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MESTRADO EM ODONTOLOGIA

BÁRBARA THEREZA DE FREITAS KOPPE

VALIDAÇÃO DO HISTÓRICO DE TRATAMENTO ENDODÔNTICO AUTORREPORTADO EM UMA SUBPOPULAÇÃO URBANA DO SUL DO BRASIL: UM ESTUDO MULTICÊNTRICO

Porto Alegre
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PÓS-GRADUAÇÃO - *STRICTO SENSU*

Pontifícia Universidade Católica
do Rio Grande do Sul

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Dissertação apresentada como requisito obrigatório para obtenção do título de mestre na área de Endodontia pelo Programa de Pós-Graduação do Curso de Odontologia da Escola de Ciências da Saúde da Pontifícia Universidade Católica do Rio Grande do Sul

Orientador: Prof. Dr. Maximiliano Schünke Gomes

Porto Alegre, fevereiro de 2019

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Dedico este trabalho à minha mãe e
ao meu pai, meus primeiros e mais
importantes mestres na vida.

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LISTA DE ABREVIATURAS

DCNT – Doença crônica não-transmissível
DCV – Doença cardiovascular
DM – Diabetes mellitus
OMS – Organização Mundial da Saúde
DP – Doença periodontal
PA – Periodontite apical
TE – Tratamento endodôntico
HTEAR – Histórico de tratamento endodôntico autorreportado

RESUMO

Testes diagnósticos e de rastreamento são ferramentas essenciais para determinar medidas acurazes de doenças, entender suas etiologias e seus padrões de transmissão. Para que um teste tenha níveis de validação adequados, sua performance deve ser comparada em uma variedade de populações e cenários. Medidas de saúde autorreportadas já se comprovaram como testes eficazes para avaliar diversas condições de saúde e doença, tanto gerais quanto orais. Especialmente no campo da Endodontia, esses testes podem ser úteis na substituição da necessidade de radiografias para estudos epidemiológicos. O histórico de tratamento endodôntico autorreportado (HTEAR) já foi utilizado como método para identificar a experiência de um indivíduo com doença e tratamento endodônticos, mas apenas em populações masculinas e com elevado nível de educação. O objetivo deste estudo multicêntrico foi quantificar a validade do HTEAR para identificação da presença de tratamento endodôntico (TE) e periodontite apical (PA) em uma subpopulação de pacientes iniciando tratamento em universidades de duas diferentes cidades do sul do Brasil. A variável de exposição principal (HTEAR) foi coletada através de questionário respondido por 228 participantes, e os desfechos TE e PA foram avaliados através da análise de radiografias panorâmicas. Os dados coletados incluíram número total de dentes e número de dentes com TE e PA para cada participante. Foram calculados os valores de acurácia, sensibilidade, especificidade, valores preditivos positivos e negativos (VPP e VPN), eficiência e razões de verossimilhança positiva e negativa (RVP e RVN). A amostra final foi composta por 198 indivíduos para análise de TE e 192 para análise de PA, após exclusões. Os valores para HTEAR foram: acurácia (TE=0,858; PA=0,474); sensibilidade (TE=0,954; PA=0,739); especificidade (TE=0,671; PA=0,250); VPP (TE=0,850; PA=0,454); VPN (TE=0,882; PA=0,530); eficiência (TE=0,812; PA=0,494); RVP (TE=2,899; PA=0,985); RVN (TE=0,068; PA=1,004). HTEAR pode ser considerado um método válido para identificação da presença de TE, mas não de PA nesta população. A maior parte dos valores das medidas que foram calculados variaram nesta população, em comparação com estudos anteriores, demonstrando que o método do HTEAR se mostrou dependente do contexto em que foi aplicado. Os presentes resultados, portanto, apontam para a necessidade de mais estudos em outros cenários populacionais sobre a acurácia do HTEAR, para

que este possa vir a ser utilizado em futuros estudos epidemiológicos de larga escala que incluam variáveis endodônticas.

Palavras-chave: tratamento endodôntico, periodontite apical, autorrelato, validação

ABSTRACT

Diagnostic and screening tests are essential tools for determining accurate estimates of diseases, understanding their etiology and transmission patterns. In order to have appropriate validity, a test's performance should be compared in a variety of populations and settings. Self-reported health status has proved to be a low cost, effective test to assess various general and oral conditions. Especially in the field of Endodontics, they can be useful in replacing the need for radiographs in epidemiological studies. Self-reported history of endodontic treatment (SRHET) has been used as a method of identifying an individual's experience with endodontic disease and treatment, but only in highly educated male populations. The aim of this multicenter study was to evaluate the validity of SRHET for endodontic treatment (ET) and apical periodontitis (AP) in a subpopulation of first-time patients at universities in two different cities in the South of Brazil. Main exposure SRHET was collected through questionnaire for 228 participants and outcomes ET and AP were assessed by analysis of panoramic radiographs. Data collected included total number of teeth and number of teeth with ET and/or AP for each participant. Validities of SRHET for presence of ET and AP were calculated separately through values of accuracy, sensitivity, specificity, positive and negative predictive values (PPV and NPV), efficiency and positive and negative likelihood ratios (PLR and NLR). Final sample comprised 198 individuals for ET analysis and 192 for AP analysis, after exclusions. The SRHET values were: accuracy (ET=0.858; AP=0.474); sensitivity (ET=0.954; AP=0.739); specificity (ET=0.671; AP=0.250); PPV (ET=0.850; AP=0.454); NPV (ET=0.882; AP=0.530); efficiency (ET=0.812; AP=0.494); PLR (ET=2.899; AP=0.985); NLR (ET=0.068; AP=1.004). SRHET is a valid method for predicting ET, but not for AP in this population. Values of most measures calculated varied in this population in comparison to previous studies. SRHET thus showed to be context-dependent and should be tested in a variety of other populational settings in order to allow its use in future large-scale epidemiological studies including endodontic variables.

Keywords: endodontic treatment, apical periodontitis, self-report, validation

SUMÁRIO

1 INTRODUÇÃO

As doenças crônicas não-transmissíveis (DCNTs) têm sido as maiores causadoras de morte na população mundial nas últimas décadas, sendo responsáveis por 38 milhões (67,8%) das 56 milhões de mortes no mundo em 2012. Destas, 82% foram provocadas pelas quatro principais DCNTs: doenças cardiovasculares (DCV), diabetes mellitus (DM), câncer e doenças respiratórias crônicas. A Organização Mundial da Saúde (OMS) relata que esses números vêm aumentando – no ano de 2000, houve 31 milhões de mortes causadas por essas enfermidades – e estima que em 2030, o total chegará a 52 milhões de mortes por DCNTs (WHO, 2014).

Contribuindo com a relevância desses dados, destaca-se ainda que cerca de 42% de tais eventos ocorrem em indivíduos com menos de 70 anos e, destes, 82% se dão em populações de países de baixa e média renda, como o Brasil. Além disso, as DCNTs provocam altos índices de morbidade nas populações, demandando altos investimentos dos serviços de saúde pública. Tais gastos, somados ao impacto provocado pela elevada prevalência das mortes prematuras, diminuem a força de trabalho e, consequentemente, dificultam o desenvolvimento socioeconômico e a erradicação da pobreza nesses países (WHO, 2010, 2014).

Tendo esses números alarmantes em vista, a OMS publicou, no ano de 2013, um plano de ação global, visando à prevenção das DCNTs e de seus eventos consequentes. Os objetivos foram estipulados principalmente com base no combate aos fatores de risco mais conhecidos para DCNTs (fumo, dieta não-balanceada, inatividade física e uso abusivo do álcool). Dentre esses objetivos estão a redução no consumo de sal e de bebidas alcoólicas, a redução na prevalência de atividade física insuficiente, diminuição do fumo, contenção do aumento na prevalência de diabetes e obesidade e redução dos índices de morte prematura por DCNTs (WHO, 2013a).

Entretanto, a própria OMS afirma que a eliminação completa dos principais fatores de risco comportamentais seria capaz de evitar apenas três quartos de todas as mortes causadas por DCNTs (WHO, 2013b). Isso significa que 25% dessas mortes podem ainda possuir outros fatores de risco, ainda não bem elucidados. Recentemente, o papel da inflamação crônica vem sendo avaliado como possível contribuinte para o desenvolvimento de DCNTs, especialmente doenças

cardiovasculares e diabetes mellitus. Estudos na área médica têm investigado a associação da inflamação crônica com riscos aumentados para aterosclerose (bem como suas consequências – doença coronariana e acidente vascular cerebral) e resistência à insulina, levando à síndrome metabólica e diabetes mellitus tipo 2 (DREGAN et al., 2014).

Seguindo essa linha, patologias bucais como doença periodontal (DP) e periodontite apical (PA), que são doenças crônicas infecto-inflamatórias, também têm sido investigadas como possíveis novos fatores de risco para DCNTs. Na área odontológica, Mattila e colaboradores foram os primeiros a identificar uma associação entre saúde oral e infarto agudo do miocárdio, mesmo após ajuste para idade, sexo, classe social, fumo, concentrações lipídicas sanguíneas e presença de diabetes (MATTILA et al., 1989). Posteriormente, outros estudos que avaliaram doença periodontal, tanto prospectivos (BECK et al., 1996; DESTEFANO et al., 1993) quanto retrospectivos (MORRISON; ELLISON; TAYLOR, 1999), conseguiram observar associação entre DP e DCVs. Ainda em relação à DP, ficou igualmente estabelecida a relação com diabetes mellitus (IACOPINO, 2001).

