Family Religiosity and Oral Health Related Quality of Life: a Multilevel Analysis in Brazilian Schoolchildren.

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Religiosity has been associated with a better dental condition and positive self-perception of health, but there are no studies on the relationship between religious practice and oral health-related quality of life (OHRQoL), especially among schoolchildren. Thus, the aim of this study was to evaluate the association between family religiosity and OHRQoL in 12-year-old schoolchildren. We conducted a cross-sectional study in a representative sample of 12-year-old schoolchildren from Santa Maria, a city in southern Brazil. A total of 1,134 schoolchildren were assessed in a randomly selected in 20 public schools in the city. Participants were examined by 4 calibrated dentists (minimum Kappa-value for intra and inter-examiner agreement were 0.79 and 0.77, respectively) according to dental caries (Decayed, Missed, Filled Teeth Index), and gingival bleeding (Community Periodontal Index criteria). OHRQoL was assessed by the Brazilian short version of Child Perceptions for Questionnaire (CPQ11-14). Parents or guardians answered a structured questionnaire regarding their socioeconomic status and religious practice. Data were analyzed using multilevel Poisson regression analysis to assess the association of religiosity and overall and domain-specific CPQ 11–14 scores. Religious practice less than once a week was associated with higher mean symptoms domain scores and higher mean CPQ 11-14 overall scores in schoolchildren. In conclusion, our findings demonstrate that family religiosity was positively associated with schoolchildren's OHRQoL.

Key Words: oral health, quality of life, religiosity, schoolchildren, social capital.

Introduction

Self-perception of oral health-related quality of life (OHRQoL) and normative measures are essential for planning of public health policies with prioritization of services, as well as for evaluation of the effect of oral health strategies. OHRQoL is described as a multidimensional construct and refers to the impact of oral health conditions on the daily functions, well-being and quality of life of individuals (1). Environmental and individual factors, such as socioeconomic status, social capital, dental behaviors and clinical status, influence subjective oral health outcomes (2). This perspective suggest that clinical factors alone cannot explain the effect of oral health on everyday life.

Social capital has been highlighted as one of the key determinants of health in the WHO's social determinants conceptual framework (3). This concept has been defined as the features of social organization, such as participation in social activities and voluntary organizations, norms of reciprocity, and trust in others (4). The social interactions within the structure of social allow the discussion about community issues and help participants to act together on objectives and mutual benefits (5). In this context, participation in religious groups can be a specific measure of social capital where there is reciprocal exchange of social support among members.

Religiosity have been linked to protective effects against chronic diseases and mortality in children and adults (6-12). Data from NHANES III Epidemiology Follow-up Study highlighted the association between church attendance and all-cause mortality in middle-aged sample of 5,449 adults (12). Religiosity was also inversely associated with health risk behavior such smoking and alcohol consumption in a cross-sectional study with 3,674 adolescents (8). Moreover, high levels of the practice of religion are associated with psychological well-being and life satisfaction among young people (13), and related to better self-rated health status among the elderly (14). However, some negative associations between religion and health have been reported. Measures of religiosity were associated with worse self-reported health (15) and obesity risk (16).

Some studies have been reported the association of religiosity with oral health in children and adults. Families with religious beliefs showed lower levels of caries (17,18) and periodontal diseases (19,20). In addition to clinical findings, the association between religiosity practice and self-rated oral health, demonstrating that frequent religious practice was a protective factor against fair or poor perception of oral health (21). Mirghafourv et al. (22) showed that received religious support and religious

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practice may act as a powerful facilitator for improving the health-related quality of life in Iranian adolescent's girls.

There are some pathways by which religiosity might lead to better subjective health outcomes (18-21). Religiosity provides adherence to a social network and support from participants, which may affect the individual's health by improving health related behavior through the more rapid diffusion of health information and increased access to local services and additional external resources for managing stress (18,20). Furthermore, attending religious practice may assist in coping with stressful life events, providing greater social support and a source of self-esteem and mutual respect (19).

