BRIEF COMMUNICATIONS

Assessment of predictors of global self-ratings of oral health among Korean adults aged 18-95 years

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Abstract

Objectives: The aims of this study were to assess predictors of global self-ratings of oral health (GSROH) and to examine whether they varied by age among Korean adults aged 18-95 years.
Methods: Data from 4,546 adults aged 18-95 years completing the Korean National Oral Health Survey 2006 were included in the analysis.
Results: Subjects' mean age was 43.5 years, with 12.1 percent aged ≥65 years; 47.8 percent were men; and 2.5 percent were edentulous. The predictors of GSROH in adults were number of missing teeth, concern about oral health, and difficulty in chewing. While wearing removable dentures was associated only in elders, perceived treatment need was associated in younger age groups. The number of decayed and filled teeth was significant only in the 18-44 age group.
Conclusions: GSROH status was associated with measures of oral disease, oral functional problems, oral health behaviors, concerns, and perceived treatment needs, and it varied by age.

Introduction

A widely used measure of health status is a single-item, global self-rating of health (GSRH), which is measure by asking respondents to rate their overall health status as excellent, good, fair, or poor. It can be administered easily and provides a succinct way of summarizing diverse health status components including values and preferences of individual respondents. The conceptual domain of GSRH includes health problems, physical functioning, and health behaviors (1). The specific referents used vary by age, with younger people more inclined to use health behaviors and older adults to use health problems as the frame of reference (1).

A conceptual framework explaining self-rated oral health measured by a global self-rating of oral health (GSROH) includes three key dimensions: clinical/oral disease; functional limitations; and other symptom elements including oral pain, discomfort, and disadvantage (2-4). Wilson and Cleary integrated the individual and the environment into the conceptual framework of characteristics for overall health-related quality of life (5). When Locker *et al.* (6) included the Oral Health Impact Profile in their assessment of GSROH among adults over 53 years of age, psychological factors and health behaviors were added to demographic and socioeconomic components as independent variables in the final model. Factors associated with GSROH appear to vary with age and sex (3,6).

GSROH predictors by age groups among Korean adults have not been reported. Our aims were to assess GSROH predictors and examine variance by age among Korean adults aged 18-95 years.

Materials and methods

The Korean National Oral Health Survey 2006, the fifth national oral health survey conducted by the Ministry of Health and Welfare (7), used a stratified random sample of 15,777 Koreans over-sampling children. The survey was conducted according to the criteria of the World Health Organization (WHO) using a modified WHO Oral Health Assessment Form (simplified), a 24-item questionnaire, and a dental examination in the Korean households. The eight dental examiners, who were trained on the standard dental examination, repeatedly assessed examples of varying decayed/missing/filled (DMF) tooth status and subsequently calibrated on 20 patients with varying oral health status. The final study data set included all records of Korean adults aged 18 yearsor over (n = 4,546) and was weighted to represent residence, age, and sex distribution. The dependent variable was the GSROH status based on a 5-point rating scale (5 = very good, 4 = good, 3 = fair, 2 = poor, and 1 = very poor), subsequently divided for application of logistic regression into two categories of approximately equal numbers which represented adequate (fair, good, or very good) or inadequate (poor or very poor) self-rated oral health. Independent variables included demographic information (age and sex), socioeconomic status (combination surrogate of education and income), and oral health behaviors (toothbrushing frequency, flossing, last dental visit, and receipt of preventive dental treatment). Oral functional problems consisted of chewing difficulties (1 = none to 5 = marked), concern about oral health (0 = none to 2 = always), and perceived dental treatment need. Clinical oral health measures included number of missing, decayed, and filled teeth; and denture status assigned as having natural teeth with or without fixed prostheses (= 0), or wearing removable denture(s) on at least one jaw (= 1).

