

Associations and discrepancies between global self-ratings of oral health and general health: a Bayesian approach

Gustavo Hermes Soares,¹ Beatriz Loureiro Santos,² Maria Gabriela Haye Biazevic,³ Edgard Michel-Crosato³ and Fabio L. Mialhe²

¹Australian Research Centre for Population Oral Health, The University of Adelaide, Australia.; ²Department of Health Sciences and Paediatric Dentistry, Piracicaba Dental School, University of Campinas, Brazil; ³Department of Social Dentistry, University of Sao Paulo Dental School, Brazil

Objective: To estimate the discrepancies between global ratings of oral health and general health and investigate the factors associated with self-rated oral health (SROH) and self-rated general health (SRGH). **Methods:** Data were collected from 502 participants aged 18 to 81 years. A structured questionnaire was used to obtain data regarding sociodemographic characteristics and self-reported conditions. Global self-ratings of oral health and general health were the main outcomes. Discrepancies between self-ratings of oral health and general health were stratified by independent variables. Bayesian ordinal logistic regression models were fitted to estimate the posterior distributions of parameters and 95% credible intervals (95% CrI). **Results:** The proportion of participants who rated their oral health worse than general health was 28.6% (95% CrI: 24.7-32.3). Negative discrepancies between SROH and SRGH were associated with being men, reporting gingivitis, and lower income. Sex (95% CrI: 1.12-2.25) impacted only on SRGH. Income (SROH – 95% CrI: 1.52-6.40; SRGH – 95% CrI: 1.08-4.56), tertiary education (SROH – 95% CrI: 1.13-2.53; SRGH – 95% CrI: 1.01-2.32), self-reported missing teeth (SROH – 95% CrI: 1.57-3.46; SRGH – 95% CrI: 2.21-4.92), self-reported gingivitis (SROH – 95% CrI: 1.10-2.40; SRGH – 95% CrI: 1.71-3.82), and self-reported chronic health problem (SROH – 95% CrI: 1.38-3.08; SRGH – 95% CrI: 1.61-3.59) impacted on both outcomes. **Conclusions:** Substantial discrepancies between self-rated oral health and self-rated general health were found and were associated with being male, reporting gingivitis, and having lower income.

Keywords: socioeconomic factors, oral health, Bayesian analysis, public health dentistry, Patient reported outcome measures

Introduction

Gift and Atchison (1995) coined a sentence that has become “viral” in the dental literature: “oral health is an integral part of general health and contributes to overall health-related quality of life”. Variations of this claim are abundant in the literature to either highlight the importance of oral health or justify studies that delve into the relationship between dental outcomes and quality of life. This popular aphorism illustrates a shift in oral health research from essentially normative assessments within a biomedical perspective to the formulation of holistic models that consider subjective measures of wellbeing and multiple dimensions of health (Locker, 1988).

Global self-ratings of health are single-item PROMs that provide important information for understanding and improving health at both individual and population levels. PROMs provide a comprehensive picture of health states that stems directly from the person and incorporates a wide spectrum of personal experiences that are difficult to measure such as pain, anxiety, expectations, preferences, and values (Lawal, 2015; McGuire *et al.*, 2014). From a clinical perspective, global self-ratings are important indicators of overall health and guide clinicians in making treatment decisions and predicting outcomes. In public health, global ratings of health can inform policy, identify disparities, and contribute

to person-centred care (Needleman *et al.*, 2023). The integration of patient-reported and clinical outcomes has been increasingly employed in clinical research for assessing the overall effectiveness of interventions (Coles *et al.*, 2021; Maruszczuk *et al.*, 2022).

The advantages of global ratings include their simplicity of use, reliability, and the possibility of appraising multiple dimensions of health such as general health, mental health and oral health (Zimmerman *et al.*, 2006; Lundbeck *et al.*, 2020). Global ratings of oral and general health are highly correlated (Torres *et al.*, 2020; Benyamini *et al.*, 2004). Yet, researchers have often reported less positive self-ratings of oral health than general health among different populations (Sanders and Slade, 2006; Brennan and Singh, 2011). These discrepancies seem to be higher in contexts of greater oral health inequalities (Chand *et al.*, 2017).