Although religiosity have been associated with better dental condition and positive self-perception of health, there are no studies regarding the relationship between religious practice and OHRQoL, especially among schoolchildren. Thus, the aim of this cross-sectional study was to evaluate the association between family religiosity and OHRQoL in 12-years-old schoolchildren. We hypothesized that children with higher family religiosity are more likely to have higher OHRQoL.

Material and Methods
Sample

We conducted a cross-sectional study to assess the oral health status in a representative sample of 12-year-old schoolchildren from Santa Maria, a city in southern Brazil. Data was gathered from May to November 2012. Santa Maria has an estimated population of 261 thousand inhabitants and 85% of these children were enroll in public schools (23). This study was part of a major project including other outcomes, thus the sample size calculation was performed to assess the association between CPQ11-14 scores and different oral health outcomes (24). The final number of the sample was 1,134 schoolchildren, achieving a power of 70% to detect a significant difference on the frequency of going to the church between those who rated their oral health as "good/excellent" and those who rated their oral health as "fair/poor".

A two-stage sampling was adopted. The primary sampling units were 20 of 39 public schools that were considered representative of all schools in Santa Maria. The secondary sampling units were all 12-year-old children who were enrolled in the 20 selected schools. All 12-year-old children enrolled in the 20 selected schools were invited to participate in the study. Children with cognitive impairment or those who were not able to read and understand Brazilian Portuguese were excluded from the study.

Ethical Considerations

The study protocol was approved by the Committee of Ethics in Research of the Federal University of Santa Maria. All children consented to participate, and their parents or guardians signed an informed consent form.

Data Collection

The gathering of data used dental examinations and structured interviews. Four examiners and three interviewers participated in the study.

The children' oral health related-quality of life (OHRQoL) was measured by the short version of the Brazilian Child Perceptions Questionnaire (CPQ11-14) (25). The questionnaire was completed at school through face-to-face interviews by three trained interviewers. The CPQ11–14 comprises 16 questions and four domains: 1) oral symptoms (four questions); 2) functional limitations (four questions); 3) emotional well-being (four questions); and 4) social well-being (four questions). Each question has five possible answers on a likert scale from 0 to 4, and higher values corresponded to a poorer OHRQoL. The CPQ11–14 scores were computed by summing up all scores for each domain, and the overall scores ranged from 0 to 64.

Socioeconomic, demographic and religious practice characteristics were collected using a self-administered questionnaire that was given to the children's parents and guardians. The questionnaire included information regarding sex, race, parents' education, household income, use of dental service, parents'perception of the child's oral health, and family religiosity. Race was classified according to the criteria established by the agency for demographic analysis, the Brazilian Institute of Geography and Statistics (23). The parents' educational level was classified as the completion or failure to complete 8 years of formal instruction. Monthly household income was measured in terms of the Brazilian Minimum Wage (BMW), a standard for this type of assessment (approximately $450 USD at the time of the survey). Data regarding the parents' health perceptions of their children's oral health were measured using the following question: "Would you say that your child's oral health is: 1 - excellent, 2 - very good, 3 - good, 4 - fair, or 5 - poor?". Religiosity was assessed according to frequency of going to church and time of religious practice by the following questions, respectively: "How often do you go to a church, temple or other religious meeting: 1 - more than once a week, 2 - about once a week, 3 - two or three times on a month, 4 - once a year or less, or 5 - never?", and "How often do you devote your time to religious activities such as prayer, meditation, Bible reading or to read other religious texts: 1 - more than once a day, 2 - daily, 3 - two or more times on a week, 4 - about once a week, 5 - a few times on a month, or 6 - never/almost never?". These questions have been used in previous study (26). The feasibility of these questionnaire was previously

assessed in a sample of 20 parents during the calibration process. These parents were not part of the final sample.

International criteria standardized by the World Health Organization for oral health surveys (27) were used for all dental examinations by four examiners. Children were examined in a room at school with natural light using periodontal the CPI probe ("ball point") and dental mirrors. Severity of dental caries was assessed by the score of Decayed, Missing, and Filled Teeth Index. Gingival bleeding was assessed by CPI (0 = healthy and 1 = bleeding) in all six sites per tooth. These examiners were trained to assess dental caries and gingival bleeding. The data were also calibrated for assessment of dental caries. The calibration process was performed prior to the survey by a benchmark dental examiner who had previous experience in epidemiological surveys. Theoretical and clinical training and calibration exercises were arranged for a total of 36 hours. For this purpose, a total of 20 children were examined twice by the same examiner with an interval of two weeks between each examination to assess intra and inter-examiner reliability.

