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Orlando Luiz do Amaral Júnior

INFLUÊNCIA DE DETERMINANTES SOCIAIS DE SAÚDE NA SAÚDE BUCAL DA POPULAÇÃO ADULTA COM IDADE SUPERIOR A 50 ANOS NO BRASIL

Santa Maria, RS
2020

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> Dissertação de mestrado apresentada ao Programa de Pós-Graduação em Ciências Odontológicas da Universidade Federal de Santa Maria (UFSM), como requisito para a obtenção do título de **Mestre em Ciências Odontológicas com ênfase em Saúde Coletiva.**

Orientador: Prof. Dr. Jessye Melgarejo do Amaral Giordani

Santa Maria, RS
2020

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Aprovado em 12 de agosto de 2020:

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(Presidente da Banca/Orientador)

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Santa Maria, RS
2020

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Creio que não se trata em ganhar um prêmio, não é chegar a um final, ou receber o título de Mestre, mas ter nestes dois anos trilhado um caminho, um caminho que vem alimentando meus sonhos e consequentemente minha vida. Agradeço a Deus por ter me acompanhado e estado presente em todos os momentos desta caminhada. Aos meus pais e irmão. Mirta, Orlando e Leonardo por me apoiarem, pelo cuidado, amor e zelo, não só durante este período, mas durante esses 25 anos de minha existência. A Laura, minha companheira que me apoio durante este período, que sonhou junto comigo e tem sido um motivo constante de felicidade em minha vida, que possamos conquistar o mundo juntos e que o amor sempre prevaleça.

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"Why treat people only to send them back to the conditions that made them sick in the first place?" Michael Marmot.

RESUMO

INFLUÊNCIA DE DETERMINANTES SOCIAIS DE SAÚDE NA SAÚDE BUCAL DA POPULAÇÃO ADULTA COM IDADE SUPERIOR A 50 ANOS NO BRASIL

AUTOR: Orlando Luiz do Amaral Júnior
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A presente dissertação foi estruturada partindo de duas hipóteses. A primeira é que a escolha de diferentes indicadores socioeconômicos pode influenciar os resultados apresentados em pesquisas de saúde bucal, portanto o objetivo do primeiro estudo foi avaliar a influência do uso de diferentes indicadores de status socioeconômico (renda individual, renda familiar per capita e índice de riqueza) em pesquisa de saúde bucal com adultos de 50 anos ou mais. Observou-se que quando utilizado o indicador de riqueza associado aos desfechos " Autopercepção de saúde bucal (n=9,365) e Edentulismo (n = 9,073) " há uma redução da prevalência de indivíduos que percebem ter uma pior autoperção e serem edentulos, quando comparados aos quintis mais pobres. Os indicadores de renda individual e renda familiar per capita mostraram-se menos sensíveis a associação com os desfechos de saúde bucal. A segunda hipótese que envolve esta dissertação, é que as dimensões conceituais (Estrutural e Cognitiva) de capital social, podem influenciar a autopercepção de saúde bucal, logo, o objetivo do segundo estudo foi verificar a associação entre capital social, considerando duas dimensões conceituais (Estrutural e Cognitiva) e autopercepção de saúde bucal. Como desfecho utilizou-se autopercepção de saúde bucal (n=9,365) e como variáveis preditoras principais foram utilizadas quatro variáveis individuais de capital social (Estrutual: Voluntariado e Participação Social), (Cognitivo: Confiança nos morados do Bairro e Percepção de amizade). Os achados sugerem que indivíduos que possuem menor capital social cognitivo tem maior prevalência de autopercepção ruim de saúde bucal. A dimensão estrutural não apresentou associação com autopercepção de saúde bucal. Para ambos os estudos, os dados foram coletados do Estudo Longitudinal Brasileiro do Envelhecimento no Brasil (ELSI-Brasil). A pesquisa de linha de base foi realizada entre 2015 e 2016. Foram utilizados modelos hierárquicos de regressão de Poisson para obter razões de prevalência brutas e ajustadas. Concluímos que o índice de riqueza foi o indicador que melhor identificou as desigualdades em saúde bucal em adultos brasileiros acima de 50 anos. Com relação a influência do capital social na autopercepção de saúde bucal, ressaltamos a plausibilidade de iniciativas que fomentem, o desenvolvimento de políticas de saúde que estimulem o capital social cognitivo na sociedade e consequentemente colabore com a melhora da saúde bucal de adultos com 50 anos ou mais no Brasil.

Palavras-chave: Capital Social; Determinantes Sociais De Saúde; Envelhecimento; Renda; Riqueza; Saúde Oral

ABSTRACT

INFLUENCE OF SOCIAL HEALTH DETERMINANTS ON THE ORAL HEALTH OF THE ADULT POPULATION AGE OVER 50 YEARS IN BRAZIL

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ADVISOR: Jessye Melgarejo do Amaral Giordani

The present dissertation was structured by two hypotheses. The first is that different socioeconomic indicators can influence the results presented in oral health research. Therefore, the objective of the first study is to assess the influence of the use of different socioeconomic indicators (individual income, family income per capita and wealth) in oral health research associated with the results "Self-reported oral health (n = 9,365) and Edentulism (n = 9,073) "there is a reduction in the prevalence of individuals who perceive themselves to have poor oral health self-reports and to be edentulous, when compared to the poorest quintiles. The indicators of individual income and family income per capita have been shown to be less sensitive when associated with oral health outcomes. The second hypothesis that involves this dissertation, is that conceptual dimensions (structural and cognitive) of social capital, can influence the oral health self- reported, therefore the aim was to verify associated between social capital considered two conceptual dimensions (Structural and Cognitive) and oral health self- reported. As the outcome we used self-reported oral health (n = 9,365) and as the main predictive variables used four individual social capital variables (Structural: Volunteering and Social Participation), (Cognitive: Trust in the neighborhood residents and Perception of friendship). The results suggest that individuals with less cognitive social capital have a higher prevalence of poor oral health self-reported. The structural dimension was not associated with oral health self-reported. For both studies, data were collected from the Brazilian Longitudinal Study on Aging. The baseline survey was carried out between 2015 and 2016. Were utilized hierarchical models of Poisson regression to have crude and adjusted prevalence ratios. We conclude that the wealth index was the indicator that best identifies the inequalities in oral health in Brazilian adults over 50 years of age. About influence of social capital in oral health self-reported, we ressalted the plausibility of initiatives that promote the development of health policies that stimulate cognitive social capital in society and consequently collaboration with improvements in the oral health of adults aged 50 or over in Brazil.

Keywords: Social capital; Social determinants of health; Aging; Income; Wealth; Oral health

SUMÁRIO

1. INTRODUÇÃO GERAL

Determinantes Sociais de Saúde (DDS) são características específicas das condições de vida diária das populações, capazes de afetar a saúde dos indivíduos, sendo imprescindível seu uso para análises das populações no contexto das políticas públicas, visto que eles impulsionam o combate às desigualdades na saúde (KRIEGER, 2001). As expressões biológicas causadas pelas desigualdades formadas pelos DDS têm sido referidas, por sua vez, em como os indivíduos incorporam e expressam biologicamente experiências econômicas e sociais, gerando desigualdades sociais em saúde (KRIEGER, 2001, 2014).

Entre as condições de saúde afetadas pelos DDS destacam-se as condições de saúde bucal. Os problemas de saúde bucal atingem cerca de quatro bilhões de pessoas em todo mundo, trazendo consequências negativas para qualidade de vida dos indivíduos e gerando graves impactos econômicos devido a seus tratamentos (MARCENES et al., 2013). Estudos prévios demonstraram que quase metade da população global tem sua saúde bucal afetada de forma injusta por condições sociais desiguais (KASSEBAUM et al., 2017; WATT et al., 2016), sendo a perda de dentes, chamada de edentulismo, a consequência mais grave dessas condições (PETERSEN et al., 2005). A perda dentária é capaz de afetar a qualidade de vida dos indivíduos principalmente durante o processo de envelhecimento, visto que é na maioria das vezes, derivada de condições crônicas (MEDINA-SOLÍS et al., 2006).

Os fatores socioeconômicos vêm se destacando entre os Determinantes Sociais de Saúde, sendo apontados como fortes indicadores únicos dos padrões de vida material em pesquisas de saúde (GALOBARDES, 2006) sendo esses possíveis indicadores das condições materiais dos indivíduos (DUNCAN et al., 2002), também são considerados indicadores do acesso aos cuidados de saúde (VAN DOORSLAER, 2006). Embora, no contexto brasileiro existam estudos prévios que tenham utilizado indicadores socioeconômicos como renda individual (ROCHA; GOES, 2008), renda domiciliar *per capita* (BASTOS et al., 2019) e riqueza (ANDRADE et al., 2019) para analisar as condições de saúde bucal da população, considera-se que indicadores econômicos de renda e riqueza são usados com menos frequência que indicadores de nível educacional e ocupação (DUNCAN et al., 2002), mesmo que estes tenham já mostrando uma associação mais fraca com saúde, tratando-se de análises em população mais velha (AVLUND et al., 2003; DUPRE, 2007).

Entre os indicadores socioeconômicos, por sua vez, existem diferentes frentes de pesquisadores que avaliam o padrão de vida através da renda per capita domiciliar, renda individual ou riqueza, constructos distintos entre si, sendo o primeiro um produto de saúde

mais utilizado e, em contraste, a riqueza uma captura do estoque acumulado de reservas econômicas (DUNCAN et al., 2002; HOWE et al., 2012). Ambos indicadores estão positivamente correlacionados em estudos prévios com saúde, sendo que quando em maiores níveis, melhor é a saúde dos indivíduos (DUNCAN et al., 2002; HOWE et al., 2012). Entretanto, a renda é difícil de se medir, além de limitar a profunda estruturação deste constructo por ser uma variável única.