According to Bottazzo’s critical theory of “Buccality”, Dentistry is a dental-centred field markedly isolated from Medicine and other specialties (Botazzo, 2000). Considered as a social practice, Dentistry generates knowledge, produces forms of care, and shapes subjectivities (patients and professionals). As a result, the mouth is often recognized as a territory *outside* the body, explaining why individuals may perceive, paradoxically, a simultaneously debilitated mouth and a healthy body, or vice versa (Botazzo, 2000; 2006). The concept of oral health itself is, essentially, an

abstraction created for practical purposes given that *health* is a condition that does not allow the existence of fragmented health states (Chaves, 1986). Thus, there is a need to investigate whether different factors are associated with self-ratings of oral and general health. To the best of our knowledge, this is the first study to empirically examine which factors influence the different frames of reference of oral health and general health in a population.

We employed a Bayesian approach to investigate discrepancies and factors associated with global self-ratings of oral and general health. Matranga et al. (2013) demonstrated the value of Bayesian statistics for oral epidemiology, which incorporates prior knowledge and the possibility of interpreting all forms of statistical uncertainty in terms of probability. These advantages of Bayesian analysis are particularly relevant for observational studies in which uncontrolled sources of bias may be present. In the study of dental caries, Bayesian logistic regression outperforms frequentist logistic regression models, yielding lower standard errors and smaller credible intervals (Workie and Belay, 2019). Thus, the aims of this study were: I) to estimate the discrepancies between global ratings of oral health and general health, and II) to investigate the factors associated with self-rated oral health and self-rated general health in a sample of Brazilian adults.

Methods

This cross-sectional study was conducted between March 2019 and October 2019. Ethical approval was granted by the Human Research Ethics Committee from a Brazilian University situated in the state of São Paulo (CAAE n. 61605316.5.0000.5418). Verbal and signed informed consent were obtained from all participants.

The study was conducted with individuals living in areas close to Family Health Units (FHU) from Piracicaba, a major city with an estimated population of approximately 410,000 inhabitants in the state of São Paulo. In São Paulo, 45% of the households are enrolled in the FHU system, one of the lowest rates across Brazilian states (the national rate is 60%) (Giovannella *et al.*, 2021). Conversely, the state of São Paulo concentrates the highest expenditure per capita and the highest rate of households with expenditure on dental insurance in Brazil (Cascaes *et al.*, 2018).

FHUs are the primary healthcare facilities within the Brazilian public health system and deliver community-based care through multidisciplinary teams. During the development of the research, the city had 42 FHUs. Initially, 10 FHUs located in different regions of the city were randomly selected taking into account the different socioeconomic characteristics of the areas where they were located. Inclusion criteria comprised adults living near these FHUs who were users of the Brazilian public health system, aged 18 or older, and with no mental or cognitive impairment. Eligible patients were selected through the FHU information system using simple random sampling. Fifty to sixty individuals were sampled in each FHU toward a target sample of 560 participants. Participants were approached in their households by community health agents during routine home visits. Data were collected using self-completion questionnaires in participants' homes by two researchers.

Self-rated oral health (SROH) and self-rated general health (SRGH) were assessed using single-item global measures: "How would you rate your oral health?" and "How do you rate your general health?" respectively. Responses were recorded using a 5-point Likert-type scale with options ranging from excellent (5) to poor (1).

Data on sociodemographic characteristics, self-reported oral health conditions, self-reported chronic health problems, and smoking were obtained using a structured questionnaire. Age was recorded as years and treated as a continuous variable. Ethnicity was recorded as self-reported skin colour and categorized as "white" and "black or brown". Household composition was categorized as "living alone" or "living with others". Family monthly income was recorded in the Brazilian currency and classified as the number of Brazilian Monthly Minimum Wages (BMMW) in three categories (< 2 BMMW; 2-5 BMMW; and >5BMMW). The BMMW in 2019 was approximately US\$ 251. Education was classified as "no tertiary education" or "tertiary education".