Como a periodontite apical (PA) divide aspectos em comum com a DP, faz sentido que também fosse investigada como fator de risco para DCV e DM. Ambas DP e PA são doenças infecciosas que apresentam microbiota semelhante (em sua maioria bactérias anaeróbias Gram-negativas) e causam elevação em marcadores inflamatórios sistêmicos (COTTI et al., 2011a).

No que se refere às DCVs, sabe-se que se originam de disfunção endotelial que leva à formação de placas ateroscleróticas (MÜLLER; ANDREA, 2000). Processos inflamatórios crônicos e doenças infecciosas, como são PA e DP, por sua vez, são capazes de provocar tais danos endoteliais e consequente aterosclerose, bem como causam eventos cardiovasculares agudos, incluindo ruptura da placa aterosclerótica e trombose (ROSS, 1999). Alguns estudos já demonstraram, inclusive, que microrganismos causadores de infecções endodônticas, como *Porphyromonas endodontalis*, estão presentes em placas ateroscleróticas (CHHIBBER-GOEL et al., 2016) e são capazes de invadir culturas de células endoteliais de artérias coronarianas (DORN et al., 2002). Além disso, uma recente metanálise mostrou que a PA está associada à elevação de marcadores inflamatórios sistêmicos, os quais são indicadores de risco para DCV (GOMES et al., 2013).

Apesar desses aspectos, ainda há poucos estudos que se dedicaram a avaliar a associação entre PA e DCV. Cotti e colaboradores (COTTI et al., 2011b) encontraram indícios de disfunção endotelial incipiente em homens adultos jovens com PA, através da avaliação de baixos níveis de reserva de fluxo endotelial e aumento dos níveis de interleucina-2 circulante. Em uma população semelhante, foi observada associação entre lesões periapicais de origem endodôntica e eventos cardiovasculares (infarto do miocárdio, angina pectoris e cardiopatia isquêmica crônica) (CAPLAN et al., 2006). Da mesma forma, porém em população de meia-idade, outro estudo identificou a carga endodôntica (soma da quantidade de elementos dentários com tratamento endodôntico e/ou com PA) como preditor de risco independente para eventos cardiovasculares (angina, infarto do miocárdio e morte por evento cardiovascular) (GOMES et al., 2016). Pasqualini e colaboradores também observaram este tipo de associação em uma população de adultos de meia-idade (PASQUALINI et al., 2012).

Em um trabalho no qual o histórico de tratamento endodôntico (TE) foi autorreportado, foram observados resultados semelhantes. Os participantes com maior histórico de tratamento endodôntico autorreportado tiveram maior chance de desenvolver DCVs do que aqueles que não reportaram histórico de tratamento endodôntico (CAPLAN et al., 2009).

Apesar de ainda não existirem estudos que avaliem prospectivamente se o tratamento endodôntico de dentes com PA é capaz de reduzir o risco de eventos cardiovasculares – algo necessário para confirmação da PA como fator de risco para DCVs –, já foi sugerido que essa redução possa ocorrer. Em um estudo de 2014, foram avaliadas retrospectivamente as imagens de tomografias computadorizadas, bem como a carga aterosclerótica da aorta abdominal através de um escore de cálcio, de 531 pacientes com um total de 11.191 dentes. Os resultados mostraram que houve aumento da carga aterosclerótica com o aumento de dentes com PA, mas não com TE. Pacientes com TE tiveram menor carga aterosclerótica que aqueles sem TE. Dentes com TE e com PA simultaneamente não tiveram relevância na carga aterosclerótica dos pacientes participantes (PETERSEN et al., 2014).

Já em relação à diabetes mellitus, diversos estudos também sugerem associação entre DM e maior prevalência de PA, com lesões periapicais maiores do que em pacientes controle e com pior prognóstico de reparo pós-TE. Por outro lado, lesões crônicas de PA não tratadas podem contribuir para maior dificuldade no

controle glicêmico de diabéticos. Assim como para as DCVs, entretanto, são necessários mais estudos epidemiológicos prospectivos para comprovar a relação efetiva entre DM e PA (SEGURA-EGEA; MARTÍN-GONZÁLEZ; CASTELLANOS-COSANO, 2015).

Tendo em vista que cada vez mais pesquisas apontam para que a PA possa ser um fator de risco para DCNTs, principalmente DCVs e DM, estudos epidemiológicos de grande escala tornam-se extremamente importantes. Segundo a OMS, a obtenção de informações sistemáticas referentes à identificação e à prevalência de fatores de risco são essenciais no planejamento da prevenção de doenças e promoção de saúde. Em seu método de "STEPS" para vigilância de doenças crônicas, o "*step*" ou passo número 1 a ser realizado é a coleta de informações sobre saúde e doença através de questionários. O uso de questionários é a forma mais rápida e com menor custo para obtenção de dados sobre populações (GOMES et al., 2012; PETERSEN; BAEZ, 2013; PITIPHAT et al., 2002).

Questionários vêm sendo um meio de coleta de dados em estudos epidemiológicos desde a Segunda Guerra Mundial e evoluíram significativamente até os dias de hoje, especialmente pela publicação de guias como o *Survey Methods* pela OMS (CANADA, 2010). É um método utilizado para a avaliação autorreportada de diversas questões de saúde-doença, tais como diabetes (BERGMANN et al., 2004; HUERTA et al., 2009; JACKSON et al., 2014), dieta (RIMM et al., 1992), hipertensão arterial sistêmica (ALONSO et al., 2005; HUERTA et al., 2009; TAYLOR et al., 2010; TORMO et al., 2000), doenças cardiovasculares (BERGMANN et al., 2004; HELIÖVAARA et al., 1993), respiratórias, musculoesqueléticas e psiquiátricas (HELIÖVAARA et al., 1993), hipercolesterolemia (HUERTA et al., 2009; TAYLOR et al., 2010), artrite reumatoide (WONG et al., 2004) e câncer (BERGMANN et al., 2004). Outros aspectos menos comuns também já foram avaliados, como uso de entorpecentes (Ecstasy) (YACOUBIAN JR; WISH, 2006) e violência doméstica (HALPERN et al., 2006).

Tal como quaisquer outros tipos de testes diagnósticos, questionários devem ser submetidos a avaliações sobre sua qualidade como método de identificação de condições de saúde-doença. Para que isto ocorra, devem ser realizados estudos para análise dos valores de sua validade ou acurácia, ou seja, a capacidade de distinção entre aqueles que têm (sensibilidade) e aqueles que não tem a doença (especificidade). Este dado é bastante importante no rastreamento de doenças em

populações. Além disso, devem ser analisados os valores preditivos positivos e negativos para que se possa responder a uma questão mais presente na prática clínica: “se o paciente tiver resultado positivo no teste, qual a probabilidade de ter a doença?”, sendo o mesmo válido para o caso negativo. Outros valores importantes que devem ser calculados são as razões de verossimilhança (ou *likelihood ratios*) positivas e negativas, que representam a probabilidade de se encontrar o resultado positivo ou negativo em pessoas doentes quando comparado a pessoas não-doentes (GORDIS, 2014; HULLEY et al., 2003).

Diversos trabalhos relatam formas de se avaliar a qualidade de testes diagnósticos (BOSSUYT et al., 2003a; DAYA, 1996; IRWIG et al., 2002; VETTER; SCHOBER; MASCHA, 2018), sendo que uma das maiores considerações é dada sobre a capacidade de generalização ou transferência dos resultados para diversas populações. Como os sujeitos são normalmente uma das principais fontes de variabilidade entre os testes, sugere-se que, para superar este obstáculo, sejam bem descritas a população incluída no estudo, sua forma de seleção, incluindo critérios de inclusão e exclusão, o local, a época e a situação da coleta dos dados (BOSSUYT et al., 2003a; DAYA, 1996; HULLEY et al., 2003; IRWIG et al., 2002). Além disso, é indicado que os estudos sejam reprodutíveis, e assim possam realizados em diversos locais, tempos e com variadas populações, com o objetivo de fornecer dados suficientes para que subsequentes metanálises possam ser realizadas (BOSSUYT et al., 2003b; HULLEY et al., 2003; IRWIG, 1994; IRWIG et al., 2002; LEE et al., 2015).

No campo da Odontologia, pode-se considerar que a avaliação de doenças através de questionários está ainda nos estágios iniciais deste processo, sendo relativamente recente, já que remete às últimas três décadas. O primeiro estudo, realizado em 1986 na Finlândia, conseguiu confirmar a eficácia do uso de questionário para a autoavaliação sobre o número de dentes e presença de próteses dentárias (KÖNÖNEN; LIPASTI; MURTOMAA, 1986). No ano de 1991, dois trabalhos deste tipo realizaram validação para saúde oral, obtendo bons resultados também para contagem de dentes (DOUGLASS; BERLIN; TENNSTEDT, 1991) e uso de próteses dentárias (PALMQVIST; B; ARNBJERG, 1991). Desde então, diversos estudos confirmaram tais resultados (AXELSSON; HELGADÓTTIR, 1995; BUHLIN et al., 2002; GILBERT; DUNCAN; KULLEY, 1997; PITIPHAT et al., 2002; RAMOS; BASTOS; PERES, 2013), enquanto outros expandiram a avaliação para

presença de doença periodontal (ABBOOD et al., 2016; BLICHER; JOSHIPURA; EKE, 2005; BUHLIN et al., 2002; COBURN et al., 2015; CYRINO et al., 2011; DIETRICH et al., 2005; EKE et al., 2013; GENCO et al., 2007; JOSHIPURA; PITIPHAT; DOUGLASS, 2002; PITIPHAT et al., 2002; RAMOS; BASTOS; PERES, 2013), cárie (PITIPHAT et al., 2002; SILVA et al., 2014), tratamento endodôntico (FRANCISCATTO et al., 2019; GOMES et al., 2012; PITIPHAT et al., 2002), dor orofacial (NILSSON; LIST; DRANGSHOLT, 2006) e agenesia dentária (BAELUM et al., 2011).