Em estudos epidemiológicos, é importante considerar indicadores socioeconômicos e as orientações existentes na literatura, para que as coletas dos dados possam nortear os resultados do estudo de forma adequada. A natureza casual, sazonal e volátil da atividade econômica é uma diferença particularmente acentuada, que deve ser levada em consideração na escolha do indicador socioeconômico. Considerando a importância da história de vida de cada indivíduo, que é diferente de acordo com os momentos ou etapas da vida, as condições de saúde da população podem ser confundidas por variáveis socioeconômicas. É importante que estudos epidemiológicos investiguem quais são os indicadores socioeconômicos que mais influenciam a saúde bucal da população. (FRY K, FIRESTONE R, CHAKRABORTY N. MEASURING EQUITY WITH NATIONALLY REPRESENTATIVE WEALTH; QUINTILES. WASHINGTON (DC): PSI; 2014). Entende-se que a compreensão do impacto estatístico de diferentes indicadores é essencial para o planejamento e interpretação de estudos epidemiológicos, relevantes para a comunidade científica e os gestores de saúde bucal.

Outros importantes determinantes que devem ser considerados em pesquisas de saúde bucal são os sociais e psicológicos comportamentais, que podem condicionar a percepção de saúde, levando em consideração os valores culturais e as experiências passadas (VALE; MENDES; MOREIRA, 2013). Por conseguinte, a autopercepção de saúde tem mostrado ser um parâmetro confiável e com validade semelhante a medidas mais complexas para a mensuração do estado de saúde dos indivíduos, além de ser uma medida de fácil aplicação. (LIMA-COSTA; FIRMO; UCHÔA, 2004). Como é considerada um forte preditor de saúde devido a sua relação com as condições clínicas (SILVA; OLIVEIRA, 2018), esse medida tem sido bastante utilizado na avaliação da associação entre os determinantes demográficos, socioeconômicos, capacidade funcional e saúde geral (ALVES; RODRIGUES, 2005).

No contexto da saúde bucal, a autopercepção é capaz de estimar o efeito das condições bucais na vida diária, tornando esses dados passíveis de serem utilizados para avaliar e monitorar melhorias na saúde bucal (JONES et al., 2001; SILVA; OLIVEIRA, 2018). A avaliação subjetiva de saúde também pode ser relacionada ao comportamento do indivíduo, relacionando com a frequência de procura aos serviços de saúde (KAPLAN; BARON-EPEL,

2003; SILVA; OLIVEIRA, 2018), e possui valores de sensibilidade e especificidade aceitáveis para aferição da condição bucal quando comparado a exames clínicos (LOCKER; WEXLER; JOKOVIC, 2007; MATSUI et al., 2017).

Entender como as pessoas percebem sua condição bucal é essencial, visto que o comportamento pessoal é condicionado pela percepção e pela importância dada a ela. Mesmo nos países que mantêm programas dirigidos a idosos, a principal razão para esse grupo não procurar o serviço odontológico é não perceber necessidade (ANDRADE et al., 2012). A percepção também pode ser afetada por valores pessoais, como a crença de que algumas dores e incapacidades são inevitáveis nessa idade, podendo levar o indivíduo a superestimar sua condição bucal (COSTA; SAINTRAIN; VIEIRA, 2010; SILVA; CASTELLANOS FERNANDES, 2001). Há uma combinação de comportamentos, cultura, atitudes relacionadas a experiências ao longo da vida que podem refletir na autopercepção e nas condições clínicas de saúde bucal (ANDRADE et al., 2012; GALLEGO et al., 2017).

Consequentemente, o conceito de capital social vem cada vez mais sendo aplicado em pesquisas no campo da saúde pública (MOORE; KAWACHI, 2017). É possível conceituar capital social como uma teia de relações cooperativas entre as pessoas de um determinado lugar, capaz de criar reciprocidade, confiança interpessoal e ajuda recíproca entre os indivíduos, gerando ações que são capazes de criar benefícios mútuos para a população (COLEMAN, 1988; MOORE; KAWACHI, 2017; PATTUSSI et al., 2006). Também pode ser considerado um subproduto das relações sociais resultantes da recíproca troca entre participantes envolvidos em redes ou associações sociais, podendo ser reconhecido como um bem público capaz de gerar cooperação e sentimentos positivos que podem levar ao alcance de objetivos comuns (CARPIANO; FITTERER, 2014).

Embora exista uma grande ambiguidade conceitual e metodológica em torno do conceito de capital social, vem sendo reconhecido que a captura da natureza multidimensional do capital social não pode ser mensurada somente por medidas simples (HARPHAM, 2002). Este conceito possui uma série de dimensões, sendo as dimensões chaves de capital social: a dimensão estrutural, responsável por caracterizar a participação dos indivíduos em atividades sociais, organizações voluntárias com foco no tamanho e intensidade das interações, e a dimensão cognitiva, responsável pelas percepções subjetivas das pessoas relacionadas à qualidade das interações sociais dentro da estrutura das relações (MOORE; KAWACHI, 2017). As formas de capital social e seus indicadores, quando considerados em um todo, tornam o conceito capaz de mostrar sua capacidade de influenciar a saúde das pessoas (BUCK-MCFADYEN et al., 2019). Sabe-se que a participação social é um dos principais

determinantes da saúde entre idosos, porém, ainda são poucas as evidências que avaliam a associação entre participação social e autopercepção de saúde bucal nesta faixa etária (TAKEUCHI et al., 2013). Também há poucas informações sobre os diferentes mecanismos associados as dimensões estrutural e cognitiva de capital social e saúde bucal. Supõe-se que apesar desses mecanismos não serem totalmente conhecidos, possam influenciar de maneira positiva na autopercepção de saúde nos indivíduos (KIM; SUBRAMANIAN; KAWACHI, 2008).

Considerando o contexto exposto e o número escasso de evidências que investigam a influência das diferentes dimensões do capital social na saúde bucal, além da potencialidade do uso dessas informações aplicadas nas políticas públicas de saúde (MOORE; KAWACHI, 2017; PATTUSSI et al., 2006), torna-se pertinente essa investigação.

A presente dissertação foi estruturada partindo de duas hipóteses. A primeira é que a escolha de diferentes indicadores socioeconômicos pode influenciar os resultados apresentados em pesquisas de saúde bucal, portanto o objetivo do primeiro artigo foi avaliar a influência do uso de diferentes indicadores de status socioeconômico (renda individual, renda familiar per capita e índice de riqueza) em desfechos de saúde bucal com adultos de 50 anos ou mais. A segunda hipótese que envolve esta dissertação, é que as dimensões conceituais (Estrutural e Cognitiva) de capital social, podem estar associadas a autopercepção de saúde bucal, logo, o objetivo do segundo artigo foi verificar a associação entre capital social, considerando duas dimensões conceituais (Estrutural e Cognitiva) e autopercepção de saúde bucal.

ARTIGO 1: *Impact of adopting different socioeconomic indicators in older adults' oral health research* – *O objetivo deste estudo é avaliar a influência do uso de diferentes indicadores de status socioeconômico (renda individual, renda familiar per capita e índice de riqueza) em desfechos de saúde bucal de adultos com idade superior a 50 anos.*

ARTIGO 2: *Social capital and self-reported oral health at baseline of the Brazilian Longitudinal Study of Aging* - *O objetivo desse estudo é estimar a associação entre as dimensões estrutural e cognitiva do capital social e a autopercepção de saúde bucal em uma grande amostra nacional de adultos com 50 anos ou mais no Brasil.*

2. ARTIGO 1:

Este artigo foi submetido ao periódico *Brazilian Oral Research,* ISSN: 1807-3107 (online). Fator de impacto: 1.508, Qualis CAPES A2. As normas para publicação estão descritas no Anexo A.

3. ARTIGO 2:

Este artigo foi submetido ao periódico *Community Dentistry and Oral Epidemiology, Wiley Online Library,* ISSN: 1600-0528 (online). Fator de impacto: 2.278, Qualis CAPES A1. As normas para publicação estão descritas no Anexo B.

2. ARTIGO 1

Thematic Area: **Community Dental Health**

Title: ***Impact of adopting different socioeconomic indicators in older adults' oral health research***

Running head: **Socioeconomic Indicators on Oral Health**

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DDS Do Amaral Júnior, MSc Menegazzo, DDS Fagundes and Dra Tomazoni conceptualized and designed the study, carried out the initial analyses, drafted the initial manuscript, reviewed and revised the manuscript. Dr Giordani conceptualized and designed the study, coordinated and supervised the initial manuscript, carried out the analyses and critically reviewed the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. The authors have no conflict of interest.

ABSTRACT

This study aimed to evaluate the influence of choosing different socioeconomic status indicators on older adults' oral. This is a cross-sectional study that analyzed baseline data from the Brazilian Longitudinal Study on Aging (ELSI-Brazil). The outcomes were edentulism (n = 9,073) and self-reported oral health (n = 9,365). The following socioeconomic indicators were assessed: individual income, per capita household income and wealth index. Poisson regression models with robust variance were performed to estimate the prevalence ratios; absolute inequalities' measures were also estimated. The individual income indicator was not statistically associated with the results after the adjustments. When using the per capita household income, individuals in the richest quintile (12%) in poor self-reported oral health, relative to the poorest, and there was no association with edentulism. When the wealth index was chosen, it was observed in the richest quintile a 22% lower prevalence of edentulism and a 15% lower prevalence of poor self-reported oral health, both in relation to the poorest quintile. Regarding the absolute inequality' measures, for edentulism, the wealth index showed the highest absolute inequality. When considering self-reported oral health, the per capita household income showed the greatest absolute inequality. In conclusion, wealth index was the indicator that better identified oral health inequalities in Brazilian adults over 50 years-old. Despite science challenges and the difficult of socioeconomic indicators metrics, further investments in its development are critical to measure, promote, and improve population oral health.

