ Não sabe ler nem escrever

☐ Ensino fundamental completo ou incompleto

☐ Ensino médio completo ou incompleto

☐ Ensino superior completo ou incompleto ou pós-graduação

6. Indique qual ou quais condições abaixo apresenta ou apresentou em algum momento da sua vida: (Marque todas que se aplicam)

☐ Cárie/ restauração

☐ Tártaro, gengivite, Necessidade de limpeza Doença periodontal (Piorreia, dentes moles)

☐ Dentes perdidos (Dentes extraídos)

☐ Tem necessidade de prótese dentária (tem espaços sem prótese)

☐ Câncer de boca

☐ Nenhuma das opções acima

7. Você possui alguma queixa ou problema na boca ou nos dentes no momento?

Se sim, qual ou quais opções abaixo?

() Dor de dente

() Cárie (buraco no dente)

() Problemas na gengiva (sangramento, dentes moles, gengiva inflamada) ()

Espaços ausentes sem prótese dentária (necessita usar prótese)

() Nenhuma das opções acima

QUESTIONÁRIO 2 - APOSTA PADRÃO

01. Imagine que você possui uma lesão de câncer (maligna) na língua, que causa dificuldade para alimentar-se e falar. Ao procurar tratamento, foi informado que o procedimento padrão é a realização de uma cirurgia para remover a lesão, seguida de sessões de radioterapia, mas sem garantias de que você vai se curar. No entanto, o profissional de saúde informou também que um novo tratamento, ainda em teste, estava sendo disponibilizado no serviço. Porém, a taxa de sucesso (chance de dar certo) desse tratamento não é conhecida, e ele pode curar a doença, mas também pode levar à sua piora, podendo chegar à morte. De 0 a 100, qual o valor de taxa sucesso (chance de dar certo) levaria você a escolher o novo tratamento proposto? (Exemplo: "Se o novo tratamento tivesse no mínimo x% de chance de dar certo, eu o aceitaria...")

02. Imagine que você possui uma lesão de câncer (maligna) na língua, que está em metástase (estágio avançado, podendo se espalhar para outras partes do corpo). No mesmo contexto da pergunta anterior, de 0 a 100, qual o valor de taxa sucesso (chance de dar certo) levaria você a escolher o novo tratamento proposto? (Exemplo: "Se o novo tratamento tivesse no mínimo x% de chance de dar certo, eu o aceitaria...")

QUESTIONÁRIO 3 - DISPONIBILIDADE A PAGAR

Imagine as situações hipotéticas à seguir e escreva o valor, em reais, que você pagaria por cada uma delas. Considere o limite máximo de R\$ 1.000.000,00.

01. Imagine que você possui uma lesão de câncer (maligna) na língua, causando dificuldade para alimentar-se e falar. Quanto você pagaria para se curar dessa doença?

02. Imagine que você possui uma lesão de câncer (maligna) na língua, que está em metástase (estágio avançado, podendo se espalhar para outras partes do corpo). Quanto você pagaria para se curar dessa doença?