Apesar de alguns estudos terem encontrado resultados insuficientes para validação de DP (BLICHER; JOSHIPURA; EKE, 2005; BUHLIN et al., 2002; DIETRICH et al., 2005; PITIPHAT et al., 2002; RAMOS; BASTOS; PERES, 2013), cárie (PITIPHAT et al., 2002) e agenesia dentária (BAELUM et al., 2011) autorreportadas, a maioria verificou como tendo validade o método de questionário. Para DP há inclusive uma revisão sistemática com metanálise confirmando a possibilidade do uso do diagnóstico autorreportado em grandes estudos epidemiológicos (ABBOOD et al., 2016). Outros corroboram com tais bons resultados, tanto para DP (COBURN et al., 2015; CYRINO et al., 2011; EKE et al., 2013; GENCO et al., 2007; HEATON et al., 2017; JOSHIPURA; PITIPHAT; DOUGLASS, 2002; LAMONTE et al., 2014), quanto para cárie (LEVIN; SHPIGEL; PERETZ, 2013; SILVA et al., 2014), dor orofacial (NILSSON; LIST; DRANGSHOLT, 2006), tratamento endodôntico (FRANCISCATTO et al., 2019; GOMES et al., 2012; PITIPHAT et al., 2002) e retenção de restaurações com uso de retentor intracanal pós-tratamento endodôntico (VON STEIN-LAUSNITZ et al., 2018).

De uma forma geral, percebe-se que questionários de saúde tendem a ter piores resultados para detecção de doenças transitórias ou agudas e melhores para doenças crônicas (BERGMANN et al., 2004; HELIÖVAARA et al., 1993). Os resultados também tendem a ser melhores para especificidade do que para sensibilidade, ou seja, identificam mais adequadamente saúde do que doença (FARMER et al., 2017; HUERTA et al., 2009).

Ainda assim, considerando que o diagnóstico para histórico e necessidade de tratamento endodôntico envolve necessariamente o uso de exames de imagem, o que aumenta consideravelmente seus custos, a ferramenta do questionário torna-se fundamental para a realização de estudos epidemiológicos nessa área. Alguns estudos já confirmaram a validade e utilizaram questionários autorreportados para

identificação de histórico de tratamento endodôntico, sendo a maioria dos participantes homens brancos, com elevado nível de escolaridade (CAPLAN et al., 2009; FRANCISCATTO et al., 2019; GOMES et al., 2012; JOSHIPURA et al., 2006; PITIPHAT et al., 2002). Há um estudo que conseguiu bons resultados para validação de DP autorreportada em uma amostra brasileira (CYRINO et al., 2011) e apenas um que tenha feito o mesmo para histórico de tratamento endodôntico (FRANCISCATTO et al., 2019). Este último trabalho, entretanto, foi composto por uma amostra extremamente específica, composta de policiais militares, em sua maioria homens, com consultas regulares ao dentista.

Nos trabalhos em que o histórico de tratamento endodôntico autorreportado foi utilizado, isto ocorreu em substituição aos exames de imagem normalmente realizados (radiografias ou tomografias computadorizadas), que seriam o padrão-ouro em imagens para avaliação da presença de TE e PA. Nos casos em que há presença de radiopacidade referente à existência de dentes com TE, pode-se sugerir que o paciente, consequentemente, tenha um histórico de doença pulpar ou periapical prévia. Entretanto, esta hipótese ainda deve ser validada, tendo apenas dois trabalhos avaliado a possibilidade da ocorrência desta relação através do histórico de TE (FRANCISCATTO et al., 2019; GOMES et al., 2012).

Este trabalho, portanto, teve como objetivo validar o histórico de tratamento endodôntico autorreportado como método de identificação de indivíduos que realizaram TE e/ou apresentam PA em uma população do sul do Brasil, composta por pacientes que estivessem iniciando tratamento em cursos de Odontologia de uma universidade particular da cidade de Porto Alegre, Rio Grande do Sul e de uma universidade pública da cidade de Santa Maria, Rio Grande do Sul.

2 ARTIGO

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MULTICENTER VALIDATION OF SELF-REPORTED HISTORY OF ENDODONTIC TREATMENT IN A SOUTH BRAZILIAN URBAN POPULATION

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ABSTRACT

The aim of this multicenter study was to evaluate the accuracy of self-reported history of endodontic treatment (SRHET) as a mean of identifying patients who have undergone endodontic treatment (ET) and present with apical periodontitis (AP) in an urban subpopulation of first-time patients at two different universities in South Brazil. Main exposure SRHET was collected through questionnaire for 228 participants, and outcomes ET and AP were assessed by the analysis of panoramic radiographs. Collected data included total number of teeth and number of teeth with ET and with AP for each participant. Validities of SRHET for the presence of ET and AP were calculated separately through values of accuracy, sensitivity, specificity, positive and negative predictive values (PPV and NPV), efficiency and positive and negative likelihood ratios (PLR and NLR). Final sample comprised 198 individuals for ET analysis and 192 for AP analysis, after exclusions. The SRHET values were: accuracy (ET=0.858; AP=0.474); sensitivity (ET=0.954; AP=0.739); specificity (ET=0.671; AP=0.250); PPV (ET=0.850; AP=0.454); NPV (ET=0.882; AP=0.530); efficiency (ET=0.812; AP=0.494); PLR (ET=2.899; AP=0.985); NLR (ET=0.068; AP=1.004). SRHET is a valid method for predicting ET, but not for AP in this population. The values of most validation measures varied in this population compared to previous studies. Present findings thus suggest that the accuracy of SRHET is dependent on the population profile, which encourages further validation research of this test in different scenarios.

Key-words: endodontic treatment, apical periodontitis, self-report, validation

Introduction

Diagnostic and screening tests are essential tools for determining accurate estimates of diseases, understanding their etiology and transmission patterns. Consequently, they enable health professionals to provide appropriate treatment for patients, contributing to the development of customized preventive public health programs according to community profiles[1]. Several studies have been published over the years specifying directions on how to evaluate the quality of diagnostic tests[2–5]. Besides having proper validity, one of their main concerns is the possible variability of test accuracy between settings, which can hinder the transferability or generalization of its applicability to different populations.

The Standards for Reporting of Diagnostic Accuracy (STARD) initiative, alongside other studies, has suggested that the description of the study population and participant recruitment, the inclusion and exclusion criteria, and the settings, locations and time of data collection are some of the ways to overcome this issue[2,3,5]. Furthermore, the test should be reproducible and its performance should be compared in a variety of populations and settings, paving the way for subsequent meta-analytic studies that can improve the test's external validity[5–8]. This is also relevant because many studies do not report considerations on the calculation of sample sizes, and having small numbers of participants can result in imprecise estimates of the overall accuracy of the test[9].

Among many diagnostic and screening tests, self-reported health status has proved to be a low cost, effective way to assess various general[10–14] as well as oral conditions[15–22], hence being extremely useful for epidemiological studies. In contrast, the diagnosis of endodontic diseases is usually deemed as costly in regards to time, money and equipment, exposes the patient to radiation and requires the work of qualified professionals. Considering that these characteristics can make it difficult to perform epidemiological studies in the field of endodontics, the self-reported history of endodontic treatment (SRHET) has been used as a simplified way to assess patient's experience of endodontic disease and treatment[19,23–26]. In these studies, SRHET was used to the detriment of the usual method of imaging exams, such as periapical and panoramic radiographs or cone beam computed tomography (CBCT). When radiopaque evidence of endodontic treatment (ET) is present in these images, they are thought to represent one's history of pulp and/or periapical pathology, even though this assumption has yet to be validated.

However, the few studies that have used SRHET so far comprised participants with a specific profile (white males with high education and regular access to dental care) from the United States and Brazil[19,23–26]. Only two tested the possibility of apical periodontitis (AP) being related to SRHET[25,26]. At this time, SRHET has yet to be tested in other varieties of populational contexts. The aim of this multicenter study was therefore to evaluate the validity of SRHET as a method for identifying patients who have undergone ET and present with AP in a subpopulation of patients seeking and initiating treatment at the school of Dentistry of one private and one public university in two southern Brazilian cities.

Methodology

This study was approved by the Ethics Committee of the School of Health Sciences of the Pontifical University of Rio Grande do Sul and by the Ethics Committee of the Faculty of Dentistry of the Santa Maria Federal University (CAAE #91678518.4.1001.5336). Every participant read and signed an informed consent before entering the study. Participants were recruited in the period between August and November 2018 in the cities of Porto Alegre (Dentistry Course, School of Health Sciences, Pontifical University of Rio Grande do Sul) and Santa Maria (Faculty of Dentistry, Federal University of Santa Maria), in the state of Rio Grande do Sul, Brazil. All collected data were de-identified before analysis.

Patients were invited to participate in the study after arriving for an appointment in the triage discipline of the Dentistry undergraduate course and before having any contact with students. Inclusion criteria comprised adults with 18 years or more, who understood and signed informed consent and had a clinical indication of a panoramic radiograph.

After reading and signing the informed consent, participants answered the questionnaire, which included sociodemographic questions (age, gender, education level, income), dentist visits-related questions (“Have you ever been to the dentist?” and “When was the last time you visited the dentist?”) and the main exposure question (SRHET) - “Have you ever had root canal treatment?”. Possible answers to that question were “yes” or “no”. Sociodemographic answers such as monthly household income were collected in categories as done in a national oral health survey[27](≤ R$ 250; 251 to 500; 501 to 1500; 1501 to 2500; 2501 to 4500; 4501 to 9500; ≥ 9501) and then stratified. The same applies to level of education which was

collected as “none, elementary school (incomplete), elementary school (complete), high school (incomplete), high school (complete), graduate school (incomplete), graduate school (complete), post-graduation (incomplete), post-graduation (complete)”, according to a national survey[28], before stratification. After completing the questionnaire, participants followed the course’s protocol, having their clinical examination performed by the students and a panoramic radiograph taken for diagnostic and treatment planning purposes.