Keywords: Income, Socioeconomic indicators, Oral Health, Wealth

INTRODUCTION

Social Determinants of Health (SDH) are specific characteristics of daily living that can affect individuals' health, like the circumstances in which people are born, grow up, live, work and get old.[1] Their use for population analysis in the context of public policies is essential, because they encourage the confrontation of health inequalities.[2,3] Poor oral health status is highlighted among the health conditions related to SDH, once it affects about four billion individuals worldwide.[4] Poor oral health brings negative consequences for the individual's quality of life, leading to serious economic problems.[4] Previous studies have shown that almost half of the global population has their oral health unfairly affected by unequal social conditions.[5,6]

Socioeconomic indicators are identified as strong indicators of living standards in health research, occupying an intermediate position in the SDHs and acting on the individual's health and well-being.[7] These indicators are considered capable of facilitating access to healthcare, through material and psychosocial pathways.[8] There are many studies using different indicators, as stand out per capita family income[9], wealth[10] and individual income[11], which differ from each other. Household and individual income have been the most used on health research, meanwhile wealth is an indicator that captures stock of economic reserves.[12]

All mentioned, socioeconomic indicators were positively correlated with health outcomes, and the higher their levels, the better the individual's health.[12,13] However, to our knowledge, there are no studies assessing which economic indicator is more appropriate to identify scenarios with socioeconomic inequalities in the population's oral health.[14] Therefore, this study aimed to evaluate the influence of using different socioeconomic status indicators (individual income, per capita household income and wealth index) on older adults' oral health research.

METHODOLOGY

Study design and Population

This cross-sectional study analyzed the baseline data obtained in the Brazilian Longitudinal Study of Aging (ELSI-Brazil). ELSI-Brazil is a nationally representative population-based cohort study constituting of people aged 50 years or older from 70 municipalities across all Brazilian regions. The baseline survey was conducted between 2015/2016 and is part of an international network of large longitudinal studies on aging. The baseline was approved by the Brazilian National Research Ethics Committee (Certificate of Ethical Appreciation Presentation: 63725117.9.0000.5091). Moreover, the 'Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)' guideline was followed to write the manuscript.

The ELSI-Brazil has a sample design with a multiple selection stages, combining stratification of primary sampling units (municipalities), census tracts, and households. The sample was divided into four strata, with the first stratum drawn from 4,420 municipalities constituting $\leq$26,700 inhabitants, second from 951 municipalities constituting 26,701 − 135,000 inhabitants, third from 171 municipalities constituting 135,000 − 750,000 inhabitants, and fourth from 23 municipalities constituting >750,000 inhabitants. The sample for the first three strata (municipalities up to 750,000 inhabitants) was selected in three stages. In the first stage, 18 municipalities were selected in the first stratum, 15 in the second, and 14 in the third. In the second stage, 8 census tracts were selected from each municipality, while households were selected from each census tract in the third stage. The sample for the fourth stratum, that included the largest municipalities, was selected in two stages, with 176 census tracts selected in the first stage and households selected in the second stage. All residents in the selected households aged 50 years and over were eligible for participation. More details can be found elsewhere.[15]

The sample size was estimated considering the following parameters: 5% standard error, 80% power, 95% confidence level, and 70% lower odds of those with higher income to have poor self-reported oral health[16] or 44% to have edentulism.[10] Correction factors of 1.2 for effect design and 30% for non-response were applied to increase accuracy. Considering the two outcomes, the minimum sample size required was 4,389 participants. The final sample for edentulism was 9,073 individuals, and 9,365 for self-reported oral health.

Data collection

Data collection was performed using a household questionnaire and an individual questionnaire answered by the selected participants.[15]

The outcomes were edentulism and self-reported oral health, collected by the following self-reported questions: "How many teeth do you have?" (none/ 1 to 9 teeth/ 10 to 19 teeth/ 20 or more teeth), categorized in edentulous (toothless) and dentate individuals.[17] Self-reported oral health was collected by the question: "Do you think the health of your teeth and gums is: (very good/ good/ regular/ bad/ too bad)?", which was dichotomized in "good" (very good/ good) and "poor" (fair/ poor/ very poor).[18]

Three common socioeconomic indicators were evaluated: individual income, *per capita* household income and wealth index. Individual income was obtained asking the amount of Brazilian Reais (approximately USD 4 during the data gathering) monthly received. It was categorized into quintiles, from the poorest to the richest, as in previous studies.[11] Per capita household income results from the total monthly gross household cash divided by the number of residents, also categorized into quintiles.[19] Wealth index was based on the national population, using a multivariate statistical technique that transforms a set of original variables into another set of variables of equal values, called principal components.[20] For its creation, information on the ownership of durable goods and housing characteristics was used: ownership of internet, television, DVD or VCR, cable TV, refrigerator, washing machine,

dishwasher, dryer, computer, landline, mobile phone, microwave, air conditioning, motorcycle, car, house with a housemaid, masonry wall, running water access, street access pavement, presence of bathroom, and family agglomeration (number of rooms in the house divided by the number of residents). It was also categorized in quintiles, as in previous studies.[10]

The conceptual theoretical model of SDH for oral health was used to select possible confounding variables.[21] Demographic and socioeconomic adjustment variables included self-reported sex (male/ female), age (50-59 years, 60-69 years, 70 years and older)[10], race (categorized in white and non-white due to the low prevalence of non-white categories: black, brown, yellow and indigenous)[22], and education (categorized in 0 to 8 years, characterizing elementary education in Brazil, and 9 years or more).[23]

Oral health behavior measures included treatment need, use of dental service and oral health habits. The first one was collected by the question: "Do you think you currently need dental treatment?" (yes/ no). The use of dental service was collected by de question: "When did you have the last visit to the dentist?" (less than one year/ one year or more/ never did). Oral health habits were assessed as follow: "Do you use a toothbrush to clean your mouth and teeth? Do you use toothpaste to clean your mouth and teeth? Do you use dental floss to clean your mouth and teeth?". The answer options were yes or no.

Statistical Analysis

Data were analyzed using STATA 14.0 statistical software. Due to the complex sample, it was necessary to use the sample weight to expand it and incorporate the design effect. Poisson regression models with robust variance were used to estimate the crude and adjusted prevalence ratios (PR), its respective 95% confidence intervals (95% CI) and 5% significance level. The associations between both outcomes and the three socioeconomic indicators were analyzed separately.

The observable absolute differences between individual income, per capita household income and wealth index were also analyzed. The absolute inequality' measure represents the absolute difference, in predicted values, of a health indicator between the most and the least favored individuals in terms of socioeconomic indicators.[24] Thus, it is calculated as the difference, in percentage points (p.p), between the estimated values for the extreme groups of the variable (the richest quintile and the poorest one).[25]

RESULTS

The ELSI-Brazil sample consisted of 9,412 individuals. The final sample for edentulism and self-reported oral health comprised 9,073 and 9,365 participants respectively. Table 1 describes the population distribution and the dependent variables according to demographic, socioeconomic and oral health behavioral variables. The sample is composed mostly of females 54%, people aged 50-59 years old 47.6%, from a non-white race/ethnic 57.2% and with less than eight years of formal education 73.1%. Most participants reported the needing of dental treatment 56.2% and 66% did not use dental care in the last year. Large part of the sample reported brushing their teeth and using toothbrush. However, 61.6% did not use dental floss. The prevalence of poor self-reported oral health was similar between the categories, with a greater discrepancy in the self-perceived treatment need. Furthermore, the prevalence of edentulism was higher among the most disadvantaged groups.

Table 2 shows the population distribution and the dependent variables according to socioeconomic characteristics. It is possible to observe that, when the individual income variable is used, most of the sample is in poorest quintiles, while the other variables have a more homogeneous distribution. The prevalence of poor self-reported oral health and edentulism was higher between those who were in the poorest quintile than those belonging to the richest one.

The Poisson regression models that assess the association between each socioeconomic indicator and the results are shown in Table 3. The associations were adjusted for sex, age, race, education, treatment need, use of dental services and use of toothbrush, toothpaste and dental floss. The individual income indicator was not statistically associated with the results after the adjustments. When using the per capita household income, individuals in the richest quintile showed a reduction of 12% in poor self-reported oral health, relative to the poorest, and there was no association with edentulism. When the wealth index was chosen, there was a reduction of 22% in the number of toothless individuals and 15% in individuals who reported having poor oral health, both relative to the poorest quintile.

Regarding the absolute inequality' measures, for edentulism the wealth index showed the highest absolute inequality (-28.4 p.p) followed by the per capita household income (-10.3 p.p) and individual income (-7.7 p.p). When considering self-reported oral health, the per capita household income presented the greatest absolute inequality (-14.1 p.p) followed by wealth index (-10.3 p.p) and individual income (-8.7 p.p). Negative values suggest that the outcome is more prevalent in the most disadvantaged groups, for example, the poorest group.[25]

DISCUSSION

We analyzed the performance of different socioeconomic status indicators (individual income, per capita household income and wealth index) when associated with oral health status of adults over 50 years-old. There are few studies evaluating different socioeconomic measures to assess inequalities in health outcomes in developing countries[7,13], and no studies considering oral health conditions. Therefore, these findings are pioneers in assessing socioeconomic indicators to identify oral health disparities in countries facing inequalities.

Although there is still a discrepancy between consumption data, such as individual income or per capita household income, and asset data, such as the wealth index, there is evidence supporting the use of the wealth index in terms of measurement when compared to

volatile and inaccurate consumption indicators.[26] Efforts to gather wealth information as part of administrative collection data can be complex. However, the explanatory power of socioeconomic status indicators based on wealth seems to have a better quality relative to more conventional indicators.[12] Moreover, individual income or per capita household income may be difficult to collect. Saying how much money is earned can make an individual feel uncomfortable for a variety of reasons, such as, theft or taxation.[27]

The data collection for the wealth index is based on a series of durable assets and information on housing characteristics and access to basic services.[28] The selected items are already included in most surveys because of their potential health influence; for example, the ownership of television and its ability to inform the population about health habits.[13] It is also necessary to highlight that the selection of assets for a wealth index is not a simple task. There are items that are clearly markers of wealthy households, such as the presence of a maid. Other goods have an approximately linear relationship with the quintiles, such as car and freezer. Other goods are almost universal, such as a refrigerator and color television.[29] It is important that all these groups of assets are included to maintain the indicator's discriminatory capacity. However, the inclusion of assets with very similar behavior does not present a substantial discriminatory gain.[29]

The wealth index does not represent current income, but the family's permanent consumption capacity.[29] It is an indicator of financial resources accumulated over the life course (including inheritances), and the patterning of wealth in old age might therefore differ substantially from the patterning of incomes.[30] It can mean that wealth is a more stable measure of socioeconomic position, because current income is subject to significant fluctuations when recorded in a relatively short reference period.[29]

Regarding the use of per capita household income, a problem in using it is that family members may have unequal access to family income.[12] That is, people can feel a

socioeconomic status that they do not enjoy. A second limitation inherent to the use of this variable is that it may be an inadequate representation of retiree's standard of living. It may not reflect the financial resources available and disregard the accumulated value effects of a lifetime of deprivation or privilege.[12]

Regarding assessing individual income, it is known that when income levels and basic needs go beyond the poverty line, individual income alone does not explain health inequalities.[31] Also, how much a person earns may not quantify his lifestyle, which can be supported by other family member. For this reason, we believe that individual income did not prove to be a good socioeconomic indicator of inequalities in individual's oral health.