Self-reported data on gingivitis were obtained by asking participants whether their gums bleed when they brush their teeth, on self-reported missing teeth by asking whether they ever had a tooth extracted due to pain or caries, on chronic health problems by asking if they have a chronic illness and on smoking asking if they currently smoked, all categorized as yes/no.

Descriptive statistics calculated percentages and frequencies for all independent variables. Self-rated oral health and general health were treated as ordinal data. A negative discrepancy (SROH < SRGH) was defined as the proportion of participants who rated their oral health worse than their general health. A positive discrepancy (SROH > SRGH) was defined as the proportion of participants who rated their oral health better than their general health. Concordance was characterized as the proportion of participants who rated their oral health and their general health as the same (SROH = SRGH). Percentages and 95% Credible Intervals (95% CrI) were estimated using a Bayesian model with 5,000 iterations that calculates relative frequencies for two or more groups. Subsequently, Bayesian ordinal logistic regression models were fitted to investigate the relationship between independent variables and global ratings of oral and general health. For each dependent variable, we built four models with more parameters. Model 1 tested associations with sociodemographic variables (sex, age, ethnicity, income, education, and household composition). Model 2 tested health-related variables (smoking, extraction, gingivitis, and chronic health problem). Model 3 included all sociodemographic and health-related variables. We also examined the associations between independent variables and negative discrepancy using Bayesian ordinal logistic regression. Negative discrepancy was modelled as an ordinal outcome to capture the varying levels of discrepancy. For instance, a participant may report excellent SRGH and very good SROH (negative discrepancy = 1), or excellent SRGH and poor SROH (negative discrepancy = 4).

To estimate the posterior distribution of parameters, four chains of 10,000 iterations were set up with a warm-up of 5,000 iterations (the first half of the iterations was excluded to remove the impact of initial values and reach

stability). A weakly informative prior distribution ($\mu = 1$, $\sigma = 100$) – default used in the *rmsb* package modelling functions – was employed in all models. Because the posterior distribution represents a tradeoff between the priors and the likelihood function, the effect of using a weakly informative prior is that the posterior distribution becomes predominantly influenced by the likelihood function (Garnier-Villarreal, 2020). Model fit was examined using Bayesian leave-one-out cross-validation (LOO) (Vehtari *et al.*, 2017). LOO model weights range from 0 to 1 (higher values indicate a greater probability that a given model is the best-approximating model). Findings of the multivariate Bayesian logistic regression models were reported as posterior odds ratios with corresponding 95% credible intervals. Population estimates correspond to the median of the posterior distributions. Posterior regression coefficients and variance components are provided as supplementary materials. Statistical analyses were conducted with R packages *rmsb* and *BayesianFirstAid* using RStudio (Version 1.4.1106).

Results

The sample comprised 502 participants (response rate 89.6%) aged 18 to 81 years (mean 39.1 ± 13.3). Most participants were female (65.3%), self-identified as white (56%), with no tertiary education (72.5%), living with other family members (88.2%), non-smokers (51.8%), and with no chronic health problems (73.1%). Most participants reported no gingivitis (73.7%) or extraction of a tooth due to pain or caries (62.1%). Approximately 75% of participants rated their general health as excellent/very good/good, whereas 64.5% rated their oral health as excellent/very good/good. Figure 1 shows the relationship between ratings of SROH and SRGH.

The negative discrepancy between self-rated global ratings of oral health and general health (oral health rated worse than general health) was 28.6%. The positive discrepancy (oral health rated better than general

health) was 11.9%. The proportion of participants with equivalent ratings of oral health and general health was 59.7%. Substantially greater negative discrepancies between ratings of oral health and general health were found between men and women (difference: 13.6% [95% CrI: 5.2, 22.0]), and those who reported having gingivitis (diff: 12.8% [95% CrI: 3.7, 22.3]) in comparison with their counterparts. Participants with lower income had substantially lower proportions of negative discrepancies between global ratings of oral health and general health (diff: 8.7% [95% CrI: 2.6, 14.7]) compared to those with monthly income between 2 to 5 Brazilian Minimum Wages (Table 1).