Throughout the analysis, three age groups (≥65, 45-64, and 18-44 years) were compared. To assess the significance of differences between descriptive values of skewed variables, the nonparametric Kruskal–Wallis test was used with applied multiple pairwise comparisons using the Wilcoxon rank-sum test and the Bonferroni correction. The chi-square test was used to test the difference of proportion among groups. A multiple logistic regression model with stepwise selection was implemented including all independent variables, and the standardized regression coefficients were compared to assess magnitudes of associations. The SAS Version 9.13 (SAS Institute Inc., Cary, NC, USA), was used for analytical procedures. A significance level of 0.05 was selected.

Results

The general characteristics of the study subjects by age group are presented in Table 1. The 4,546 participants ranged in age from 18 to 95 years, with a mean age (standard deviation) of 43.5 (15.9) years, with 12.1 percent aged 65 years and over.

Table 1 General Characteristics of Study Subjects (n = 4,546)

		Age groups (years)		
Characteristics	Total	65 or over 12.1%	45-64 30.5%	18-44 57.4%
Mean (standard deviation)				
Age	43.5 (15.9)	72.7 (4.2)	53.0 (5.8)	32.3 (8.5)
Number of missing teeth*	3.3 (6.5)	13.5 (6.7)[a]†	4.2 (6.0)[b]	0.7 (2.1)[c]
Number of decayed teeth	0.4 (1.3)	0.6 (1.1)	0.3 (1.0)	0.5 (1.5)
Number of filled teeth*	3.0 (3.5)	1.9 (2.1)[a]	2.7 (3.1)[b]	3.6 (4.3)[c]
Percent				
Sex (male)*	47.8	39.8	49.6	48.5
Level of education (>9 years)*	68.7	14.9	45.2	92.7
One or more missing teeth*	49.8	94.6	70.5	29.4
One or more decayed teeth*	20.2	21.0	17.9	21.2
One or more filled teeth*	66.4	46.8	65.9	70.8
Edentulous*	2.5	15.8	1.9	0.1
Wearing removable denture(s)*	11.2	52.5	15.2	0.9
Self-ratings of oral health*				
Very good	1.5	1.1	1.4	1.7
Good	25.0	28.4	22.2	25.8
Fair	26.4	17.3	20.8	31.3
Poor	37.4	34.8	42.6	35.1
Very poor	9.7	18.4	13.0	6.2

* Significantly different among three age groups ($P < 0.05$).

† Different superscript letters mean significantly different values ($P < 0.05$).

Table 2 Standardized Beta (STB) Parameters and *P*-Values (*P*) from Multiple Logistic Regression with Stepwise Selection for Self-Rated Adequate (Fair, Good, or Very Good) Oral Health (n = 4,546)

			Age groups (years)					
	Total		65 or over		45-64		18-44	
Independent variables	STB	*P*	STB	*P*	STB	*P*	STB	*P*
Number of missing teeth	–0.52	<0.0001	–0.69	0.0004	–0.32	0.0004	–0.24	0.0027
Concern about oral health	–0.32	<0.0001	–0.45	0.0012	–0.26	0.0004	–0.29	<0.0001
Perceived treatment need	–0.25	<0.0001	–*	–	–0.32	<0.0001	–0.23	<0.0001
Chewing difficulty	–0.24	<0.0001	–0.40	0.0023	–0.25	0.0017	–0.15	0.0070
Wearing removable denture	0.20	0.0059	0.36	0.0434	–	–	–	–
Number of decayed teeth	–0.17	0.0023	–*	–	–	–	–0.15	0.0149
Age (years)	0.15	0.0048	–	–	–	–	–	–
Number of filled teeth	–0.12	0.0053	–	–	–	–	–0.18	0.0010
Frequency of brushing	0.09	0.0274	–	–	0.16	0.0274	–	–

* Not selected by the stepwise selection.