Our findings showed a great disparity in oral diseases prevalence, especially among the population' extreme extracts, where the richest portion had positive results and the poorest portion, negative results. This is in line with studies that show the disadvantage in oral health among the least socio-economically favored.[4,32] This socioeconomic inequality is also demonstrated between countries at different development levels, like Brazil, where population social disparities are more evident.[33] Socioeconomic status has been recognized as a risk factor for morbidity and mortality that vary over time, by culture and age group, being the elderly population the most affected.[34] In the same way that aging causes impasses in general health, many elderly people have a range of oral problems that are affected by common risk factors with systemic diseases.[35] Health inequalities in the elderly have received relatively little attention, perhaps partly because of measurement problems. Measuring socioeconomic status in older age groups is necessary for research and oral health policy for an expanding but still marginalized population.[36]

Absolute inequalities, once identified, allow observing the pattern of population's inequality. We found that individuals aged 50 years or over living in Brazil with better oral health condition also have a higher socioeconomic level. In addition, we observed that the use

of different indicators produces different inequalities in the population and it is important that more studies are carried out assessing other differences, such as geographic regions, ethnic groups, age groups and sex/gender categories.[24] Moreover, the visualization of these inequalities is useful for formulating strategies to promote equality between these groups, prioritizing the improvement of indicators among the most disadvantaged and favoring the progress of national indicators. As far as we know, there is no study evaluating which indicator is the most adequate to identify scenarios of socioeconomic inequalities in population' oral health. These indicator's analysis is important for conducting research to better understand the population and to evaluate the healthcare model, so that planning strategies to promote oral health.

CONCLUSION

Wealth index was the socioeconomic indicator that better identified oral health inequalities in Brazilian adults over 50 years-old. Despite science challenges and the difficult of socioeconomic indicators metrics, further investments in its development are critical to measure, promote, and improve population oral health.

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Table 1. Weighted Sample demographics characteristics, socioeconomic adjustment variables and oral health behavior prevalence and crude prevalence ratios of edentulism and poor self-perception of oral health among older adults at baseline of the Brazilian Longitudinal Study of Aging.

Variables	Weighted	Edentulism	Poor Self-Reported of Oral Health
	%	Prevalence (95%CI)	Prevalence (95%CI)
Sex			
Female	54.0	35.85 (33.3-38.5)	41.8 (39.9-43.7)
Male	46.0	22.31 (19.7-25.0)	49.7 (47.6-51.7)
Age			
50-59 years-old	47.6	15.40 (13.6-17.4)	51.4 (49.0-53.8)
60-69 years-old	29,7	33.60 (30.6-36.8)	43.8 (41.6-46.0)
≥70 years-old	22,7	53.99 (50.9-57.0)	34.9 (32.7-37.2)
Race			
White	42.7	28.57 (25.7-31.6)	41.6 (39.8-43.4)
Non-white	57,3	29.43 (26.7-32.3)	48.8 (46.6-51.1)
Own education			
0-8 years of formal education	73.1	36.40 (33.7-39.2)	46.3 (44.4-48.3)
>8 years of formal education	26.9	11.30 (9.7-13.0)	42.9 (40.1-45.7)
Need of treatment			
No	43.8	48.6 (44.7-52.5)	20.4 (18.4-22.5)
Yes	56.2	14.2 (12.7-15.8)	64.9 (62.8-66.8)
Use of dental service			
Less than a year	32.6	11.3 (10.0-12.7)	43.9 (41.8-46.1)
In a year or more	66.0	38.2 (35.2-41.3)	46.0 (44.0-48.1)
Never used	1.4	27.1 (18.0-38.8)	51.0 (41.1-60.7)
Use of toothbrush			
No	3.2	69.5 (62.8-75.5)	39.3 (32.2-46.7)
Yes	96.8	28.1 (25.8-30.5)	45.6 (44.0-47.3)
Use of toothpaste			
No	2.8	65.0 (57.9-71.5)	40.2 (31.6-49.4)
Yes	97.2	28.4 (26.0-30.9)	45.6 (44.0-47.2)
Use of dental floss			
No	61.6	44.6 (41.3-47.9)	45.5 (43.7-47.4)
Yes	38.4	5.1 (4.0-6.4)	45.3 (42.9-47.8)

95%CI: 95% of confidence interval.

Table 2. Weighted Sample socioeconomic characteristics, prevalence and crude prevalence ratios of edentulism and poor self-perception of oral health among older adults at baseline of the Brazilian Longitudinal Study of Aging.

Socioeconomic Variables	Weighted	Edentulism	Poor Self-Reported of Oral Health
	%	Prevalence (95%CI)	Prevalence (95%CI)
Individual income			
1st quintile (poorest)	23.0	24.0 (21.1-27.2)	49.7 (46.6-52.8)
2nd quintile	22.5	42.4 (38.8-46.0)	44.3 (41.7-47.1)
3rd quintile	13.5	38.5 (34.0-43.2)	44.8 (41.7-47.9)
4th quintile	19.8	30.2 (26.9-33.7)	46.8 (44.2-49.3)
5th quintile (richest)	21.2	16.3 (14.0-18.8)	41.0 (38.3-43.9)
Q1-Q5		7.7	8.7
Per capita household income			
1st quintile (poorest)	19.5	30.5 (27.7-33.6)	51.3 (47.3-55.3)
2nd quintile	19.1	33.9 (30.3-37.7)	48.4 (45.1-51.6)
3rd quintile	19.4	38.0 (34.1-42.0)	45.3 (42.3-48.3)
4th quintile	20.9	26.8 (23.5-30.4)	45.6 (42.7-48.5)
5th quintile (richest)	21.1	20.2 (17.7-23.0)	37.2 (34.8-39.7)
QI-Q5		10.3	14.1
Wealth			
1st quintile (poorest)	20.0	42.0 (37.7-46.5)	48.4 (45.8-51.1)
2nd quintile	20.0	39.4 (35.7-43.2)	49.1 (45.9-52.3)
3rd quintile	20.0	29.7 (26.7-32.8)	45.7 (43.0-48.4)
4th quintile	20.1	23.8 (20.9-26.9)	45.7 (42.2-49.2)
5th quintile (richest)	19.9	13.6 (11.1-16.5)	38.1 (35.6-40.6)
Q1-Q5		28.4	10.3

95%CI: 95% of confidence interval

Table 3. Weighted adjusted prevalence ratios of socioeconomic variables with edentulism and poor self-perception of oral health among older adults at baseline of the Brazilian Longitudinal Study of Aging, using Poisson regression models.

Socioeconomic Variables	Edentulism PR* (95%CI)	Poor Self-Reported of Oral Health PR* (95%CI)
Individual Income		
1st quintile (poorest)	1	1
2nd quintile	0.98 (0.88-1.10)	1.02 (0.94-1.10)
3rd quintile	0.94 (0.83-1.06)	1.02 (0.94-1.10)
4th quintile	0.95 (0.85-1.05)	1.01 (0.95-1.09)
5th quintile (richest	0.87 (0.75-1.00)	0.92 (0.83-1.02)
Per Capita Household Income		
1st quintile (poorest)	1	1
2nd quintile	1.06 (0.96-1.17)	0.98 (0.91-1.06)
3rd quintile	1.01 (0.89-1.14)	0.98 (0.89-1.09)
4th quintile	0.96 (0.85-1.07)	0.99 (0.91-1.08)
5th quintile (richest)	0.94 (0.83-1.07)	**0.88 (0.78-0.98)**
Wealth		
1st quintile (poorest)	1	1
2nd quintile	1.03 (0.94-1.13)	**1.08 (1.01-1.14)**
3rd quintile	0.93 (0.83-1.04)	0.98 (0.90-1.06)
4th quintile	0.95 (0.85-1.06)	0.97 (0.89-1.06)
5st quintile (richest)	**0.78 (0.64-0.94)**	**0.85 (0.78.0.93)**

PR: prevalence ratio; 95%CI: 95% of confidence interval.

*Adjusted by: sex, age, race/ethnic, own education, need of treatment, use of dental service and use of toothbrush, toothpaste and dental floss.

3. ARTIGO 2

Title: **Social Capital and Self-Reported Oral Health at Baseline of the Brazilian Longitudinal Study of Aging**

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Social capital and self-reported oral health

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DDS Do Amaral Júnior, MSc Menegazzo, DDS Fagundes and DSS Campagnol conceptualized and designed the study, carried out the initial analyses, drafted the initial manuscript, reviewed and revised the manuscript. Dr Giordani conceptualized and designed the study, coordinated and supervised the initial manuscript, carried out the analyses and critically reviewed the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. The authors have no conflict of interest.

ABSTRACT

Objectives: This cross-sectional study aimed to estimate the association between the structural and cognitive dimensions of social capital and self-reported oral health. **Methods:** This study conducted individual assessments of 9,365 individuals aged 50 years or older from Brazil. Four individual variables based on structural and cognitive dimensions of social capital were assessed. We used hierarchical Poisson regression models to estimate the prevalence ratio of self-reported oral health with individual structural and cognitive social capital variables adjusted for associated factors. **Results:** Cognitive social capital was associated with self-reported oral health. Individuals who reported not trust in the neighborhood and not have friends had an increase of 14% (RP: 1.14; 95% CI: 1.07-1.21) and 9% (RP: 1.09; 95% CI: 1.01-1.19), respectively, of poor self-reported oral health, relative to those who say to trust in the neighborhood and to have friends. **Conclusion:** Our findings suggest that the cognitive dimension of social capital may be linked with self-reported oral health. Therefore, social capital must be considered in the context of social policies and its encouraging can be an efficient tool for improving individuals' health and, consequently, in the oral health of the elderly.