Men were approximately 1.5 times more likely to report better SRGH than females (Table 2). In model 1, the probability of reporting better SRGH decreased by 3% as age increased by one year. Participants with a family monthly income higher than 5 BMMWs were, on average, 2.2 times more likely to report a better SRGH than those with family monthly income lower than 2 BMMWs. No association was observed between age and SRGH in the full model. Better educated participants were 1.7 times more likely to report better SRGH in model 1. There was a two-fold higher probability of rating higher scores on SRGH for participants with no history of dental extraction and no self-reported chronic health problem, and a 60% increased likelihood of better SRGH for participants with no self-reported gingivitis.

The Bayesian models for SROH are presented in Table 3. Participants with higher family monthly income and with no history of dental extraction were three times more likely to rate their SROH higher than their counterparts. A gradient was observed for the different levels of income on SROH. Participants with tertiary education were 52% more likely to report better SROH. A two-fold higher likelihood of reporting higher scores of SROH was found for participants with no report of gingivitis and no report of chronic health problem.

Table 4 presents the associations between negative discrepancy ($SROH < SRGH$) and explanatory variables. Males were, on average, 2.4 times more likely to report a discrepancy between SROH and SRGH than females. Higher income (2-5 BMMW) and reporting no gingivitis were associated with a 46% and 44% lower likelihood of reporting a discrepancy between how participants rate their oral health and general health.

Discussion

This study aimed to investigate the factors associated with self-rated oral health and self-rated general health. Many participants perceived their oral health to be worse than their general health. This disparity was greater among men and participants who reported having gingivitis. Income, tertiary education, self-reported missing teeth, self-reported gingivitis, and self-reported chronic health problem predicted both outcomes independently.

Previous studies have observed that participants rated their oral health as excellent, very good, or good less often than their general health (Sanders and Slade 2006; Balasubramanian *et al.*, 2021; Bado *et al.*, 2020). Chand *et al.* (2017) reported deficits between positive

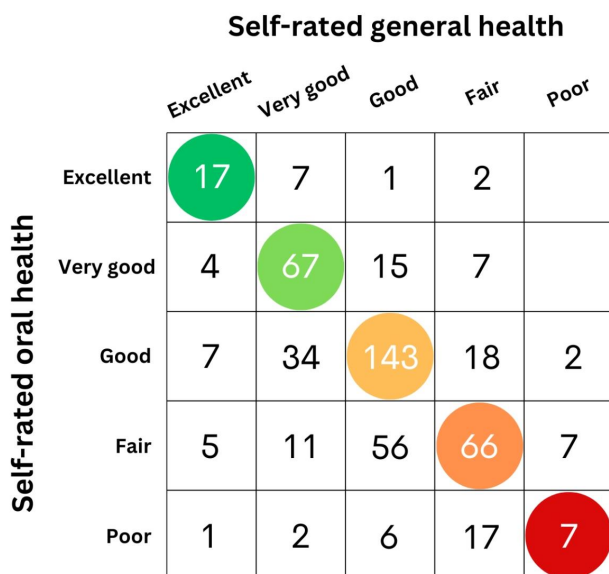


Figure 1. Relationship between ratings of SRGH and SROH.

Table 1. Discrepancies between global ratings of oral health and general health.