The digital panoramic radiographs were used to obtain the main outcomes ET and AP. The image exams were analyzed by a specialist in endodontics, blinded to SRHET data and previously calibrated to assess the following parameters, according to Gomes *et al.*[25]:

- ET absent = 0, when absence of radiopaque materials inside root canals was observed.
- ET present = 1, when presence of radiopaque materials inside one or more root canals was observed.
- AP absent = 0, when integrity of the periapical lamina dura was observed, as well as a periodontal ligament width ≤ 2 mm.
- AP present = 1, when lack of integrity of the periapical lamina dura, as well as a radiolucency compatible with bone destruction, and periodontal ligament width > 2 mm was observed in one or more roots.

The conditions for analysis of the exams were standardized, where radiographs were viewed in a darkened room, in a 20-inch widescreen monitor (LG E2050T; LG, Seoul, South Korea) with an Intel HD Graphics 4600 (Intel, Santa Clara, CA) video card, 32-bit color and 1600x900 resolution.

The calibration process comprised the analysis of 40 panoramic radiographs not included in the study sample, evaluated by two examiners. Both specialists independently evaluated the images twice, with a 45-day hiatus between the first and second evaluations. Intra and interexaminer kappa agreement levels were calculated. After calibration, the results for interexaminer agreement were kappa = 0.922 (ET) and kappa = 0.800 (AP). Intraexaminer results were kappa = 0.973 (ET) and kappa = 0.956 (AP).

Parameters for ET and PA were analyzed for every tooth in every participant, and total number of teeth were recorded. When limitations of the panoramic radiograph, such as overlapping or severe distortions of the image, made it

impossible for the examiner to determine parameters for ET or AP for a tooth, that unit was considered “undefined”. If an individual had 10% or more of all teeth with “undefined” parameters, then that subject was excluded from the sample analysis for that outcome (ET or AP). Participants with less than 10 teeth were also excluded. The initial sample was calculated to include 162 patients, based on a previous study[25] and considering a power of 80% and α = 5%.

After exclusions, for the remaining participants, the validity of the main exposure (SRHET) was calculated separately in relation to both outcomes (presence of ET and AP) obtained from radiographic analysis. Values for accuracy, sensitivity, specificity, positive and negative predictive values, efficiency, and positive and negative likelihood ratios were assessed. Pearson correlation (*r*) was also calculated between SRHET and ET, SRHET and AP, and ET and AP.

Results

At the end of the study, out of the 228 individuals that answered the questionnaire, 30 were excluded for reasons shown in Figure 1. Furthermore, 6 patients were also excluded from AP analysis for having 10% or more of remaining teeth with undefined parameters for AP. Consequently, final sample size comprised 198 participants for ET and 192 for AP.

Sociodemographic and dental characteristics of the sample are shown in Table 1. The majority of participants were female (65.7%), with a mean BMI index of 27.76 ± 4.99 (overweight), and low levels of education (67.2% had never been to school or had never completed a High School degree). The monthly household income was also low, with the majority of participants’ families earning between R$ 1501 and R$ 2500. The mean age was 49.55 ± 13.58, with the youngest participant being 18 and the oldest 78 years old. Almost all individuals had already gone to the dentist before in their lives (98.9%), with the most recent visit being had within the past year or two (76.8%). Comparisons between all sociodemographic and dental characteristics of the sample in both cities (Porto Alegre – POA and Santa Maria – SM) are also presented in Table 1.

The evaluations of panoramic radiographs showed a mean number of teeth of 23.34 ± 5.76 per patient for the sample. Total number of teeth evaluated was 4639, of which 347 (7.5%) presented ET and 161 (3.5%) presented AP. Most individuals had more than 1 tooth with ET present (37.4%), as opposed to one (28.8%) or no teeth

with ET (33.8%). In contrast, for the outcome AP, a slight majority had no teeth with AP (54.2%), while 24.0% had one and 21.8% had more than one teeth with AP. In total, 131 participants presented at least 1 tooth with ET (66.2%) and 88 had 1 or more teeth with AP (45.8%). The overwhelming majority of individuals (147 or 74.2%) responded positively to SRHET.

The contingency table for SRHET in relation to both ET and AP is shown in Table 2. Among that majority who said they had a history of ET, 125 (63.1%) actually presented with ET in radiographic evaluation, thus representing true positives. Also, 22 (11.1%) of them did not present ET (false positives). Among those who reported negative SRHET, analysis of radiographs showed 45 (22.8%) participants who did indeed not have ET (true negatives), while 6 (3.0%) presented ET (false negatives). In regard to the 192 analyzed for AP, 143 (74.5%) said yes to SRHET: 65 (33.8%) of them presented AP (true positives) and 78 (40.6%) did not (false positives). Among the ones who responded negatively to having history of ET, 26 (13.6%) did not present AP in radiographic evaluations (true negatives), while 23 (12.0%) had 1 tooth or more with AP (false negatives).

Table 3 presents the results of accuracy, sensitivity, specificity, positive predictive value, negative predictive value, efficiency, positive likelihood ratio, and negative likelihood ratio for SRHET in relation to the presence of ET and AP. Good results were found for ET, especially for sensitivity (.954), accuracy (.858), positive (.850) and negative (.882) predictive values. On the other hand, the opposite was found for AP with overall low values, particularly for specificity (.250), positive predictive value (.454) and accuracy (.474).

Finally, Table 4 shows the contingency table for the presence of ET and PA. Out of 126 (65.6%) who had ET, almost half (61/48.4%) presented with AP as well, while the other half did not have any teeth with AP (65/51.6%). Among those who had no teeth with ET (66/34.4%), 39 (59.1%) also had no teeth with AP and 27 (40.9%) had at least 1 tooth with AP. The Pearson correlation calculated between ET and AP was r = 0.072 (p=0.322), between SRHET and AP was r = -0.013 (p=0.857) and between SRHET and ET was r = 0.677 (p<0.001).

Discussion

This study has confirmed previous findings[19,25,26] that SRHET is an accurate method for the screening of patients who have undergone ET. On the other hand, it

has also confirmed that SRHET is not predictive of the presence of AP in this population, which agrees with the results found in other studies with different populations[25,26]. The main novel finding of this study is that the SRHET method showed to be context-dependent, since variations in the population profile modified the accuracy of the instrument.

Unlike the aforementioned preceding studies[19,25,26], the subjects in this sample were mostly women, with low levels of education and monthly household income, and these characteristics are somewhat representative of such aspects in Southern Brazilian populations. For instance, women are known to seek more frequently for health treatment and have more regularly scheduled appointments than men[29,30] and thus are more likely to be initiating treatment in two universities. Additionally, just as seen in our sample, the majority (55%) of Southern Brazilians has not completed a high school degree[28] and has a mean monthly household income of R$ 2373[31]. Since education is inversely related to risk of obesity[32], this could also explain the high BMI found in our study, indicating that most participants are either overweight or obese (69.6%). Finally, while the number of people that has been to the dentist at least one time in their lives is actually high for the South more developed region of Brazil (95.4%)[27], in our findings this rate was even higher (98.9%). The high frequency of consultation, with the last visit having been in the past year or two (76.8%), is in accordance with Southern Brazilian populations as well (85%)[27].

This sociodemographic profile may explain why so many participants (66.2%) had one or more teeth with ET present, which is much higher than the prevalence found by Franciscatto *et al.* (37.5%)[26], Gomes *et al.* (35.8%)[25] and Pitiphat *et al* (34.5%)[19] in other subpopulations. Low socioeconomic status (education and income) is related to higher risk of caries[33], which can consequently lead to ET need, with or without AP. The high frequency of visits to the dentist of the subjects of our study will therefore likely have those needs identified and then ET performed. The prevalence of AP in this population was much higher than in the study of Franciscatto *et al.* and Gomes *et al.* as well (45.8% versus 24.3%[26] and 17.8%[25]), and the same reasoning could be applied.

The prevalence of ET and AP, considering the tooth as a unit, also mostly differed from those found in previous studies. The prevalence of ET (347 or 7.5%) was slightly higher and the prevalence of AP (161 or 3.5%) was lower than the results from a different Brazilian population[34], but both values were lower in

494 comparison to the ones reported in a systematic review with studies from various
495 countries[35]. Both of these studies comprised a much larger sample in number of
496 teeth than our study, which can be considered as a limitation to epidemiological
497 comparisons regarding number of teeth.

498 Another highly contrasting aspect we found when comparing present results to
499 those from previous studies that attempted to validate SRHET before is the
500 proportion of individuals that responded positively to having a history of ET. While in
501 our study that response was given by an overwhelming majority of 74.2% of
502 participants, in previous results that percentage was of only 46.3%[26], 39.7%[25] and
503 31%[19]. These importantly different numbers, alongside the high prevalence of
504 patients with ET, could explain the fact that we found a highly significant value for
505 sensitivity of the SRHET (0.954) test in identifying individuals with history of ET in
506 comparison to the three studies (the other values were 0.960[26], 0.915[25] and 0.900[19]).
507 On the other hand, our number of negative SRHET responses (25.8% versus
508 53.7%[26], 60.3%[25] and 60.3%[19]) and the prevalence of patients who actually did not
509 have any ET (33.8% versus 62.5%[26], 64.3%[25] and 65.5%[19]) was so much lower than
510 the other studies that it may have interfered with our true negative analysis and
511 specificity numbers, which were lower than previously reported (0.671 versus
512 0.835[26], 0.891[25] and 0.921[19]).