Statistical Analysis

Data were analyzed using STATA 14.0 software (Stata College Station, TX, USA). Outcomes were overall and domain-specific CPQ11–14 scores. Predictor was considered the family religiosity. The frequency of going to the church was dichotomized into "often" (those who have gone to the church at least once a month) and "never/almost never" (those who have never gone or have gone to the church less than once a month) (21). The time of religious practice was dichotomized in "once a week/more than once a week" and "less than once a week". Gingivitis was dichotomized as either "without" (gingival bleeding in <15% of sites) or "with" (gingival bleeding in 15% or more of sites). Other independent variables were categorized according to their distribution in the sample.

All descriptive analyses considered the sample weight using STATA's "svy" command for complex data samples. Unadjusted analyses were conducted to provide summary statistics and preliminary assessments of the associations between the independent variables and the outcomes (OHRQoL). Models were fitted using multilevel Poisson regression analysis to assess the association of religiosity and OHRQoL. The multilevel model considered children as the first-level unit and schools as the second-level unit. The rate ratios and their respective 95% confidence intervals (CIs) were used to assess the predictors of OHRQoL, and it corresponded to the mean of CPQ11–14 scores between the exposed and unexposed groups. Models building was carried out using statistical and epidemiologic criteria. Initially, a preliminary analysis was carried out using

unadjusted models, and all variables showing associations with p<0.25 were considered for the adjusted models. "Monthly household income" was maintained following an epidemiological criterion. The model excluded the variable "father's level of education" and "use of dental services" from the analysis to prevent multicollinearity with the variable "mother's level of education" and "reason visit to the dentist", respectively. All final models were adjusted by sex, race, monthly household income, mother's education, parent's health perception, untreated dental caries, gingivitis, reason visit to the dentist, frequency of going to the church, and time of religious practice. The quality of the fit was measured using deviance (-2 log likelihood), and significant changes in the fitting of the models were assessed using the likelihood ratio test.

Results

In a total, 1,134 children (46% male and 54% female) were enrolled with a response rate of 93%. Non-participation was typically attributable to the absence of children from school on the day of the examination or a failure of the children to return the signed consent form. Inter- and intra-examiner agreement (Kappa statistics) for dental caries ranged from 0.79 to 0.85 and from 0.77 to 0.82, respectively.

Table 1 summarizes the distribution of the sample according to demographic, socioeconomic religious practice and clinical status. In relation to the family religiosity characteristics, the majority of the families gone to the church frequently (86.7%) and had high religious practice (74.5%).

The mean CPQ11–14 scores ranged from 0 to 43, with a mean of 10.2 (standard deviation, SD 0.3). Domain-specific scores did not have a large variation. Scores in the emotional well-being and oral symptoms domains had the largest variations (range of 0 to 16) (Table 2).

Family religiosity was associated with mean CPQ11–14 scores and domain-specific scores in the unadjusted models. Children whose family reported never or almost never went to church and had less than once a week of religious practice showed higher mean symptom CPQ11-14 domain scores. Moreover, lower time of religious practice was associated with higher mean overall CPQ11–14 scores in children (Table 3).