Variable	Category	%	Negative discrepancy (SROH < SRGH)	Concordance (SROH = SRGH)	Positive discrepancy (SROH > SRGH)
			% (95% CrI)	% (95% CrI)	% (95% CrI)
	Total	100	28.6 (24.7-32.3)	59.7 (55.5-64.0)	11.9 (9.1-14.6)
Sex	Male	34.7	37.5 (30.4-44.8)	54.0 (46.9-61.5)	9.1 (5.0-13.4)
	Female	65.3	23.9 (19.3-28.6)	62.7 (57.4-67.8)	13.6 (10.1-17.5)
Age	18-34 years	41.0	26.0 (20.2-31.9)	65.9 (59.3-72.2)	8.6 (5.1-12.6)
	35-44 years	26.1	33.1 (24.5-41.2)	54.9 (45.9-62.9)	12.8 (7.5-18.6)
	45-59 years	23.5	30.0 (21.7-38.1)	55.8 (47.2-64.7)	15.0 (8.9-21.4)
	60 and older	9.4	26.4 (14.6-38.9)	55.1 (41.1-68.3)	20.4 (10.2-31.9)
Ethnicity	White	11.7	28.2 (23.0-33.6)	61.5 (55.9-67.0)	10.6 (7.2-14.3)
	Black/Brown	88.2	29.1 (23.2-35.0)	57.4 (50.9-63.8)	13.9 (9.5-18.5)
Income	<2 BMMW	56.0	33.5 (27.8-39.4)	58.7 (52.7-64.7)	8.2 (5.0-11.2)
	2-5 BMMW	44.0	22.2 (16.7-27.9)	61.3 (54.7-68.0)	16.9 (12.1-22.2)
	>5 BMMW	50.8	31.7 (18.5-45.3)	56.8 (42.1-70.9)	13.7 (4.4-23.5)
Education	No tertiary degree	40.8	30.6 (26.0-35.5)	57.4 (52.4-62.4)	12.3 (9.0-15.7)
	Tertiary degree	8.4	23.6 (16.4-30.5)	65.7 (57.8-73.4)	11.4 (6.5-16.9)
Household composition	Living alone	72.5	39.4 (27.1-51.2)	49.3 (37.0-61.9)	13.1 (5.4-21.8)
	Living with other(s)	27.5	27.2 (23.1-31.4)	61.1 (56.5-65.5)	11.9 (8.9-14.9)
Smoking	No	51.8	29.9 (24.4-35.8)	61.5 (55.4-67.6)	9.0 (5.7-12.7)
	Yes	48.2	27.5 (22.2-32.9)	58.0 (52.2-64.1)	14.9 (10.7-19.1)
Dental extraction	No	37.8	23.4 (17.5-29.4)	63.0 (56.0-69.9)	14.1 (9.3-19.0)
	Yes	62.1	31.9 (26.7-37.0)	57.7 (52.3-63.2)	10.8 (7.5-14.3)
Gingivitis	No	73.7	25.3 (20.8-29.7)	62.6 (57.7-67.5)	12.4 (9.2-15.8)
	Yes	26.3	38.0 (29.9-46.0)	51.5 (43.5-60.3)	11.2 (6.1-16.5)
Chronic health problem	No	73.1	26.8 (22.4-31.5)	61.5 (56.5-66.2)	11.9 (8.7-15.2)
	Yes	26.9	33.6 (25.8-41.6)	54.8 (46.6-63.2)	12.4 (7.0-17.8)

Negative discrepancy: SROH worse than SRGH; Concordance: SROH = SRGH; Positive discrepancy: SROH better than SRGH; 95% CrI: 95% credible intervals; Bold values indicate non-overlapping credible intervals.

Table 2. Bayesian Ordinal Logistic Regression models for Self-Rated General Health.

Variable	Model 1	Model 2	Model 3
	OR (95% CrI)	OR (95% CrI)	OR (95% CrI)
Age (years)	0.97 (0.96-0.99)		0.99 (0.98-1.00)
Sex (Ref. Female)	1		1
Male	1.59 (1.12-2.25)		1.49 (1.04-2.13)
Ethnicity (Ref. White)	1		1
Black/Brown	0.76 (0.55-1.06)		0.90 (0.63-1.27)
Income (Ref. <2BMMW)	1		1
2-5 BMMW	1.07 (0.75-1.51)		0.89 (0.62-1.27)
>5 BMMW	2.66 (1.34-5.29)		2.21 (1.08-4.56)
Education (Ref. No tertiary)	1		1
Tertiary	1.69 (1.13-2.53)		1.50 (0.98-2.29)
Household composition (Ref. Alone)	1		1
Living with others	0.68 (0.41-1.12)		0.68 (0.41-1.13)
Smoking (Ref. Yes)		1	1
No		1.01 (0.72-1.40)	1.08 (0.76-1.52)
Dental extraction (Ref. Yes)		1	1
No		2.84 (1.98-4.08)	2.33 (1.57-3.46)
Gingivitis (Ref. Yes)		1	1
No		1.62 (1.10-2.38)	1.63 (1.10-2.40)
Chronic health problem (Ref. Yes)		1	1
No		2.31 (1.56-3.42)	2.06 (1.38-3.08)
LOO weights	0.135	0.243	0.622