513 The same reasoning could be applied to the analysis of the AP outcome. The
514 prevalence of patients with at least one tooth with AP was also higher than the
515 previous studies that tried to validate SRHET as a predictor for AP (45.8% versus
516 24.3%[26] and 17.8%[25]). Both our and the other studies' results found SRHET to be
517 insufficient for the screening of patients with AP, but the results for accuracy,
518 sensitivity, specificity, positive and negative predictive values, efficiency and positive
519 and negative likelihood ratios were overall lower in our findings (Table 3). This is
520 most likely explained by the more even distribution of true and false positives and
521 negatives in the sample of this study (Table 2), which in consequence fails to present
522 good results for the validation of SRHET as a method to identify AP. The *r* values
523 results confirm this, showing that the only correlation found was between SRHET and
524 ET.

525 We aimed to select first-time patients of both universities in order to avoid
526 having the patient get the SRHET information from students. However, with the
527 frequent visits to the dentist profile of this sample, it is apparent that individuals had a

good knowledge of their oral conditions. Additionally, the fact that SRHET is more accurate in predicting ET than AP is expected, considering that ET is a relatively costly, complex treatment that often requires more than one long appointment and that is frequently indicated after an episode of acute pain or swelling. These factors alone can cause sufficient impact on a persons' life to have them remember having ET performed. In contrast, AP is a commonly asymptomatic disease that is only found through radiographic and clinical examinations.

ET is also a treatment that can be indicated in cases without the presence of AP, such as symptomatic irreversible pulpitis or trauma. However, if AP is present, after ET being done it would be expected to heal and consequently disappear from periapical images in radiographic exams. These reasons would increase true positives for SRHET and ET and false positives for SRHET and AP, which was observed in this study (Table 2). In the case of a negative answer for SRHET, it could also mean an increase in false negatives for AP, if it was present and asymptomatic. Furthermore, AP is a disease that can be treated not only through ET, but also by tooth extraction, which can happen to both endodontically treated or non-treated teeth and can thus affect the incidence of false positive and false negative results for ET and AP. Tooth loss is consequently an important confounder and that is why we included only patients with 10 or more teeth.

Besides excluding individuals with less than 10 teeth, we also excluded the ones with 10% or more of remaining teeth with undefined parameters for ET or AP evaluation because of image distortions or overlapping of structures, since this is common for panoramic radiographs, which were the ones we used. The six patients excluded from AP analysis for this reason were mainly from distortions in the anterior region, restricted to anterior teeth. Even though these exclusions mean a reduction in the sample, they are important to strengthen results. Still, our sample size was greater than the calculated 162 that were needed based on a previous study[25].

Regarding radiographic examination it is important to discuss that we used panoramic radiographs in this study because they are still most commonly indicated, cost-effective, low-radiation imaging exams in used our universities. While complete series of periapical radiographies and especially cone beam computed tomography can significantly improve the detection of apical periodontitis[36], the only true gold standard in detecting actual presence of a periapical lesion would be a histological assessment[37,38]. Therefore, despite its limitations, panoramic radiographs do have

good accuracy for detecting AP lesions while being more radioprotective than CBCT[39]. They are still a reasonable method that has been used in many other epidemiological studies regarding the prevalence of periapical radiolucency and endodontic treatment[35]. Another important aspect is that this is a cross-sectional study, meaning we cannot identify the stage of development or healing of periapical disease, which can only be done in longitudinal studies[35,38].

Even considering all the differences in characteristics of populations, high values (0.850 - 0.954) of accuracy, sensitivity, positive and negative predictive values were still found for SRHET and ET in this sample as they were in males with high levels of education and lower prevalences of ET[19,25,26]. In comparison, cold and electric pulp vitality tests, broadly used in daily clinical practice, have less significant or equal values than those of SRHET and ET[40]. However, despite the higher prevalence of AP in this sample, SRHET showed even weaker numbers for the prediction of this disease (Table 3) than it had in the only previous studies that evaluated SRHET and AP[25,26]. Notwithstanding the fact that SRHET has apparently been sensible to population and settings changes, it is likely that the only way of identifying AP through questionnaire is to add a serious of questions related to endodontic risk factors in the same manner that was suggested for periodontal disease[41].

Conclusions

SRHET has confirmed to be an accurate method for identifying individuals with experience of ET but not for the presence of AP in this population. Values of accuracy, sensitivity, specificity, positive and negative predictive values, efficiency, positive and negative likelihood ratios and Pearson correlation *r* values for ET and AP, SRHET and ET and SRHET and AP have shown to be sensible to characteristics of the population in which SRHET is applied. More studies in other contexts should be performed to maximize data in the validation of SRHET as a diagnostic tool that would allow the insertion of endodontic variables in large-scale epidemiological studies. Further investigations should be dedicated to find a specific set of questions that could predict the presence of AP in individuals.

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References

1. Gordis L. *Epidemiology*. 5th edition. Philadelphia: Elsevier Saunders; 2014.

2. Daya S. Study Design for the Evaluation of Diagnostic Tests. *Semin Reprod Endocrinol*. 1996;14(2):111-118.

3. Bossuyt PM, Reitsma JB, Bruns DE, et al. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. *Br Med J*. 2003;326:41-44.

4. Vetter TR, Schober P, Mascha EJ. Diagnostic Testing and Decision-Making. *Anesth Analg*. 2018;127(4):1.

5. Irwig LM, Bossuyt PM, Glasziou PP, Gatsonis C, Lijmer JG. Designing Studies to Ensure that Estimates of Test Are Transferable. *Br Med J*. 2002;324(7338):669-671.

6. Bossuyt PM, Reitsma JB, Bruns DE, et al. The STARD Statement for Reporting Studies of Diagnostic Accuracy: Explanation and Elaboration. *Clin Chem*. 2003;49(1):7-18.

7. Irwig L. Guidelines for Meta-analyses Evaluating Diagnostic Tests. *Ann Intern Med*. 1994;120(8):667.

8. Lee J, Kim KW, Choi SH, Huh J. Systematic Review and Meta-Analysis of Studies Evaluating Diagnostic Test Accuracy : A Practical Review for Clinical Researchers – Part II . Statistical Methods of. *Korean J Radiol*. 2015;16(6):1188-1196.

9. Bachmann LM, Puhan MA, ter Riet G, Bossuyt PM. Sample sizes of studies on diagnostic accuracy: literature survey. *Br Med J*. 2006;332:1127-1129.

10. Rimm EB, Giovannucci EL, Stampfer MJ, Colditz GA, Litin LB, Willett WC. Reproducibility and Validity of an Expanded Self-Administered Semiquantitative Food Frequency Questionnaire among Male Health Professionals. *Am J Epidemiol*. 1992;135(10):1114-1126.

11. Alonso A, Beunza JJ, Delgado-Rodríguez M, Martínez-González MA. Validation of self reported diagnosis of hypertension in a cohort of university graduates in Spain. *BMC Public Health*. 2005;5:94.

12. Wong AL, Harker JO, Mittman BS, et al. Development and evaluation of a patient self-report case-finding method for rheumatoid arthritis. *Semin Arthritis Rheum*. 2004;34(1):484-499.

13. Huerta JM, Tormo MJ, Egea-Caparrós JM, Ortolá-Devesa JB, Navarro C. Accuracy of self-reported diabetes, hypertension and hyperlipidemia in the adult Spanish population. DINO study findings. *Rev Española Cardiol*. 2009;62(2):143-152.

14. Jackson JM, DeFor TA, Crain AL, et al. Validity of Diabetes Self-Reports in the Women's Health Initiative. *Menopause*. 2014;21(8):861-868.

15. Eke PI, Dye BA, Wei L, et al. Self-reported measures for surveillance of periodontitis. *J Dent Res*. 2013;92(11):1041-1047.

16. Silva AER, Menezes AMB, Assunção MCF, et al. Validation of self-Reported information on dental caries in a birth cohort at 18 years of age. *PLoS One*. 2014;9(9):1-8.

17. Ramos RQ, Bastos JL, Peres MA. Diagnostic validity of self-reported oral health outcomes in population surveys : literature review Validade diagnóstica de agravos. *Rev Bras Epidemiol*. 2013;16(3):716-728.

18. Nilsson I-M, List T, Drangsholt M. The Reliability and Validity of Self-reported Temporomandibular Disorder Pain in Adolescents. *J Orofac Pain*. 2006;20(2):138-144.

19. Pitiphat W, Garcia RI, Douglass CW, Joshipura KJ. Validation of self-reported oral health measures. *J Public Health Dent*. 2002;62(2):122-128.

20. Farmer J, Ramraj C, Azarpazhooh A, Dempster L, Ravaghi V, Quiñonez C. Comparing self-reported and clinically diagnosed unmet dental treatment needs using a nationally representative survey. *J Public Health Dent*. 2017;(c):1-7.

21. Axelsson G, Helgadóttir S. Comparison of oral health data from self-administered questionnaire and clinical examination. *Community Dent Oral Epidemiol*. 1995;23(6):365-368.

22. Palmqvist S, B S, Arnbjerg D. Self-assessment of dental conditions: validity of a questionnaire. *Community Dent Oral Epidemiol*. 1991;19(5):249-251.

23. Joshipura KJ, Pitiphat W, Hung HC, Willett WC, Colditz GA, Douglass CW. Pulpal inflammation and incidence of coronary heart disease. *J Endod*. 2006;32(2):99-103.