The results of the multilevel adjusted analysis of the dental clinical, socioeconomic and religious variables for CPQ 11-14 scores are shown in Table. 4. Religious practice less than once a week was associated with 1.10 higher mean symptoms CPQ 11-14 domain scores and 1.01 higher mean CPQ 11-14 overall scores in schoolchildren. This study identified other clinical conditions that associate with OHRQoL; a fair or poor parental perception of their

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Table 1. Characteristics of the sample of 1,134 12-year-old schoolchildren from Santa Maria, RS, Brazil

Variables	n	%*
Sex		
Female	610	54.0
Male	524	46.0
Race		
White	863	77.8
Non-white	250	22.2
Monthly household income		
≥ 1.6BMW	556	54.4
< 1.6BMW	480	45.6
Mother's education		
≥ 8 years	702	65.5
< 8 years	382	34.5
Father's education		
≥ 8 years	628	61.4
< 8 years	406	38.6
Parents' health perception		
Good/excellent	719	65.5
Fair/poor	385	34.5
DMFT (mean [SE])	1.15 (0.1)	
Gingivitis		
Without	851	75.1
With	283	24.9
Use of dental services		
Yes	514	47.5
No	572	52.5
Reason visit to the dentist		
Checkup/Routine	735	69.9
Toothache	319	30.1
Frequency of church attendance		
Often	933	86.7
Never/almost never	146	13.3
Time spending to religious practice		
Once a week/more than once a week	795	74.5
Less than a week	277	25.5

BMW, Brazilian minimum wage (approximately $450 USD at the time of the survey); DMFT, Decayed, Missing, and Filled Teeth Index; SE, Standard error. *Taking into account the sampling weight. Values lower than 1,134 due to missing data.

oral health and reported toothache had a higher mean CPQ11-14 scores and domain-specific scores. The means of the CPQ11–14 also was higher for females, non-white children, children whose mothers have not completed primary education, and children with gingivitis (Table 4).

Discussion

This study assessed the association between family religiosity and OHRQoL in Brazilian schoolchildren. The time spending in religious practices, such as prayers, meditations, Bible reading or reading of others religious texts was associated with better OHRQoL. In addition, parents' perception oral health of children, mother's education, visit to the dentist by pain, female, non-white race and gingivitis also had negatively impacts to OHRQoL.

Non-practice of religious activities or less frequent practice was associated with worst OHRQoL. Only one study (22) assessed the impact of religiosity on health related-quality of life and its findings showed that religious activities may be considered a powerful facilitator to improving the quality of life in adolescents. However, there are no studies that link the quality of life regarding oral health. Participation on religious activities have been described as important features of bounding, coping with stress and also encouragement of health behavior (18,19,21). Therefore, practicing religious activities is a feature that facilitates the action of members within a social group, thus benefiting health and influencing behaviors that lead to an improvement in OHRQoL.

Additionally, worse oral symptoms related to quality of life were report by schoolchildren who engage in fewer religious activities in their lives. These results are in accordance to previous studies that showed the association between clinical outcomes and psychosocial factors, focusing on the best dental conditions presented by people

Table 2. Descriptive distribution of overall and domain-specific CPQ 11-14 scores

Domain	Number of Items	Mean (SD) CPQ 11-14 Scores*	Possible Range	Observed Range
CPQ (Overall Scale)	16	10.2 (0.3)	0 to 64	0 to 43
Emotional Well-Being	4	2.7 (0.1)	0 to 20	0 to 16
Social Well-Being	4	1.6 (0.1)	0 to 20	0 to 15
Functional Limitation	4	2.5 (0.1)	0 to 20	0 to 14
Oral Symptoms	4	3.5 (0.1)	0 to 20	0 to 16

CPQ, Child Perception Questionnaire; SD, Standard deviation. *Taking into account the sampling weight.

who have higher rates of religiosity (17-19). These results highlight that religiosity may affect the individual's health by improving health related behavior through the rapid diffusion of health information and increased access to local services and amenities.

Sociodemographic characteristics as non-white children and females, and parent's perception of children's oral health were negatively associated with ORHQoL in schoolchildren, which corroborates the findings of previous studies (24,28). Clinical conditions as dental caries, gingivitis, and seek dental care due to pain were also associated with negative impact on OHRQoL in accordance with literature (24,29).

Some plausible pathways link religiosity to health outcomes (18-21). Religiosity can act as an important social network through the dissemination of health promotion by promoting greater access to health and would promote greater social support, acting as a source of self-esteem and mutual respect (19,20). Thus, in more active communities, people would be better able to solve their own problems or possess better infrastructure to facilitate their involvement community and its actions related to health. Recent studies reported that religious support and religious practice were positively associated with health-related quality of life (22,30). This pathway appears to provide a plausible mechanism regarding the protective effect of family religiosity on OHRQoL. Thus, we propose that as observed for health-related quality of life, religiosity may affect children' OHRQoL through a psychosocial pathway.