INTRODUCTION

Social capital has been defined as characteristics of social organization, such as civic participation, norms of reciprocity, and trust in others, which facilitate cooperation for mutual benefit.[1] As a multidisciplinary concept, it originates from widely discussed theories of social, political, and behavioral sciences.[1,2] Bourdieu, the first key author of this concept, defined social capital as a sum of resources derived from durable networks of relationships, where each member receives credential support to use the benefits of this collective property.[3] Few years later, a political scientist named Putnam declared that social capital encompasses characteristics of networks, including social life, norms, and trust, that enable participants to act together more effectively.[4] This concept remains significant, even today, as a theory outlining the complex understanding of the social determinants of health.[5]

The social capital construct has been increasingly applied in health research, however, its translation into the field of healthcare pays little attention to the extensive debates about its concept.[5] High social capital ratios have been associated with lower rates of violence, higher incidence of people in public life, lower mortality, and better health assessment.[6,7] The extensive research on the association between social capital and oral health suggests that social capital may aid in protecting an individual's oral health, especially those living in countries with great inequalities.[8] Moreover, higher levels of social support, measured based on the number of close friends, have been associated with better self-reported oral health among edentulous individuals.[9]

Studies on social capital and oral health do not usually distinguish between different dimensions of social capital. However, social capital has been framed using structural and cognitive dimensions.[2,10] The structural dimension refers to the presence or absence of formal structures of opportunity or activities in which individual actors can develop social ties and build social networks.[2] Conversely, the cognitive dimension refers to people's subjective values and perceptions, which evaluate perceptions of trust, reciprocity, and support.[2]

This distinction between dimensions is necessary, since social capital can interact with other forms of capital, thereby maintaining resources among those possessing high levels of cultural and economic capital and contributing to the reproduction of inequalities.[11] Defining these dimensions may explain how social relations can translate into actions that promote health.[11] Considering the importance of outlining social determinants of oral health and recognizing social capital as an important tool in the implementation of more effective public health policies [11,12] this study, therefore, aimed to estimate the association between structural

and cognitive dimensions of social capital and self-reported oral health in a nation-wide sample of older adults in Brazil.

METHODS

This cross-sectional study analyzed the baseline data estimated in the Brazilian Longitudinal Study of Aging (ELSI-Brazil), a nationally representative population-based cohort study constituting people aged 50 years or older from 70 municipalities across all regions of Brazil. As the largest country in South America, with an estimated population of 210 million people, and a developing country, Brazil has maintained its trend in aging in recent years, with 24.5% of its total population aged 50 years or over.[13]

ELSI-Brazil was approved by the ethics board of FIOCRUZ, Minas Gerais (Presentation Certificate for Ethical Appreciation: 34649814.3.0000.5091). Genotyping of the cohort population was approved by Brazil's national research ethics committee (Presentation Certificate for Ethical Appreciation: 63725117.9.0000.5091). Participants signed separate informed consent forms for the interviews. [14]

The ELSI-Brazil incorporated a design constituting selection stages, combining stratification of primary sampling units (municipalities), census tracts, and households. The sample was divided into four strata, with the first stratum drawn from 4,420 municipalities constituting $\leq$ 26,700 inhabitants, second from 951 municipalities constituting 26,701 – 135,000 inhabitants, third from 171 municipalities constituting 135,000 – 750,000 inhabitants, and fourth from 23 municipalities constituting >750,000 inhabitants. The sample for the first three strata (municipalities up to 750,000 inhabitants) was selected in three stages. In the first stage, 18 municipalities were selected in the first stratum, 15 in the second, and 14 in the third. In the second stage, 8 census tracts were selected from each municipality, while households were selected from each census tract in the third stage. The sample for the fourth stratum, that included the largest municipalities, was selected in two stages, with 176 census tracts selected in the first stage and households selected in the second stage. All residents in the selected households aged 50 years and over were eligible for participation.[14]

The measures evaluated by the ELSI-Brazil included a household questionnaire and an individual questionnaire, which was answered by all residents aged 50 years and over. All interviews were conducted at participants' homes by trained interviewers.[14]

The sample size to verify the association between social capital and self-reported oral health was calculated as follows: 30% higher odds of poor self-reported oral health with low social support,[15] 95% confidence level, 1:1 exposed/unexposed ratio, and 80% test power.

Thus, the minimum sample size required, adding 30% for eventual losses, was 6.544 individuals. The final sample of ELSI-Brazil with self-reported measures of oral health constituted 9,365 individuals.[14]

Assessment of Outcome

The outcome of this study was based on answers to the question "Would you say that your oral health (teeth and gums) is…", that were dichotomized as "good" (very good/good) and "poor" (fair/poor/very poor).[16] It was considered that subjective oral health can be assessed through a single global item such as oral health self-reported.[17] The response categorization is based on other studies that investigated self-rated oral health.[16]

Assessment of Social Capital

Despite broad theoretical developments, there is a gap in literature surrounding the important issues regarding measurement of social capital, thereby posing a threat to construct validity.[18] Since there is no consensus regarding the best indicator of social capital,[2,19] we adopted proxies for social capital that have been used in past researches. To measure structural social capital, we included two variables to assess volunteering and participation in organizations and groups. The first variable assessed participation in volunteer work using the following yes/no question: "In the last 12 months did you do any volunteer work?" The second variable assessed participation in organized social activities using the following yes/no question: "In the last 12 months, did you participate in organized social activities (clubs, community or religious groups, community center, senior university, etc)?" These indicators were also used in previous studies on social capital and health.[2,20] To measure cognitive social capital, we assessed individual perceptions of close ties and emotional social support. We included the following yes/no question to assess group interpersonal trust: "Do you think you can trust most people in the neighborhood?" Further, the perception of friends was also used as a proxy for cognitive social capital, assessed using the following yes/no question: "Do you have friends?" These indicators have been chosen, since interpersonal trust is considered a central element of cognitive social capital. [2,5,11]

Assessment of socioeconomic and demographic variables

We included a wealth variable (categorized into quintiles), which assessed the possession of durable goods (car, refrigerator, television etc…), housing resources, and access to basic services.[21] This proxy is commonly used to quantify socioeconomic inequalities in a range of health outcomes,[22] and was measured using principal components analysis.[23] Further

details can be found in a previous publication.[21] Other covariates, also based on self-reports, included age (50 to 59 years, 60 to 69 years, and 70 years and older),[22] sex (male/female), educational status (0 to 8 years/9 or more years),[24] and race (white and non-white).[25]

Behavioral, access to health services and psychosocial pathway variables

Based on Rouxel et al. (2015),[5] the hypothesized pathways linking social capital and oral health are: behavioral; access to health services; and psychosocial. The psychosocial variable included was depression, assessed by the following question: "Has any doctor ever said that you have depression?" (yes / no). Behavioral variables and those referring to health services access included: dental visit, oral health habits and smoking habit. The last dental visit was assessed by the following question: "When did you last visit a dentist?" (less than a year/in a year or more/never used). Oral health habits were assessed by the questions: "Do you use a toothbrush to clean your mouth and teeth?" and "Do you use dental floss to clean your mouth and teeth?". The answer options were yes or no. The current smoking habit was assessed by the questions: "Currently, do you smoke (considering smoking industrial cigarettes, straw cigarettes or other tobacco products such as cigars, cigarillos, pipes, cloves cigarettes, Indian cigarettes and hookahs)?". With the following answer options: "yes, daily", for those who smoke every day, at least one of the products; "yes, less than daily", for those who smoke but not every day; and "no", for those who do not smoke, not even occasionally. That were dichotomized as "yes" (yes, daily/yes, less than daily) and "no".

Theoretical conceptual model

The theoretical conceptual model sought to follow hypothetical pathways linking social capital to oral health, relying heavily on studies conducted by Watt and Sheiham (2012)[26] and Rouxel et al. (2015)[5](Figure 1). The main factors included demographic, socioeconomic, behavioral, access to health services and psychosocial pathway variables.

Statistical Analyses

As it was a complex sample, it was necessary to expand it using the sample weight, and incorporate the sample design effect, using the "svy" command of the statistical program. Preliminary analyses described the data and presented the prevalence of all variables.

Therefore, crude, unadjusted and adjusted prevalence ratios (PR) were considered, with a 95% confidence interval (95% CI). To assess the association between social capital and self-reported oral health, hierarchical Poisson regression models were analyzed as follows:

social capital variables adjusted for demographic and socioeconomic status (Model 1); social capital variables adjusted for demographic, socioeconomic, behavioral, access to health services and psychosocial pathway variables (Model 2). All social capital variables were included in the analysis together. All analyses were performed using Stata 14.0 (Stata Corporation, College Station, TX, USA).

RESULTS

The ELSI-Brazil sample consisted of 9,412 individuals, however, the final sample of this study constituted 9,365 individuals who completed self-report measures of oral health. Characteristics of the sample, as well as the prevalence of poor self-reported oral health are presented in Table 1. The participants were predominantly non-white, women, with less than 8 years of education, and aged between 50 to 59 years. Moreover, most of the participants did not engage in voluntary work or social activities, such as religious groups and community centers, and trust most people in their neighborhood. The majority of the participants had not a medical diagnostic from depression. Regarding the behavioral pathway variables, most of participants had not visited a dental service in the last year, use toothbrush and dental floss and were not smokers.

The associations between social capital and self-reported oral health by Poisson regression models are shown in Table 2. The Model 1 is the adjusted analyses by sex, race, age, own education and wealth. In Model 2 the analyses were adjusted determined for Model 1 and the variables: depression; use of dental service; use of toothbrush; use of dental floss; and smoking habit. As in Model 1, but adjusted to the variables that can mediate the association between social capital and self-reported oral health, the Model 2 demonstrated that individuals who reported not trust in the neighborhood and not have friends had an increase of 14% (RP: 1.14; 95% CI: 1.07-1.21) and 9% (RP: 1.09; 95% CI: 1.01-1.19), respectively, of poor self-reported oral health, relative to those who say they trust in the neighborhood and have friends.