24. Caplan DJ, Pankow JS, Cai J, Offenbacher S, Beck JD. The relationship between self-reported history of endodontic therapy and coronary heart disease in the Atherosclerosis Risk in Communities Study. *J Am Dent Assoc*. 2009;140(8):1004-1012.

25. Gomes MS, Hugo FN, Hilgert JB, et al. Validity of self-reported history of endodontic treatment in the Baltimore longitudinal study of aging. *J Endod*. 2012;38(5):589-593.

26. Franciscatto GJ, Koppe BTF, Hoppe CB, et al. Validation of self-reported history of root canal treatment in a South Brazilian subpopulation. *Braz Oral Res*. 2019;in press.

27. BRASIL. MINISTÉRIO DA SAÚDE. *SB Brasil 2010: Pesquisa Nacional de Saúde Bucal - Resultados Principais*. Brasília; 2012.

28. Instituto Brasileiro de Geografia e Estatística. *Pesquisa Nacional Por Amostra de Domicílios Contínua: Educação 2017*. Rio de Janeiro; 2018. https://biblioteca.ibge.gov.br/visualizacao/livros/liv101576_informativo.pdf.

29. Instituto Brasileiro de Geografia e Estatística. *Pesquisa Nacional Por Amostra de Domicílios: Acesso e Utilização de Serviços de Saúde - 2003*. Rio de Janeiro; 2005. https://biblioteca.ibge.gov.br/visualizacao/livros/liv6194.pdf.

30. Nascimento GG, Weber CM, Silva DDF. Oral health care in primary care attention: experience from two facilities of Porto Alegre. *Rev Fac Odontol P Alegre*. 2011;52(1/3):19-24. http://seer.ufrgs.br/index.php/RevistadaFaculdadeOdontologia/article/view/30416/24246.

31. Instituto Brasileiro de Geografia e Estatística. *Pesquisa Nacional Por Amostra de Domicílios Contínua: Rendimento de Todas as Fontes 2017*. Rio de Janeiro; 2018.

32. Monteiro CA, Conde WL, Popkin BM. Independent Effects of Income and Education on the Risk of Obesity in the Brazilian Adult Population. *J Nutr*. 2001;131(3):881-886.

33. Costa SM, Martins CC, Bonfim M de LC, et al. A systematic review of socioeconomic indicators and dental caries in adults. *Int J Environ Res Public Health*. 2012;9(10):3540-3574.

34. Berlinck T, Tinoco JMM, Carvalho FLF, Sassone LM, Tinoco EMB. Epidemiological evaluation of apical periodontitis prevalence in an urban Brazilian population. *Braz Oral Res*. 2015;29(1):1-7.

35. Pak JG, Fayazi S, White SN. Prevalence of periapical radiolucency and root canal treatment: A systematic review of cross-sectional studies. *J Endod*. 2012;38(9):1170-1176.

36. Estrela C, Bueno MR, Leles CR, Azevedo B, Azevedo JR. Accuracy of Cone Beam Computed Tomography and Panoramic and Periapical Radiography for Detection of Apical Periodontitis. *J Endod*. 2008;34(3):273-279.

37. Kanagasingam S, Lim CX, Yong CP, Mannocci F, Patel S. Diagnostic accuracy of periapical radiography and cone beam computed tomography in detecting apical periodontitis using histopathological findings as a reference standard. *Int Endod J*. 2017;50(5):417-426.

38. Huumonen S, Ørstavik D. Radiological aspects of apical periodontitis. *Endod Top*. 2002;1:3-25.

39. Nardi C, Calistri L, Grazzini G, et al. Is Panoramic Radiography an Accurate Imaging Technique for the Detection of Endodontically Treated Asymptomatic Apical Periodontitis? *J Endod.* 2018;44(10):1500-1508.

40. Salgar AR, Singh SH, Podar RS, Kulkarni GP, Babel SN. Determining predictability and accuracy of thermal and electrical dental pulp tests: An in vivo

717 study. *J Conserv Dent*. 2017;20(1):46.

718 41. Blicher B, Joshipura K, Eke P. Validation of self-reported periodontal disease: a
719 systematic review. *J Dent Res*. 2005;84(10):881-890.

720 **Figure 1 -** Sample selection flowchart

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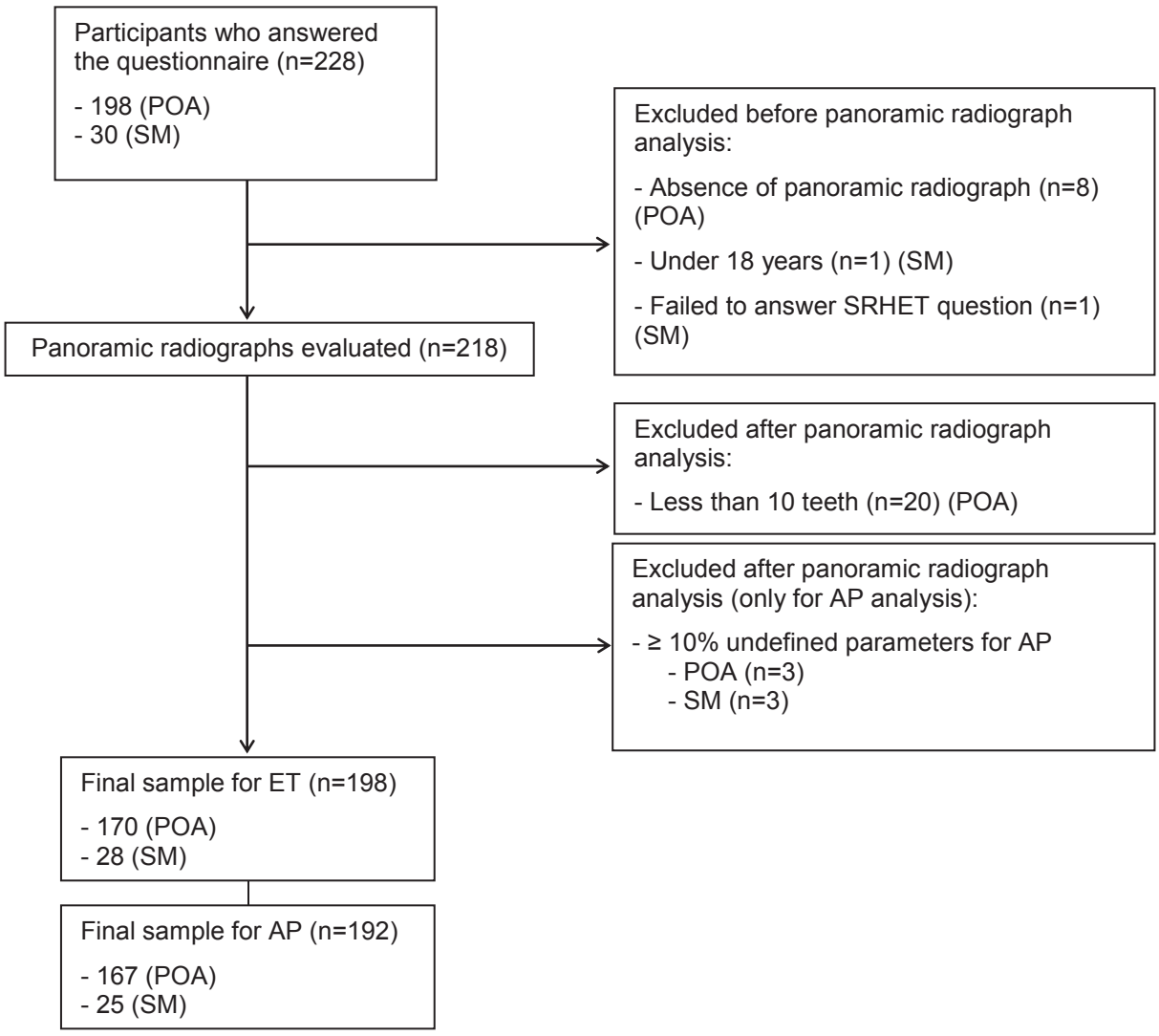

723 **Table 1 -** Sociodemographic and dental characteristics of the sample (n(%) or Mean±SD)

Variable	POA	SM	Total
Sociodemographic			
Age (years) (n=198) POA (n=170) / SM (n=28)	50.54 ± 13.13	43.57 ± 14.54	49.55 ± 13.58
Gender (n=198) POA (n=170) / SM (n=28)			
Male	59 (35.0)	9 (32.0)	68 (34.3)
Female	111 (65.0)	19 (68.0)	130 (65.7)
Monthly household income (R$) (n=188) POA (n=165) / SM (n=23)			
0 to 500	4 (2.4)	2 (8.7)	6 (3.2)
501 to 1500	46 (27.9)	10 (43.5)	56 (29.8)
1501 to 2500	66 (40.0)	9 (39.1)	75 (39.9)
2501 to 4500	34 (20.6)	2 (8.7)	36 (19.1)
≥ 4501	15 (9.1)	0 (0.0)	15 (8.0)
Education (n=198) POA (n=170) / SM (n=28)			
None to High School (incomplete)	75 (44.1)	16	133 (67.2)
High School (complete) to Graduate School (incomplete)	63 (37.1)	6	42 (21.2)
Graduate school (complete) to Post-graduation (complete)	32 (18.8)	6	23 (11.6)
BMI (n=194) POA (n=168) / SM (n=26)	27.96 ± 5.15	26.48 ± 3.64	27.76 ± 4.99
Normal weight (18.5–24.9)	49 (29.2)	10 (38.5)	59 (30.4)
Overweight (25.0–29.9)	72 (42.8)	13 (50.0)	85 (43.8)
Obesity (≥ 30.0)	47 (28.0)	3 (11.5)	50 (25.8)
Dental			
Total number of teeth evaluated	3940 (84.9)	699 (15.1)	4639
Number of teeth per patient (n=198) POA (n=170) / SM (n=28)	23.18 ± 5.85	24.96 ± 5.02	23.34 ± 5.76
SRHET (n=198) POA (n=170) / SM (n=28)			
Yes	128 (75.3)	19 (67.9)	147 (74.2)
No	42 (24.7)	9 (32.1)	51 (25.8)
Number of teeth with ET (n=4639)	299 (7.6)	48 (6.9)	347 (7.5)
Number of teeth with ET per patient (n=198) POA (n=170) / SM (n=28)	1.76 ± 2.28	1.71 ± 1.80	1.75 ± 2.21
0	60 (35.3)	7 (25.0)	67 (33.8)
1	46 (27.1)	11 (39.3)	57 (28.8)
> 1	64 (37.6)	10 (35.7)	74 (37.4)
Number of teeth with AP (n=4639)	141 (3.6)	20 (2.9)	161 (3.5)
Number of teeth with AP per patient (n=192) POA (n=167) / SM (n=25)	0.84 ± 1.22	0.80 ± 1.08	0.84 ± 1.20
0	93 (55.7)	11 (44.0)	104 (54.2)
1	35 (21.0)	11 (44.0)	46 (24.0)
> 1	39 (23.3)	3 (12.0)	42 (21.8)