Note: OR: Odds Ratio; CrI: Credible intervals. Bold values indicate significant effects.

Table 3. Bayesian Ordinal Logistic Regression models for Self-Rated Oral Health.

Variable	Model 1	Model 2	Model 3
	OR (95% CrI)	OR (95% CrI)	OR (95% CrI)
Age (years)	0.98 (0.97-0.99)		1.00 (0.99-1.01)
Sex (Ref. Female)	1		1
Male	0.92 (0.65-1.30)		0.78 (0.54-1.11)
Ethnicity (Ref. White)	1		1
Black/Brown	0.75 (0.54-1.04)		0.90 (0.64-1.27)
Income (Ref. <2BMMW)	1		1
2-5 BMMW	2.11 (1.49-2.99)		1.83 (1.28-2.64)
>5 BMMW	3.60 (1.82-7.14)		3.11 (1.52-6.40)
Education (Ref. No tertiary)	1		1
Tertiary	1.85 (1.22-2.79)		1.52 (1.01-2.32)
Household composition (Ref. Alone)	1		1
Living with others	0.94 (0.56-1.57)		0.91 (0.54-1.55)
Smoking (Ref. Yes)		1	1
No		1.08 (0.77-1.50)	1.09 (0.78-1.54)
Dental extraction (Ref. Yes)		1	1
No		3.89 (2.70-5.61)	3.30 (2.21-4.92)
Gingivitis (Ref. Yes)		1	1
No		2.61 (1.76 -3.87)	2.56 (1.71-3.82)
Chronic health problem (Ref. Yes)		1	1
No		2.35 (1.60-3.47)	2.40 (1.61-3.59)
LOO weights	0.018	0.255	0.727

Note: OR: Odds Ratio; CrI: Credible intervals. Bold values indicate significant effects.

Table 4. Bayesian Ordinal Logistic Regression models for discrepancy between SROH and SRGH.

Variable	OR (95% CrI)
Age (Ref. 18-34 years)	0.99 (0.98-1.01)
Sex (Ref. Female)	1
Male	2.39 (1.56-3.65)
Ethnicity (Ref. White)	1
Black/Brown	1.00 (0.66-1.52)
Income (Ref. <2BMMW)	1
2-5 BMMW	0.54 (0.34-0.84)
>5 BMMW	0.88 (0.39-2.02)
Education (Ref. No tertiary)	1
Tertiary	0.78 (0.45-1.34)
Household composition (Ref. Alone)	1
Living with others	0.59 (0.33-1.08)
Smoking (Ref. Yes)	1
No	1.05 (0.69-1.60)
Dental extraction (Ref. Yes)	1
No	0.73 (0.46-1.18)
Gingivitis (Ref. Yes)	1
No	0.56 (0.36-0.89)
Chronic health problem (Ref. Yes)	1
No	0.71 (0.44-1.13)

global ratings of general and oral health ranging from 10.5% to 43.8% among Indigenous Australian populations and a substantially lower deficit (5%) in a representative sample of Australian adults. Conversely, more

independent-living older Brazilians rated their oral health positively than their general health (Tôrres *et al.*, 2020). Benyamini *et al.* (2004) highlight that SROH provides specific information regarding social, psychological, and physical wellbeing that is not fully captured by global ratings of general health.