DISCUSSION

The main finding of this study suggests an association between cognitive social capital and poor self-reported oral health. To the best of our knowledge, this is the first study to verify the association between structural and cognitive dimensions of social capital and self-reported oral health in older adults in a nation-wide study based in a developing country.

The mechanisms by which social capital affects health are not yet fully understood[2] and the pathways linking social capital to health outcomes vary according to the level of analysis.[27] However, drawing heavily on the previous studies, a possible way to explain the influence of cognitive social capital in self-reported oral health is through health behaviors, psychosocial mechanisms, access to health services and policy development.[5,27] There seems to be something beneficial, at the individual level, in having multiple networks, in addition to the ability of recruiting social support through close ties.[27] This study provided some evidence for the protective role of the cognitive dimension of social capital in self-reported oral health. The elderly social relations can greatly influence their psychological well-being,[28,29] which would explain the link between the cognitive dimension and self-reported oral health.

This study assessed the cognitive dimension of social capital using measures that evaluated interpersonal trust, often based on interpersonal trust in a neighborhood and friendship.[2,5] However, it is important to note that generalized trust may differ from particularized trust. Although a previous study reported associations between generalized and individual trust and health outcomes.[30] This study did not assess generalized trust, since previous researches suggest a critical assessment of the mechanisms that link group trust and health and the additional delineation of network and psychosocial mechanisms with health.[31,32]

Structural dimensions of social capital, namely voluntary participation and social participation, were not associated with self-reported oral health, which is in accordance with past findings.[11] Although structural social capital does not have a strong association with subjective health outcomes, it is often associated with objective health measures.[11,15] This result suggests that specific aspects of social capital, such as the structural dimension may be associated with different domains of oral health in older adults, with a different pattern of associations between different ways of assessing oral health.[11] The term structural is used to indicate individual actors, referring to the presence or absence of formal structures or activities that can develop and build social networks.[2] Macro-level structural social capital measures designed to capture the number or density of citizens or neighborhood associations, clubs, or other activities available to individuals were not included due to the lack of information in the ELSI-Brazil database.[2]

Brazil is a country that reports high levels of distrust,[33] and it serves as a promising subject for study, both from the standpoint of social capital theory and its precise dimensions.[2] New perspectives for public health and social epidemiology may be proposed based on elements of social capital, such as mutual trust, norms of reciprocity or solidarity, and civic

engagement.[34] Ways to increase the population individual social capital would be implemented to approach health services, for example, through community agents aggregation in primary care or through the creation of population groups with common interests to discuss health care with the health professionals.

The improvement and reduction of oral health inequities are likely to be more easily guaranteed through the adoption of oral health promotion policies based on the common risk factors approach.[35] Isolated oral health education interventions with an individualistic focus are ineffective, waste limited resources and can increase inequalities. Compartmentalized approaches will hardly promote oral health in all sections of the community.[35] In addition, the dominant theory about health and disease has determined that health is primarily affected by socio-political factors.[27] Taking that into account, the social interaction processes may improve individual and collective skills and enable greater individuals empowerment, playing a beneficial role in oral health.[36] Accordingly, social capital can also be a tool to relieve stress levels caused by emotional and behavioral problems.

This study has some limitations. The cross-sectional design limits the scope of causal inferences, highlighting the need for prospective studies. In addition, the questions used to measure social capital may not have assessed entirety its concept, since there is still a debate about its definition,[37] and there is no gold standard for assessing social capital dimensions so far. Also, there are limitations in the number of psychosocial variables included in the ELSI-Brazil questionnaire, such as issues related, for example, to dental fear. Regarding the use of self-reported oral health, although methodologically challenging, there are acceptable values of sensitivity and specificity for self-reported oral health and oral health condition.[38] This suggests that the questions can be used for this purpose. In addition, the use of subjective oral-health measures integrate different values, expectations and beliefs about health and disease, as health is a social construction.[17] To understand the patient's perspective, alongside to normative evaluations, can better address population needs, pointing out which areas should be prioritized regarding public health investments. It can collaborate with the development, implementation and evaluation of public health policies, being an inexpensive measure to collect and capable of allowing the inclusion of oral health issues in large population surveys, generating information and promoting health surveillance strategies.[39]

We conclude that the cognitive dimension of social capital is associated with better self-reported oral health in the elderly. Thus, encouraging the increase of population's social capital can be an efficient tool for improving individuals' health and, consequently, in the oral health of the elderly.

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Table 1. Weighted Sample characteristics and prevalence of poor self-reported oral health among older adults at baseline of the Brazilian Longitudinal Study of Aging.

	Variables	Weighted %	Prevalence of poor self-reported oral health (95%CIª)
Socioeconomic and demographic	**Sex**		
	Female	54.0	41.8 (39.9-43.7)
	Male	46.0	49.7 (47.6-51.7)
	Race		
	White	42.8	41.6 (39.8-43.4)
	Non white	57.2	48.8 (46.6-51.1)
	Age (years)		
	50-59	47.7	51.4 (49.0-53.8)
	60-69	29.6	43.8 (41.6-46.0)
	≥70	22.7	34.9 (32.7-37.2)
	Own education (Years)		
	0-8	73.1	46.3 (44.4-48.3)
	>8	26.9	42.9 (40.1-45.7)
	Wealth		
	1 st quintile (poorest)	20.0	48.7 (46.1-51.4)
	2 nd quintile	20.0	49.2 (46.1-52.3)
	3 rd quintile	20.0	45.4 (42.7-48.1)
	4 th quintile	20.1	45.7 (42.1-49.3)
	5 th quintile (richest)	19.9	38.1 (35.5-40.6)
Social capital	***Structural social capital***		
	Volunteer status		
	Yes	18.1	43.2 (40.0-46.5)
	No	81.9	45.9 (44.0-47.7)
	Social participation		
	Yes	48.7	43.7 (41.5-45.9)
	No	51.3	47.0 (44.9-49.2)
	Cognitive social capital		
	Trustiness status		
	Yes	54.6	41.6 (39.8-43.4)
	No	45.4	50.2 (47.8-52.6)
	Friendship status		
	Yes	89.6	44.6 (42.7-4.4)
	No	10.4	52.6 (48.8-5.4)
Behavioral Pathway, access of Service and psychosocial pathway	**Depression**		
	Yes	18.6	51.2 (48.4-54.0)
	No	81.4	44.1(42.2-45.9)
	Use of Dental Service		
	Less than a year	32.6	43.9 (41.8-46.1)
	In a year or more	67.4	46.1 (44.1-48.2)
	Use of Tooth brushing		
	Yes	96.7	45.6 (44.0-47.3)
	No	03.3	39.3 (32.2-46.7)
	Flossing		
	Yes	38.4	45.3 (42.9-47.8)
	No	61.6	45.5 (43.7-47.4)
	Smoking		
	Yes	17.0	44.3 (42.4-46.3)
	No	83.0	50.6 (47.8-53.4)

* Taking in account de sample weigh. ªCI, confidence interval.

Table 2. Unadjusted and adjusted association of social capital variables with poor self-reported of oral health, determined using Poisson regressions.

Individual Social Capital	Poor self-reported of oral health		
	Unadjusted PR^a (95% CI^b)	Model 1^ǂ PR^a (95% CI^b)	Model 2^ǂ PR^a (95% CI^b)
Structural social capital			
Volunteer status			
Yes	1	1	1
No	1.06 (0.97-1.14	1.04 (0.96-1.12)	1.04 (0.96 - 1.13)
Social participation			
Yes	**1**	1	1
No	**1.07 (1.01-1.13)**	1.03 (0.96-1.12)	1.03 (0.98 - 1.09)
Cognitive social capital			
Trust in the neighborhood			
Yes	**1**	**1**	**1**
No	**1.20 (1.13-1.27)**	**1.14 (1.08-1.21)**	**1.14 (1.07 - 1.21)**
Perception of friends			
Yes	**1**	**1**	**1**
No	**1.18 (1.08-1.28)**	**1.10 (1.02-1.20)**	**1.09 (1.01 - 1.19)**

Notes:

^aPR, prevalence ratio; ^b95% CI, 95% confidence interval.

Taking in account the sample weigh.

^ǂModel 1 adjusted for: sex, race, age, own education and wealth.

^ǂModel 2 adjusted for: sex, race, age, own education, wealth, depression, use of dental service, use of toothbrush, use of dental floss and smoking habit.

Figure 1) Adaptation of the conceptual theoretical models of Watt and Sheiham (2012) and Rouxel et al. (2015).
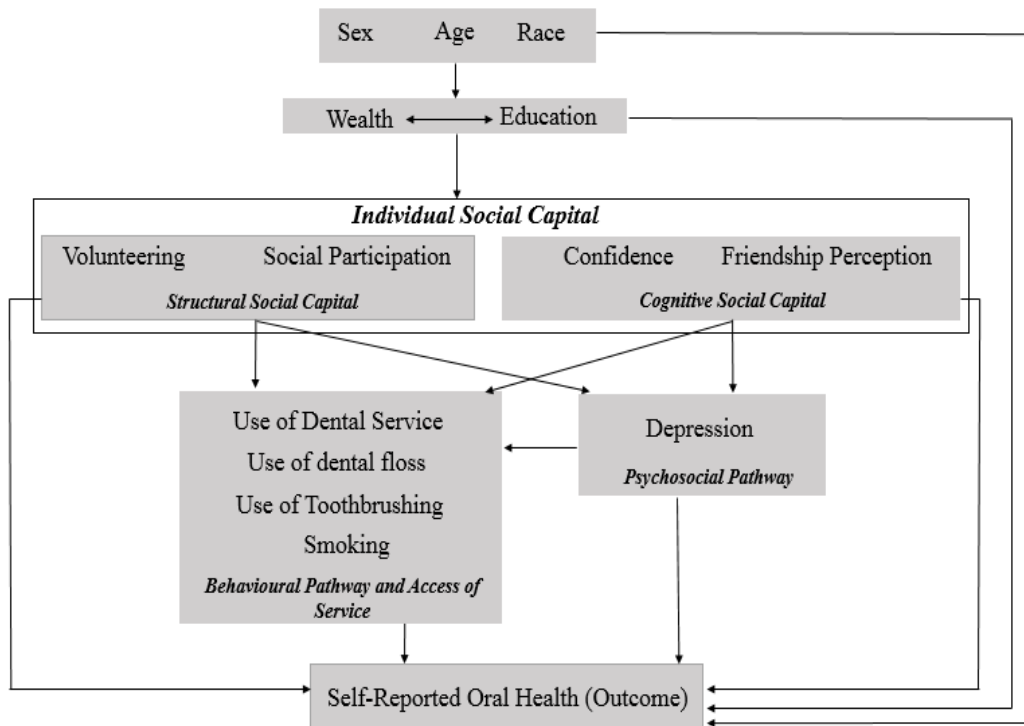
4. DISCUSSÃO GERAL

O resultado do primeiro artigo apresentado nesta dissertação, cujo objetivo foi analisar o comportamento de diferentes indicadores de status socioeconômico (renda individual, renda domiciliar per capita e índice de riqueza) quando associados ao estado de saúde bucal de adultos acima de 50 anos, sugere que o índice de riqueza apresentou melhores associações com os desfechos de saúde bucal. É relevante citarmos que há poucos estudos que avaliam a influência de diferentes medidas socioeconômicas e saúde em países em desenvolvimento (GALOBARDES, 2006; HOWE et al., 2012), e nenhum estudo de nosso conhecimento buscou avaliar o comportamento de diferentes indicadores socioeconômicos em pesquisa de saúde bucal.