"Have you ever gone to the dentist before?" (n=189)			
POA (n=161) / SM = (n=28)			
Yes	161 (100.0)	26 (92.9)	187 (98.9)
No	0 (0.0)	2 (7.1)	2 (1.1)
Time since last visit to the dentist (n=177)			
POA (n=150) / SM (n=27)			
< 1 year to 2 years	113 (75.3)	23 (85.2)	136 (76.8)
3 years or more	37 (24.7)	4 (14.8)	41 (23.2)

Table 2 - Contingency table for the presence of ET and AP in relation to SRHET. Results shown as n(%).

	Endodontic treatment			Apical periodontitis		
SRHET	**Yes**	**No**	**Total**	**Yes**	**No**	**Total**
Yes	125 (85.0)	22 (14.9)	147 (74.2)	65 (45.5)	78 (54.5)	143 (74.5)
No	6 (11.8)	45 (88.2)	51 (25.8)	23 (46.9)	26 (53.1)	49 (25.5)
Total	131 (66.2)	67 (33.8)	198 (100)	88 (45.8)	104 (54.2)	192 (100)

Table 3 - Values of Accuracy, Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Efficiency, Positive Likelihood Ratio, and Negative Likelihood Ratio for SRHET in Relation to the Presence of ET and AP

	ET (n = 198)	**PA (n = 192)**
Accuracy	.858	.474
Sensitivity	.954	.739
Specificity	.671	.250
Positive predictive value	.850	.454
Negative predictive value	.882	.530
Efficiency	.812	.494
Positive likelihood ratio	2.899	0.985
Negative likelihood ratio	0.068	1.044

Table 4 - Contingency table correlating the presence of ET and AP; n(%). n = 192

	Presence of AP		
Presence of ET	**Yes**	**No**	**Total**
Yes	61 (48.4)	65 (51.6)	126 (65.6)
No	27 (40.9)	39 (59.1)	66 (34.4)
Total	88 (45.8)	104 (54.2)	192 (100)

3 CONSIDERAÇÕES FINAIS

O histórico de tratamento endodôntico autorreportado (HTEAR) é uma ferramenta que tem se mostrado acuraz para a identificação de indivíduos com experiência de tratamento endodôntico em diferentes populações. O HTEAR se apresenta, portanto, como uma alternativa viável para a substituição das radiografias em estudos epidemiológicos em Endodontia. Por outro lado, este teste não tem se demonstrado capaz de identificar a presença de periodontite apical. Para possibilitar a apuração desta doença através de instrumentos de autorrelato parece ser necessário desenvolver um conjunto maior de perguntas sobre fatores de risco endodôntico.

A maior parte dos valores calculados para os testes de validação (acurácia, sensibilidade, especificidade, valores preditivos positivos e negativos, eficiência, razões de verossimilhança positivas e negativas e correlações de Pearson) do HTEAR variaram nesta população, especialmente em relação à presença de PA, em comparações com amostras de diferentes perfis sociodemográficos. Dessa forma, o HTEAR parece ser sensível a mudanças nas características da população e deve, portanto, ser testado em outros contextos populacionais para permitir seu uso em futuros estudos epidemiológicos de larga escala que incluam variáveis endodônticas.

4 REFERÊNCIAS BIBLIOGRÁFICAS

ABBOOD, H. M. et al. Validity of Self-Reported Periodontal Disease: A Systematic Review and Meta-Analysis. **Journal of Periodontology**, v. 87, n. 12, p. 1474–1483, 2016.

ALONSO, A. et al. Validation of self reported diagnosis of hypertension in a cohort of university graduates in Spain. **BMC public health**, v. 5, p. 94, 2005.

AXELSSON, G.; HELGADÓTTIR, S. Comparison of oral health data from self-administered questionnaire and clinical examination. **Community Dentistry and Oral Epidemiology**, v. 23, n. 6, p. 365–368, 1995.

BAELUM, V. et al. The validity of self-reported dental agenesis. **European Journal of Oral Sciences**, v. 119, n. 4, p. 282–287, 2011.

BECK, J. et al. Periodontal disease and cardiovascular disease. **J. Periodontol.**, v. 67, n. 10 Suppl, p. 1123–1137, 1996.

BERGMANN, M. et al. Agreement of self-reported medical history: comparison of an in-person interview with a self-administered questionnaire. **European Journal of Epidemiology**, v. 19, n. 5, p. 411–416, 2004.

BLICHER, B.; JOSHIPURA, K.; EKE, P. Validation of self-reported periodontal disease: a systematic review. **Journal of Dental Research**, v. 84, n. 10, p. 881–890, 2005.

BOSSUYT, P. M. et al. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. **British Medical Journal**, v. 326, p. 41–44, 2003a.

BOSSUYT, P. M. et al. The STARD Statement for Reporting Studies of Diagnostic Accuracy: Explanation and Elaboration. **Clinical Chemistry**, v. 49, n. 1, p. 7–18, 2003b.

BUHLIN, K. et al. Validity and limitations of self-reported periodontal health. **Community dentistry and oral epidemiology**, v. 30, n. 6, p. 431–7, 2002.

CANADA. **Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey, 2007-2009**. [s.l.] Health Canada, 2010.

CAPLAN, D. J. et al. Lesions of Endodontic Origin and Risk of Coronary Heart Disease. **Journal of Dental Research**, v. 85, n. 11, p. 996–1000, 2006.

CAPLAN, D. J. et al. The relationship between self-reported history of endodontic therapy and coronary heart disease in the Atherosclerosis Risk in Communities Study. **Journal of the American Dental Association**, v. 140, n. 8, p. 1004–1012, 2009.

CHHIBBER-GOEL, J. et al. Linkages between oral commensal bacteria and atherosclerotic plaques in coronary artery disease patients. **NPJ Biofilms and Microbiomes**, v. 2, n. 1, p. 7, 2016.

796 COBURN, B. W. et al. Performance of self-reported measures for periodontitis in
797 rheumatoid arthritis and osteoarthritis. **Journal of periodontology**, v. 86, n. 1, p. 16–
798 26, 2015.

799 COTTI, E. et al. Can a chronic dental infection be considered a cause of
800 cardiovascular disease? A review of the literature. **International Journal of**
801 **Cardiology**, v. 148, n. 1, p. 4–10, 2011a.

802 COTTI, E. et al. Association of endodontic infection with detection of an initial lesion
803 to the cardiovascular system. **Journal of Endodontics**, v. 37, n. 12, p. 1624–1629,
804 2011b.

805 CYRINO, R. M. et al. Evaluation of Self-Reported Measures for Prediction of
806 Periodontitis in a Sample of Brazilians. **Journal of Periodontology**, v. 82, n. 12, p.
807 1693–1704, 2011.

808 DAYA, S. Study Design for the Evaluation of Diagnostic Tests. **Seminars in**
809 **Reproductive Endocrinology**, v. 14, n. 2, p. 111–118, 1996.

810 DESTEFANO, F. et al. Dental disease and risk of coronary heart disease and
811 mortality. **British Medical Journal**, v. 306, n. 6879, p. 688–91, 1993.

812 DIETRICH, T. et al. The accuracy of individual self-reported items to determine
813 periodontal disease history. **European Journal of Oral Sciences**, v. 113, n. 2, p.
814 135–140, 2005.

815 DORN, B. R. et al. Invasion of vascular cells in vitro by prophyromonas endodontalis.
816 **International Endodontic Journal**, v. 35, p. 366–371, 2002.

817 DOUGLASS, C.; BERLIN, J.; TENNSTEDT, S. The validity of self-reported oral
818 health status in the elderly. **Journal of Public Health Dentistry**, v. 51, n. 4, p. 220–
819 222, 1991.

820 DREGAN, A. et al. Chronic inflammatory disorders and risk of type 2 diabetes
821 mellitus, coronary heart disease, and stroke : A population-based cohort study.
822 **Circulation**, v. 130, n. 10, p. 837–844, 2014.

823 EKE, P. I. et al. Self-reported measures for surveillance of periodontitis. **Journal of**
824 **dental research**, v. 92, n. 11, p. 1041–7, 2013.

825 FARMER, J. et al. Comparing self-reported and clinically diagnosed unmet dental
826 treatment needs using a nationally representative survey. **Journal of Public Health**
827 **Dentistry**, p. 1–7, 2017.