Our study has some limitations. The cross-sectional design prevents the establishment of causality between religiosity and OHRQoL. In addition, parents reported religiosity experience through two questions which may not capture the full extension of the impact of religiousness on oral health. Nevertheless, no validated instruments were available to assess religiosity in Brazilian population when the present study was conduct. The study also evaluated only schoolchildren from public schools. Finally, there is limitation of using religiosity as aspect of social capital.

It is possible that religious practice may not reflect the differences in individual social capital, and we did assess other indicators such trust and social support. The strengths of this study are the sample size and its representativeness because 85% of the children are enrolled in public schools of the city (18). In addition, previous studies have been used religious practice as a valid measurement to evaluate the social capital and its impact in oral health (14,15).

In conclusion, our findings demonstrate that family religiosity was associated with schoolchildren's OHRQoL. The association may be important to highlighted the participation in communities, social movements, associations, trade unions, councils of class and health may favor the creation of social capital, and, consequently, stimulate the adoption of behaviors more consistent with health and better quality of life. The implication of this study is that the religiosity assists in coping with stressor circumstances of life for improving the individual social capital. Therefore, religious affiliation provides social network and support from others, which may lead to better normative and subjective oral health. We suggest that strategies to improve social capital should be considered in the future studies.

Acknowledgements

Resumo

A religiosidade tem sido associada a uma melhor condição dentária e autopercepção positiva de saúde, mas não há estudos sobre a relação entre a prática religiosa e qualidade de vida relacionada à saúde bucal (QVRSB), especialmente entre escolares. Assim, o objetivo deste estudo foi avaliar a associação entre religiosidade da família e a QVRSB em escolares de 12 anos de idade. Nós realizamos um estudo transversal em uma amostra representativa de escolares de 12 anos de idade de Santa Maria, uma cidade no sul do Brasil. Um total de 1.134 escolares foram avaliados em uma seleção aleatória em 20 escolas públicas da cidade. Os participantes

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Table 3. Mean (SD) of overall and domain-specific CPQ 11-14 scores according to the religious variables, unadjusted assessment

Domain	Frequency of going to the church*		p†	Time of religious practice*		p†
	Often	Never/almost never		Once a week/ more than once a week	Less than a week	
CPQ (Overall Scale)	10.2 (0.3)	10.8 (0.9)	0.14	10.0 (0.2)	10.9 (0.7)	0.00
Emotional well-being	2.7 (0.1)	2.9 (0.4)	0.58	2.6 (0.1)	2.7 (0.3)	0.11
Social well-being	1.6 (0.1)	1.7 (0.3)	0.74	1.6 (0.1)	1.6 (0.2)	0.37
Functional limitation	2.4 (0.1)	2.4 (0.2)	0.75	2.4 (0.1)	2.5 (0.2)	0.22
Oral symptoms	3.4 (0.1)	3.8 (0.2)	0.04	2.4 (0.1)	3.9 (0.2)	0.00

CPQ, Child Perception Questionnaire; SD, Standard deviation. *Taking into account the sampling weight. †Multilevel Poisson regression model.

Table 4. Multilevel adjusted assessment of overall CPQ 11-14 scores association dental clinical, socioeconomic and religious variables