Existem diferentes maneiras de classificar os indivíduos de acordo com sua posição socioeconômica e todas têm pontos positivos e negativos, como a facilidade para coleta das informações ou a dificuldade para obtenção de informações precisas (HOWE et al., 2012). Entretanto, não há dúvida da importância do uso desses indicadores em estudos epidemiológicos, visto que são capazes de interferir nos resultados finais das pesquisas. Também, não se deve deixar de lado a natureza casual, sazonal e volátil das atividades econômicas, como sendo algo que deve ser levado em consideração na escolha do indicador socioeconômico. Esses achados são pioneiros no entendimento das disparidades de saúde bucal em países onde existem grandes desigualdades socioeconômicas, considerando a importância da compreensão do impacto estatístico de diferentes indicadores, como sendo, essencial para o planejamento e interpretação de estudos epidemiológicos, relevante para a comunidade científica e para os gestores de saúde.

O segundo artigo apresentado na presente dissertação, teve como objetivo estimar associação entre as dimensões estrutural e cognitiva de capital social e autopercepção de saúde bucal. Sugere-se que há associação entre capital social cognitivo e autopercepção saúde bucal. Até onde sabemos, este é o primeiro estudo que verificou associação entre as dimensões estrutural e cognitiva do capital social e a autopecepção de saúde bucal de adultos sede em um país em desenvolvimento como o Brasil.

Os mecanismos pelos quais o capital social afeta a saúde ainda não são totalmente compreendidos (MOORE; KAWACHI, 2017). No entanto, com base em estudos anteriores, uma possível maneira de explicar a influência da dimensão cognitiva de capital social é através de comportamentos de saúde, mecanismos psicossociais e acesso a serviços de saúde

(KAWACHI; BERKMAN, 2000). Um exemplo seria a possibilidade do envolvimento com outras pessoas gerar confiança interpessoal, resultando assim em uma maior probabilidade de indivíduos procurarem atendimento odontológico (BURR; LEE, 2013). É provável que a melhoria e redução das iniquidades em saúde bucal sejam mais facilmente garantidas com a adoção de políticas de promoção da saúde bucal com base na abordagem de fatores de risco comuns. Intervenções isoladas de educação em saúde bucal com foco individualista são ineficazes, desperdiçam recursos limitados e podem aumentar desigualdades (WATT; SHEIHAM, 2012).

Diante disso, é importante que as políticas de saúde reforcem as atividades de grupo e ações de saúde, principalmente na Atenção Primária a Saúde. Assim, as modalidades se diversificam para atender usuários hipertensos, diabéticos, mulheres, gestantes, idosos, entre outros, no sentido de atuar na complementaridade terapêutica. Evidencia-se uma possível potencialidade terapêutica capaz de promover saúde e educação em contextos que permitem a articulação entre saberes técnicos e populares e a mobilização de recursos institucionais e comunitários para o enfrentamento dos problemas de saúde e consequentemente impactando positivamente na saúde bucal da população.

Este estudo avaliou a dimensão cognitiva do capital social usando medidas que avaliaram a confiança interpessoal, geralmente baseada na confiança interpessoal em um bairro e na amizade (HARPHAM, 2002). Como o Brasil é um país com altos níveis de desconfiança (PATTUSSI et al., 2006), serve como um assunto promissor para mais estudos, tanto do ponto de vista da teoria do capital social quanto de suas dimensões (MOORE; KAWACHI, 2017). Novas perspectivas para a saúde pública e a epidemiologia podem ser propostas com base em elementos de capital social, como confiança mútua, normas de reciprocidade ou solidariedade e engajamento cívico.(SOUZA; GRUNDY, 2004). A dimensão estrutural do capital social, ou seja, participação voluntária e participação social, não foram associadas estatisticamente à autopercepção de saúde bucal. Embora o capital social estrutural não tenha uma forte associação com os resultados subjetivos da saúde, é frequentemente associado a medidas objetivas de saúde.(ROUXEL et al., 2015).

5. CONSIDERAÇÕES FINAIS

Sugere-se, que o índice de riqueza foi a variável que melhor identificou as desigualdades em saúde bucal em adultos brasileiros acima de 50 anos. Apesar dos desafios científicos e da dificuldade das métricas dos indicadores socioeconômicos, novos investimentos em seu desenvolvimento são importantes para monitorar, medir, promover e melhorar a saúde bucal da população. Com relação a influência do capital social na autopercepção de saúde bucal, concluímos que o capital social deve ser considerado no contexto das políticas sociais e que a dimensão cognitiva do capital social está associada a uma melhor autopercepção de saúde em adultos com idade superior a 50 anos.

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7. ANEXO A – NORMAS PARA PUBLICAÇÃO NO PERIÓDICO BRAZILIAN ORAL RESEARCH

Presentation of the manuscript

The manuscript text should be written in English and provided in a digital file compatible with "Microsoft Word" (in DOC, DOCX, or RTF format).

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Main Text

Abstract: Must be presented as a single paragraph (without sub-divisions into sections, containing objective, methodology, results, and conclusions). In the System if applicable, use the Special characters tool for special characters.

Keywords: Ranging from 3 (three) to 5 (five) main descriptors should be provided, chosen from the keywords registered at https://meshb.nlm.nih.gov/search (no synonyms will be accepted).

Introduction: This should present the relevance of the study, and its connection with other published works in the same line of research or field, identifying its limitations and possible biases. The objective of the study should be concisely presented at the end of this section.

Methodology: All the features of the material pertinent to the research subject should be provided (*e.g.*, tissue samples or research subjects). The experimental, analytical, and statistical methods should be described in a concise manner, although in detail, sufficient to allow others to recreate the work. Data from manufacturers or suppliers of products, equipment, or software must be explicit when first mentioned in this section, as follows: manufacturer's name, city, and country. The computer programs and statistical methods must also be specified. Unless the objective of the work is to compare products or specific systems, the trade names of techniques, as well as products, or scientific and clinical equipment should only be cited in the "Methodology" and "Acknowledgments" sections, according to each case. Generic names should be used in the remainder of the manuscript, including the title. Manuscripts containing radiographs, microradiographs, or SEM images, the following information must be included: radiation source, filters, and kV levels used. Manuscripts reporting studies on humans should include proof that the research was ethically conducted according to the Helsinki Declaration (*World Medical Association,* http://www.wma.net/en/30publications/10policies/b3/). The approval protocol number issued by an Institutional Ethics Committee must be cited. Observational studies should follow the STROBE guidelines (http://strobe-statement.org/), and the check list must be submitted. Clinical Trials must be reported according to the CONSORT Statement standard protocol (http://www.consort-statement.org/); systematic reviews and meta-analysis must follow the PRISMA (http://www.prisma-statement.org/), or Cochrane protocol (http://www.cochrane.org/).

Characteristics and layouts of types of manuscripts

Original Research

Limited to 30,000 characters including spaces (considering the introduction, methodology, results, discussion, conclusion, acknowledgments, tables, references, and figure legends). A maximum of 8 (eight) figures and 40 (forty) references will be accepted. The abstract can contain a maximum of 250 words.

Layout

- Title Page

- Main text (30,000 characters including spaces)
- Abstract: a maximum of 250 words
- Keywords: 3 (three)-5 (five) main descriptors
- Introduction
- Methodology
- Results
- Discussion
- Conclusion
- Acknowledgments
- References: maximum of 40 references
- Figure legends
- Figures: a maximum of 8 (eight) figures, as described above
- Tables.

Copyright transfer agreement and responsibility statements
The manuscript submitted for publication must include the Copyright Transfer Agreement and the Responsibility Statements, available in the online system and mandatory.

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Publication fees

Authors are not required to pay for the submission or review of articles.

EXAMPLES OF REFERENCES

Journals

Bhutta ZA, Darmstadt GL, Hasan BS, Haws RA. Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. Pediatrics. 2005;115(2 Suppl):519-617. https://doi.org/10.1542/peds.2004-1441

Articles with title and text in a language other than English
Li YJ, He X, Liu LN, Lan YY, Wang AM, Wang YL. [Studies on chemical constituents in herb of Polygonum orientale]. Zhongguo Ahong Yao Za Zhi. 2005 Mar;30(6):444-6. Chinese.

Supplements or Special Editions

Pucca Junior GA, Lucena EHG, Cawahisa PT. Financing national policy on oral health in Brazil in the context of the Unified Health System. Braz Oral Res. 2010 Aug;24 Spec Iss 1:26-32.

Books

Stedman TL. Stedman's medical dictionary: a vocabulary of medicine and its allied sciences, with pronunciations and derivations. 20th ed. Baltimore: Williams & Wilkins; 1961.