828 FRANCISCATTO, G. J. et al. Validation of self-reported history of root canal
829 treatment in a South Brazilian subpopulation. **Brazilian Oral Research**, in press,
830 2019.

831 GENCO, R. J. et al. Validity of self-reported measures for surveillance of periodontal
832 disease in two western New York population-based studies. **The Journal of**
833 **periodontology**, v. 78, n. 7 Suppl, p. 1439–1454, 2007.

834 GILBERT, G.; DUNCAN, R.; KULLEY, A. Validity of self-reported tooth counts during
835 a telephone screening interview. **Journal of public health dentistry**, v. 57, n. 3, p.

176–80, 1997.

GOMES, M. S. et al. Validity of self-reported history of endodontic treatment in the Baltimore longitudinal study of aging. **Journal of Endodontics**, v. 38, n. 5, p. 589–593, 2012.

GOMES, M. S. et al. Can apical periodontitis modify systemic levels of inflammatory markers? A systematic review and meta-analysis. **Journal of Endodontics**, v. 39, n. 10, p. 1205–1217, 2013.

GOMES, M. S. et al. Apical periodontitis and incident cardiovascular events in the Baltimore Longitudinal Study of Ageing. **International Endodontic Journal**, v. 49, n. 4, p. 334–342, 2016.

GORDIS, L. **Epidemiology**. 5th edition. Ed. Philadelphia: Elsevier Saunders, 2014.

HALPERN, L. et al. A protocol to diagnose intimate partner violence in the emergency department. **Journal of trauma**, v. 60, n. 5, p. 1101–1105, 2006.

HEATON, B. et al. A Clinical Validation of Self-Reported Periodontitis Among Participants in the Black Women's Health Study. **Journal of Periodontology**, v. 88, n. 6, p. 582–592, 2017.

HELIÖVAARA, M. et al. Reliability and validity of interview data on chronic diseases. The Mini-Finland Health Survey. **Journal of Clinical Epidemiology**, v. 46, n. 2, p. 181–191, 1993.

HUERTA, J. M. et al. Accuracy of self-reported diabetes, hypertension and hyperlipidemia in the adult Spanish population. DINO study findings. **Revista Española de Cardiología**, v. 62, n. 2, p. 143–152, 2009.

HULLEY, S. B. et al. Delineando a pesquisa clínica: uma abordagem epidemiológica. In: 2ª edição ed. Porto Alegre: Artmed, 2003. p. 203–224.

IACOPINO, A. Periodontitis and diabetes interrelationships: role of inflammation. **Annals of periodontology / the American Academy of Periodontology**, v. 6, n. 1, p. 125–137, 2001.

IRWIG, L. Guidelines for Meta-analyses Evaluating Diagnostic Tests. **Annals of Internal Medicine**, v. 120, n. 8, p. 667, 1994.

IRWIG, L. M. et al. Designing Studies to Ensure that Estimates of Test Are Transferable. **British Medical Journal**, v. 324, n. 7338, p. 669–671, 2002.

JACKSON, J. M. et al. Validity of Diabetes Self-Reports in the Women's Health Initiative. **Menopause**, v. 21, n. 8, p. 861–868, 2014.

JOSHIPURA, K. J. et al. Pulpal inflammation and incidence of coronary heart disease. **Journal of Endodontics**, v. 32, n. 2, p. 99–103, 2006.

JOSHIPURA, K. J.; PITIPHAT, W.; DOUGLASS, C. W. Validation of self-reported periodontal measures among health professionals. **Journal of public health dentistry**, v. 62, n. 2, p. 115–121, 2002.

KÖNÖNEN, M.; LIPASTI, J.; MURTOMAA, H. Comparison of dental information

obtained from self-examination and clinical examination. **Community dentistry and oral epidemiology**, v. 14, n. 5, p. 258–260, 1986.

LAMONTE, M. J. et al. Accuracy of Self-Reported Periodontal Disease in the Women's Health Initiative Observational Study. **Journal of Periodontology**, v. 85, n. 8, p. 1006–1018, 2014.

LEE, J. et al. Systematic Review and Meta-Analysis of Studies Evaluating Diagnostic Test Accuracy : A Practical Review for Clinical Researchers – Part II . Statistical Methods of. **Korean Journal of Radiology**, v. 16, n. 6, p. 1188–1196, 2015.

LEVIN, L.; SHPIGEL, I.; PERETZ, B. The use of a self-report questionnaire for dental health status assessment: A preliminary study. **British Dental Journal**, v. 214, n. 5, p. 1–4, 2013.

MATTILA, M. S.; VALTONEN, V. V.; RASI, V. P.; KESÄNIEMI, Y. A.; SYRJÄLÄ, S. L.; JUNGELL, P. S.; ISOLUOMA, M.; HIETANIEMI, K. ;JOKINEN, M. J. Association between dental health and acute myocardial infarction. **British Medical Journal**, v. 298, n. March, p. 779–781, 1989.

MORRISON, H. I.; ELLISON, L. F.; TAYLOR, G. W. Periodontal disease and risk of fatal coronary heart and cerebrovascular diseases. **Journal of Cardiovascular Risk**, v. 6, n. 1, p. 7–11, 1999.

MÜLLER, M. M.; ANDREA, G. Markers of Endothelial Dysfunction. **Clinical Chemistry and Laboratory Medicine**, 2000. Disponível em: <https://www.degruyter.com/view/j/cclm.2000.38.issue-2/cclm.2000.013/cclm.2000.013.xml>

NILSSON, I.-M.; LIST, T.; DRANGSHOLT, M. The Reliability and Validity of Self-reported Temporomandibular Disorder Pain in Adolescents. **Journal of Orofacial Pain**, v. 20, n. 2, p. 138–144, 2006.

PALMQVIST, S.; B, S.; ARNBJERG, D. Self-assessment of dental conditions: validity of a questionnaire. **Community Dentistry and Oral Epidemiology**, v. 19, n. 5, p. 249–251, 1991.

PASQUALINI, D. et al. Association among oral health, apical periodontitis, CD14 polymorphisms, and coronary heart disease in middle-aged adults. **Journal of Endodontics**, v. 38, n. 12, p. 1570–1577, 2012.

PETERSEN, J. et al. The association of chronic apical periodontitis and endodontic therapy with atherosclerosis. **Clinical Oral Investigations**, v. 18, n. 7, p. 1813–1823, 2014.

PETERSEN, P.; BAEZ, R. **Oral Health Suverys Basic Methods**. WHO, 2013.

PITIPHAT, W. et al. Validation of self-reported oral health measures. **Journal of public health dentistry**, v. 62, n. 2, p. 122–128, 2002.

RAMOS, R. Q.; BASTOS, J. L.; PERES, M. A. Diagnostic validity of self-reported oral health outcomes in population surveys : literature review Validade diagnóstica de agravos. **Rev Bras Epidemiol**, v. 16, n. 3, p. 716–728, 2013.

915 RIMM, E. B. et al. Reproducibility and Validity of an Expanded Self-Administered
916 Semiquantitative Food Frequency Questionnaire among Male Health Professionals.
917 **American Journal of Epidemiology**, v. 135, n. 10, p. 1114–1126, 15 maio 1992.

918 ROSS, R. Inflammation or Atherogenesis. **The New England Journal of Medicine**,
919 v. 340, n. 2, p. 115–126, 1999.

920 SEGURA-EGEA, J.; MARTÍN-GONZÁLEZ, J.; CASTELLANOS-COSANO, L.
921 Endodontic medicine: Connections between apical periodontitis and systemic
922 diseases. **International Endodontic Journal**, v. 48, n. 10, p. 933–951, 2015.

923 SILVA, A. E. R. et al. Validation of self-Reported information on dental caries in a
924 birth cohort at 18 years of age. **PLoS ONE**, v. 9, n. 9, p. 1–8, 2014.

925 TAYLOR, A. et al. Comparing self-reported and measured high blood pressure and
926 high cholesterol status using data from a large representative cohort study.
927 **Australian and New Zealand Journal of Public Health**, v. 34, n. 4, p. 394–400,
928 2010.

929 TORMO, M. J. et al. Validation of self diagnosis of high blood pressure in a sample of
930 the Spanish EPIC cohort: overall agreement and predictive values. EPIC Group of
931 Spain. **Journal of epidemiology and community health**, v. 54, n. 3, p. 221–6,
932 2000.

933 VETTER, T. R.; SCHOBER, P.; MASCHA, E. J. Diagnostic Testing and Decision-
934 Making. **Anesthesia & Analgesia**, v. 127, n. 4, p. 1, 2018.

935 VON STEIN-LAUSNITZ, M. et al. Patients' self-report on post-retained restoration is
936 more valuable than expected! Explorative analysis of an 11-year follow-up. **Acta**
937 **Odontologica Scandinavica**, v. 0, n. 0, p. 1–6, 2018.

938 WHO. **Global status report on noncommunicable diseases 2010.**

939 WHO. **Global action plan for the prevention and control of noncommunicable**
940 **diseases 2013-2020.**

941 WHO. **Key Facts on Noncommunicable diseases**. Disponível em:
942 <http://www.wpro.who.int/mediacentre/factsheets/fs20130311/en/>. Acesso em: 30
943 set. 2017b.

944 WHO. **Global status report on noncommunicable diseases 2014World Health**.

945 WONG, A. L. et al. Development and evaluation of a patient self-report case-finding
946 method for rheumatoid arthritis. **Seminars in Arthritis and Rheumatism**, v. 34, n. 1,
947 p. 484–499, 2004.

948 YACOUBIAN JR, G.; WISH, E. Exploring the validity of self-reported Ecstasy use
949 among club rave attendees. **Journal of Psychoactive Drugs**, v. 38, n. 1, p. 31–34,
950 2006.