Several factors may influence how one rates one's oral and general health. These include social disadvantage, culture, demographic characteristics, distinct frames of reference for general and oral health, levels of morbidity and impairment, perceived treatment need, sense of community belonging, and the organization and delivery of care (Chand *et al.*, 2017; Atchison *et al.*, 1998; Michalski *et al.*, 2020; Olusile *et al.*, 2014). Individuals frequently use a biomedical reference point when rating their general and/or oral health (Sanders and Slade 2006; Brennan and Singh 2011). The main frame of reference to participants' ratings of general and oral health in this study seems to be physical health. However, Locker and Gibson (2005) showed that global ratings do not always reflect patients' satisfaction with oral health. In Brazil, public dental care remains focused on biological and individual notions of disease, ignoring broader determinants of health and the importance of a holistic approach (Leme *et al.*, 2019). As argued by Bottazzo (2000), the mouth is often viewed as detached from the rest of the body and from society.

Tooth loss best predicted both SRGH and SROH. Participants who reported gingivitis or a chronic health problem also rated both outcomes as worse. One explanation for the association between self-reported gingivitis and discrepancies between SROH and SRGH may be that that signs of gingivitis may be perceived as a condition

mostly restricted to the oral cavity. Clinical oral health outcomes are stronger predictors of self-rated oral health than sociodemographic factors (Tôrres *et al.*, 2020; Mejia *et al.*, 2014). Nguyen *et al.* (2021) found that self-reported measures of gingival status are strong predictors of future self-rated general health. Conversely, having multiple chronic health conditions has been associated with poorer self-rated general health but not with self-rated oral health in a sample of older adults (Balasubramanian *et al.*, 2021).

Men were times more likely to rate their general health better than women. Similar associations have been seen in France, Italy, Israel, and Saudi Arabia (Desesquelles *et al.*, 2009; Moradi-Lakeh *et al.*, 2015; Ziv and Schellekens 2020). Men were more likely to report worse oral than general health, potentially due to a better perception of SRGH. Gender is likely to be associated with other determinants of SROH and SRGH, resulting in a greater burden of health conditions and greater perception of their effects among women. Similarly, income was an important predictor for both SROH and SRGH, reflecting how socioeconomic disadvantage may prevent individuals from accessing the resources needed to maintain their oral health and overall wellbeing (Chafee *et al.*, 2017). Cialani *et al.* (2020) demonstrated that SRGH is more influenced by perceived measures of economic resources than objective measures of income (as used in this study). In this study, participants living in families with higher monthly income were two and three times more likely to report better SRGH and SROH than participants living with up to two minimum wages, respectively. Furthermore, a gradient effect of income was observed for SROH, but not for SRGH.

This study has important implications for the delivery and organization of healthcare. Improving the oral health of individuals may impact positively how they perceive their general health. Similarly, preventing chronic diseases may promote a better perception of oral health. These results highlight the importance of integrating oral and general health through health promotion strategies and the common risk factor approach, which, ultimately, may improve overall quality of life (Sheiham and Watt, 2000).

Limitations of this study should be acknowledged. First, we did not include clinical measures of oral and general health. Instead, we employed self-reported outcomes, which are subjected to selective memory and may have introduced some misclassification. Second, the cross-sectional data do not allow causal inference. Third, findings are not representative of the Brazilian population and may not be generalized to other demographic groups, such as the rural population. Findings may be generalizable to the Brazilian adult population enrolled in the primary healthcare system from medium and large urban areas of the Southeast region. Lastly, we employed a weakly informative prior that provides a modest regularization of the posterior distribution. This approach allows us to assess the patterns in data, it also yields estimates that are equivalent to frequentist maximum likelihood estimation (Lemoine 2019).

In conclusion, there were substantial discrepancies between participants ratings of their general and oral health. More participants who perceive their oral health to be not as good as their general health were men or who reported gingivitis. Income, education, self-reported missing teeth, self-reported gingivitis, and self-reported

chronic health problem predicted both SROH and SRGH, independently. Sex predicted only SRGH. Our findings highlight the need to integrate oral and general health care strategies such as via the common risk factor approach.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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