Online Books

Foley KM, Gelband H, editors. Improving palliative care for cancer [monograph on the Internet]. Washington: National Academy Press; 2001 [cited 2002 Jul 9]. Available from: http://www.nap.edu/books/0309074029/html/

Websites

Cancer-Pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources, Inc.; c2000 [cited 2002 Jul 9]. Available from: http://www.cancer-pain.org/

8. ANEXO B – NORMAS PARA PUBLICAÇÃO NO PERIÓDICO COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY

Author Guidelines

Content of Author Guidelines: 1. General, 2. Ethical Guidelines, 3. Submission of Manuscripts, 4. Manuscript Format and Structure, 5. After Acceptance

1. GENERAL

The aim of *Community Dentistry and Oral Epidemiology* is to serve as a forum for scientifically based information in community dentistry, with the intention of continually expanding the knowledge base in the field. The scope is therefore broad, ranging from original studies in epidemiology, behavioural sciences related to dentistry, and health services research, through to methodological reports in program planning, implementation and evaluation. Reports dealing with people of any age group are welcome.

The journal encourages manuscripts which present methodologically detailed scientific research findings from original data collection or analysis of existing databases. Preference is given to new findings. Confirmation of previous findings can be of value, but the journal seeks to avoid needless repetition. It also encourages thoughtful, provocative commentaries on subjects ranging from research methods to public policies. Purely descriptive reports are not encouraged, and neither are behavioural science reports with only marginal application to dentistry.

Knowledge in any field advances only when research findings and policies are held up to critical scrutiny. To be consistent with that view, the journal encourages scientific debate on a wide range of topics. Responses to research findings and views expressed in the journal are always welcome, whether in the form of a manuscript or a commentary. Prompt publication will be sought for these submissions. Book reviews and short reports from international conferences are also welcome, and publication of conference proceedings can be arranged with the publisher.

Please read the instructions below carefully for details on the submission of manuscripts, and the journal's requirements and standards, as well as information on the procedure after acceptance of a manuscript for publication in *Community Dentistry and Oral Epidemiology*. Authors are encouraged to visit **Wiley Blackwell Author Services** for further information on the preparation and submission of articles and figures.

2. GUIDELINES FOR RESEARCH REPORTING

Community Dentistry and Oral Epidemiology adheres to the ethical guidelines below for publication and research.

2.1. Authorship and Acknowledgements

Authorship: Authors submitting a manuscript do so on the understanding that the manuscript has been read and approved by all authors, and that all authors agree to the submission of the manuscript to the Journal.

Community Dentistry and Oral Epidemiology adheres to the definition of authorship set up by the International Committee of Medical Journal Editors (ICMJE). According to the

ICMJE criteria, authorship should be based on (1) substantial contributions to conception and design of, or acquisition of data or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content and (3) final approval of the version to be published. Authors should meet conditions 1, 2 and 3. It is a requirement that all authors have been credited as appropriate upon submission of the manuscript. Contributors who do not qualify as authors should instead be mentioned under Acknowledgments.

Acknowledgements: Under *acknowledgements*, please specify contributors to the article other than the authors accredited, along with all sources of financial support for the research.

2.2. Ethical Approvals

In all reports of original studies with humans, authors should specifically state the nature of the ethical review and clearance for the study protocol. Informed consent must be obtained from human participants in research studies. Some reports, such as those dealing with institutionalized children or mentally disabled persons, may need additional details of ethical clearance.

Research participants: research involving human participants will be published only if such research has been conducted in full accordance with ethical principles, including the World Medical Association **Declaration of Helsinki** (version 2008) and the additional requirements (if any) of the country where the research has been carried out.

Manuscripts must be accompanied by a statement that the research was undertaken with the understanding and written consent of each participant and according to the above mentioned principles. All studies should include an explicit statement in the Methods section identifying the review and ethics committee approval for each study, if applicable. Editors reserve the right to reject papers if there is doubt as to whether appropriate procedures have been used. Take care to use the term "participant" instead of "subject" when reporting on your study.

Ethics of investigation: Manuscripts not in agreement with the guidelines of the Helsinki Declaration (as revised in 1975) will not be accepted for publication.

Animal Studies: If experimental animals are used, the methods section must clearly indicate that adequate measures were taken to minimize pain or discomfort. Experiments should be carried out in accordance with the Guidelines laid down by the National Institute of Health (NIH) in the USA in respect of the care and use of animals for experimental procedures or with the European Communities Council Directive of 24 November 1986 (86/609/EEC) and in accordance with local laws and regulations.

SUBMISSION OF MANUSCRIPTS

Manuscripts should be submitted electronically via the online submission site **http://mc.manuscriptcentral.com/cdoe**. The use of an online submission and peer review site enables immediate distribution of manuscripts and consequentially speeds up the review process. It also allows authors to track the status of their own manuscripts. *Community Dentistry and Oral Epidemiology* requires the submitting/corresponding author (only) to provide an ORCID iD when submitting their manuscript. If the author does not have an ORCID iD, an easy-to-use application to obtain one is available through the journal's ScholarOne system. Complete instructions for submitting a manuscript are available online and below. Further assistance can be obtained from the Managing Editor, Michelle Martire: **cdoejournal@wiley.com**

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- When you have selected all files you wish to upload, click the 'Upload Files' button.
• Review your submission (in HTML and PDF format) before sending to the Journal. Click the 'Submit' button when you are finished reviewing.

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed.

Manuscript Files Accepted

Manuscripts should be uploaded as Word (.doc or .docx) or Rich Text Format (.rtf) files (not write-protected), along with separate Figure files. For the latter, GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. Tables should be done in Word rather than in Excel. The files will be automatically converted to HTML and a PDF document on upload, and those will be used for the review process. The text file must contain the entire manuscript, including the title page, abstract, text, references, tables, and figure legends, but no embedded figures. Figure tags should be included in the file. Manuscripts should be formatted as described in the Author Guidelines below.

MANUSCRIPT FORMAT AND STRUCTURE

Word Limit and Page Charges

Articles should be limited to 3,700 words (including references) and 6 Tables or Figures; alternatively, 4,000 words and 5 Tables or Figures may be used. This equates to seven published pages, **and authors are strongly encouraged to stay within those limits.** The

Methods and Results sections are usually where the word count can "blow out", and authors are encouraged to consider submitting heavily detailed material for inclusion in a separate online Appendix to their article (at no cost). **Articles exceeding seven published pages are subject to a charge of USD 300 per additional page. One published page amounts approximately to 5,500 characters (including spaces) of text but does not include Figures and Tables.**

Format

Language: All submissions must be in English; both British and American spelling conventions are acceptable. Authors for whom English is a second language must have their manuscript professionally edited by an English speaking person before submission to make sure the English is of high quality. It is preferred that the manuscript is professionally edited. A list of independent suppliers of editing services can be found at **http://wileyeditingservices.com/en/**. All services must be paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

Font: All submissions must be 1.5 spaced using a standard 12-point font size, and preferably in the Times Roman font.

Abbreviations, Symbols and Nomenclature: Authors can consult the following source: CBE Style Manual Committee. Scientific style and format: the CBE manual for authors, editors, and publishers. 6th ed. Cambridge: Cambridge University Press, 1994

Structure

All manuscripts submitted to *Community Dentistry and Oral Epidemiology* should follow the structure guidelines below.

Title Page: the names and institutional affiliations of all authors of the manuscript should be included.

Abstract: All manuscripts submitted to *Community Dentistry and Oral Epidemiology* should use a structured abstract under the headings: Objectives – Methods – Results – Conclusions.

Main Text of Original Articles should include Introduction, Methods, Results and Discussion. Subheadings are not encouraged.

Introduction: this should be focused, outlining the historical or logical origins of the study and not summarise the findings; exhaustive literature reviews are not appropriate. It should close with an explicit statement of the specific aims of the investigation.

Methods must contain sufficient detail such that, in combination with the references cited, all studies reported can be fully reproduced. As a condition of publication, authors are required to make materials and methods used freely available to other academic researchers for their own use.

Results should not focus overly on P values – we concur with recent calls for less emphasis on statistical significance (see Amrhein et al, Nature 2019; 567: 305-307). In the Results section, have one paragraph of text per Table, and do not repeat Table data in that Results text; instead, draw the reader's attention to the highlights/important parts of the Table. Avoid "compared to" - use 'than' instead.

Discussion: See Docherty and Smith, BMJ 1999; 318: 1224-5 for how to structure a Discussion section. That structure is encouraged. The section should end with a brief conclusion and a comment on the potential clinical program or policy relevance of the

findings. Statements and interpretation of the data should be appropriately supported by original references. In the Discussion and conclusion, use the term 'findings' rather than 'results'.

References: Authors are required to cite all necessary references for the research background, methods and issues discussed. Primary sources should be cited. Relevant references published in CDOE are expected to be among the cited literature.

The list of references begins on a fresh page in the manuscript. All references should be numbered consecutively in order of appearance and should be as complete as possible. In text citations should cite references in consecutive order using Arabic superscript numerals. Sample references follow:

Journal article:

1. King VM, Armstrong DM, Apps R, Trott JR. Numerical aspects of pontine, lateral reticular, and inferior olivary projections to two paravermal cortical zones of the cat cerebellum. *J Comp Neurol* 1998;390:537-551.

Book:

2. Voet D, Voet JG. *Biochemistry*. New York: John Wiley & Sons; 1990. 1223 p.

Please note that journal title abbreviations should conform to the practices of Chemical Abstracts.

For more information about AMA reference style - **AMA Manual of Style**

Tables, Figures and Figure Legends

Tables are part of the text and should be included, one per page, after the References. Please see our **Guide to Tables and Figures** for guidance on how to lay these out. All graphs, drawings, and photographs are considered figures and should be sequentially numbered with Arabic numerals. Each figure must be on a separate page and each must have a caption. All captions, with necessary references, should be typed together on a separate page and numbered clearly (Fig.1, Fig. 2, etc.).

Preparation of Electronic Figures for Publication: Although low-quality images are adequate for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit EPS (lineart) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented programmes. Scans (TIFF only) should have a resolution of 300 dpi (halftone) or 600 to 1200 dpi (line drawings) in relation to the reproduction size (see below). EPS files should be saved with fonts embedded (and with a TIFF preview if possible). For scanned images, the scanning resolution (at final image size) should be as follows to ensure good reproduction: line art: >600 dpi; half-tones (including gel photographs): >300 dpi; figures containing both halftone and line images: >600.

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