Variable	CPQ (Overall Scale)*	Domains*			
		Emotional Well-Being	Social Well-Being	Functional Limitation	Oral Symptoms
Sex					
Female	1	1	1	1	1
Male	0.84 (0.81 - 0.88) p<0.01	0.79 (0.73 - 0.86) p<0.01	0.75 (0.67 - 0.83) p<0.01	0.83 (0.76 - 0.90) p<0.01	0.95 (0.88 - 1.02) p=0.14
Race					
White	1	1	1	1	1
Non-white	1.03 (0.98 - 1.09) p=0.21	1.01 (0.92 - 1.12) p=0.82	1.15 (1.02 - 1.30) p=0.03	1.01 (0.91 - 1.12) p=0.86	1.01 (0.92 - 1.10) p=0.90
Monthly household income					
≥ 1.6BMW	1	1	1	1	1
< 1.6BMW	1.03 (0.99 - 1.08) p=0.18	1.07 (0.98 - 1.17) p=0.15	0.98 (0.87 - 1.10) p=0.70	1.04 (0.95 - 1.14) p=0.39	1.03 (0.95 - 1.11) p=0.53
Mother's education					
≥ 8 years	1	1	1	1	1
< 8 years	1.08 (1.03 - 1.13) p<0.01	1.10 (1.00 - 1.21) p=0.05	1.03 (0.92 - 1.17) p=0.59	1.12 (1.02 - 1.24) p=0.02	1.05 (0.97 - 1.14) p=0.26
Parent's health perception					
Good/excellent	1	1	1	1	1
Fair/poor	1.24 (1.18 - 1.30) p<0.01	1.42 (1.30 - 1.55) p<0.01	1.40 (1.24 - 1.57) p<0.01	1.14 (1.04 - 1.25) p<0.01	1.12 (1.03 - 1.21) p<0.01
DMFT	1.00 (0.99 - 1.02) p=0.55	1.01 (0.99 - 1.04) p=0.25	0.97 (0.94 - 1.00) p=0.08	1.01 (0.99 - 1.04) p=0.28	1.00 (0.98 - 1.03) p=0.84
Gingivitis					
Without	1	1	1	1	1
With	1.06 (1.01 - 1.11) p=0.02	1.08 (0.98 - 1.19) p=0.10	1.05 (0.93 - 1.19) p=0.43	1.05 (0.95 - 1.16) p=0.36	1.05 (0.97 - 1.14) p=0.26
Reason visit to the dentist					
Checkup/Routine	1	1	1	1	1
Toothache	1.21 (1.15 - 1.27) p<0.01	1.38 (1.26 - 1.51) p<0.01	1.26 (1.12 - 1.42) p<0.01	1.13 (1.03 - 1.24) p=0.01	1.12 (1.03 - 1.21) p<0.01
Frequency of going to the church					
Often	1	1	1	1	1
Never/almost never	0.97 (0.91 - 1.04) p=0.40	0.92 (0.81 - 1.04) p=0.19	0.97 (0.82 - 1.14) p=0.70	0.92 (0.80 - 1.05) p=0.19	1.06 (0.95 - 1.18) p=0.30
Time of religious practice					
Once a week/more than once a week	1	1	1	1	1
Less than once a week	1.01 (0.96 - 1.07) p=0.60	(0.91 - 1.11) p=0.97	0.87 (0.76 - 1.00) p=0.05	0.99 (0.90 - 1.10) p=0.90	1.10 (1.01 - 1.20) p=0.03

Abbreviations: CPQ, Child Perception Questionnaire; BMW: Brazilian minimum wage (approximately $450 USD at the time of the survey); DMFT: Decayed, Missing, and Filled Teeth Index. *Adjusted multilevel Poisson regression model, shown as RR (95% CI).

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foram examinados por 4 dentistas calibrados (valor mínimo do Kappa para concordância intra e inter-examinador foi de 0,79 e 0,77, respectivamente) de acordo com cárie dental (Índice de Dentes Cariados, Perdidos e Obturados) e sangramento gengival (Índice Periodontal Comunitário). QVRSB foi avaliada pela versão reduzida brasileira do Child Perceptions for Questionnaire (CPQ11-14). Os pais ou responsáveis responderam a um questionário estruturado sobre sua condição socioeconômica e prática religiosa. Os dados foram analisados usando análise de regressão de Poisson multinível para avaliar a associação de religiosidade e escores de QVRSB geral e por domínio específico. A prática religiosa menos de uma vez por semana foi associada com maior escore do domínio sintomas orais e maior média do escore total do CPQ 11-14 em escolares. Em conclusão, nossos achados demonstram que religiosidade familiar foi positivamente associada com a QVRSB dos escolares.

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