Among all the participants, 47.8 percent were men and 2.5 percent were edentulous. Approximately half of the participants (49.8 percent) had one or more missing teeth, 20.2 percent had at least one decayed tooth, and 66.4 percent had one or more filled teeth. Among the participants wearing removable denture(s) (11.2 percent), there was a disproportionate distribution across the three age groups, with slightly over half aged 65 years and older wearing removable denture(s). The distribution of GSROH categories for all study subjects was as follows: very poor, 9.7 percent; poor, 37.4 percent; fair, 26.4 percent; good, 25.0 percent; and very good, 1.5 percent.

In the multivariate analysis for self-rated adequate oral health, the number of missing teeth showed the strongest association with GSROH, followed by concern about oral health, perceived dental treatment need, and chewing difficulty (Table 2). Higher number of missing, decayed, or filled teeth; more concern about oral health; perceived dental treatment need; and chewing difficulty were negatively associated with adequate GSROH. Wearing a removable denture(s), toothbrushing frequency, and age were positively associated with adequate GSROH. The model for those 65 years and older selected four significant independent variables, including number of missing teeth, concern about oral health, chewing difficulty, and wearing a removable denture(s). The stepwise selection method for the 45-64-year age group indicated five significant independent variables in decreasing order of magnitude of association: perceived dental treatment need; number of missing teeth; concern about oral health; chewing difficulty; and tooth brushing frequency. The model for the 18-44-year age group selected six significant independent variables in decreasing order of magnitude of association: concern about oral health; number of missing teeth; perceived treatment needs; number of filled teeth; chewing difficulty; and number of decayed teeth.

Discussion

A major finding of this study was that significant predictors of GSROH status among Korean adults were identified among measures of oral disease/disorder, functional problems, oral health behaviors, concern about oral health, perceived dental treatment needs, and demographic information, and they differed by age group. Among the whole population, missing teeth had the most significant impact on the GSROH; however, the relative importance of missing teeth varied by age group, being most prominent among those aged 65 years and older.

Among subjects under 65 years old, perceived dental treatment needs or concern about oral health were equally or more important than missing teeth. The number of missing teeth and chewing difficulty as powerful predictors for GSROH status in this population is consistent with previous studies (3,4,6). This study did not assess oral health-related quality of life (OHRQL); however, in a study of Korean older adults, oral pain, followed by nutrition, and number of teeth were the most significant contributors to OHRQL (8). Denture wearing has been suggested as the strongest predictor of impaired OHRQL among adults (9). However, in this study, with only 15.8 percent edentulous, 94.6 percent missing one or more teeth, and 52.5 percent wearing a removable denture, wearing a removable denture was predictive of adequate oral health. This supports the hypothesis of John *et al.* (9) that all lost teeth might not be equally important in predicting OHRQL or a GSROH measure. Adequate replacement of lost teeth with partial dentures might positively affect a person's self-rating of oral health.

In this study, the numbers of decayed and filled teeth were significantly associated with GSROH only in the 18-44-year age group. In previous studies, having untreated decayed teeth was significantly associated with poor oral health

impacts among 32-year-olds (10). This finding might relate to dental pain or unsightly anterior tooth decay that adversely affect social function in the workplace.

For effective and accurate utilization in health services research of a single item for measuring self-related oral health status, such as the GSROH, further studies expanding and validating the conceptual framework for self-perceived oral health across the age span are needed. This analysis indicates that Korean adults assess their unmet dental restorative treatment needs (most important for those aged 18-44 years) and prosthetic treatment needs (most important for those aged 65 years and older) as being more important than preventive dental care and their personal oral health behaviors in their assessment of the status of their oral health. This suggests that oral health programs in Korea would benefit from improving access to dental treatment and providing education on the importance of daily oral hygiene.

The possibility of unique culture-based variations for self-reported oral health status should be explored in cross-cultural studies to assess the generalizability of population-based research findings. Populations may differ in their expectations for ideal oral health and locus of control. There may be individual and population differences in the relevance and impact of oral health in everyday life. Exploration of the predictors of GSROH status in large national population surveys may reveal insight into these variances and support or refute the utility of such a single-item measure. Variations in predictors of GSROH by age may give insight into how to design age-appropriate dental public health programs and intervention studies.

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