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Dental Caries and the Quality of Life Amongst Older Adults in Vietnam: A Cross-Sectional Study

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Abstract:
The present study aimed to investigate the current Oral Health Related Quality of Life (OHRQoL) among older adults and to explore any correlations between dental caries and OHRQoL in Southern Vietnam. A community-based, cross-sectional study was conducted was conducted among 2,700 elderly respondents (aged 60 years or older) using a cluster sampling design. A face-to-face questionnaire survey and a dental examination were used to evaluate the prevalence of dental caries. Further, the Vietnamese version of OHIP-14 (OHIP-14VN) was used to measure OHRQoL of older adults. The percentage of older adults with dental caries was 32.3%. Results show that older adults with dental caries had significantly higher physical pain and physical disability than those without dental caries. In conclusion, dental caries is a common disease that affects the quality of life among older people in Southern Vietnam. The current study suggested that dental caries should be a priority in daily and regular healthcare under a health promotion program in Vietnam.

Keywords: Elderly, dental health survey, dental caries, OHRQoL, Vietnam

INTRODUCTION

Dental caries is increasingly a significant health phenomenon amongst older adults, both in developed and developing countries [1]. Large-scale studies have shown that dental caries amongst older people could be very highly common, with a prevalence rate ranging from half to three-fourths [2]. Dental caries negatively impact not only the functionality and appearance of older adults but also their psychological well-being, ultimately reducing their overall health and Oral Health Related Quality of Life (OHRQoL) [3]. In recent years, a significant increase in studies on the OHRQoL of older people has been conducted. The impact of dental caries on OHRQoL broadens the empirical evidence from community-based research beyond just clinical-setting indicators [3, 4]. Therefore, various instruments have been developed to measure OHRQoL, like the Geriatric Oral Health Assessment Index (GOHAI) [5], dental impact profile [6], and Oral Health Impact Profile (OHIP) [7]. The long-form OHIP-49 scale and short-form OHIP-14 scale [7, 8] have been widely used to assess OHRQoL in many developed and developing countries [9]. The reliability and validity of the scale have been thoroughly validated through intensive testing of its psychometric properties.

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Vietnam is a lower-middle-income country in Southeast Asian. The aging population, which has increased dramatically in recent decades [10], is becoming a significant challenge for social and economic development and sustainability. As the population of older individuals continues to grow, Vietnam is experiencing a significant dental transition. Unfortunately, there is limited information available regarding the oral health status of older people and its impact on their daily lives [11]. According to a 1999 National Oral Health Study, the prevalence of caries among adults aged 45 or older is as high as three-fourths [12]. Further, there are insufficient dental health services in Vietnam [12, 13], whereas most dental practices are located in urban areas [14]. Conducting a large-scale survey could greatly contribute to improving oral health awareness in Vietnam. In light of this, our cross-sectional study aimed to investigate the current Oral Health-Related Quality of Life (OHRQoL) among older adults and to explore any correlations between dental caries and OHRQoL in Southern Vietnam.

METHODS

Sampling

This cross-sectional study employed a cluster sampling design to recruit 2,700 elderly respondents aged 60 or older from two large provinces in southern Vietnam. Can Tho province covers an area of about 1,400 km^2, including five urban districts and four rural districts, with about 1.6 million residents in 2022 [15]. Binh Duong province is a large low-lying area with a total area of 2,694 km^2. Binh Duong has five urban districts and four rural districts, with about 2.2 million residents in 2022 [15]. The two provinces were chosen because they could provide representative data on both urban and rural populations (10 urban districts and eight rural districts), including the impact of rapid economic and population growth in southern Vietnam. In the next stage, three districts in each province were chosen to represent the urban and rural population of Southern Vietnam. Then, five communes were randomly selected from each of the six districts. Finally, 45 respondents were randomly selected from the sampling frame of older adults in each commune. Data for this study were collected between 2016 and 2017.

Data Collection Tools

After obtaining verbal consent, a face-to-face interview was conducted for each respondent to collect their demographic data, oral health history, and OHRQoL. The inclusion criteria were local elderly residents (≥60 years old) who were able to self-care and communicate. In each commune, we conducted interviews and dental examinations until we had 45 respondents. The respondent who refused to participate was replaced by the next one in the sampling frame.

The instrument used to measure the impact of OHRQoL of the older adults was the short-form OHIP-14 scale [8]. The OHIP-14 comprises 14 items that measure the impact of oral health on seven dimensions of OHRQoL: functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Each item has five possible options according to the Likert-type answers: never, rarely, occasionally, frequently, and consistently. The Vietnamese version of OHIP-14 (OHIP-14VN) was validated with fair to good construct validity and reliability in a large-scale study in an urban district in Can Tho province [16]. Following the completion of the interview, oral health was thoroughly assessed by dental examination to diagnose the experience and severity of dental caries (DMFT index) using criteria defined by the World Health Organization (WHO) [17]. Tooth status includes decayed teeth with crown or root caries (DT), missing teeth due to caries (MT), and filled teeth due to caries (FT) [17]. Then, we calculated decayed and filled teeth (DFT) (sum of DT and FT) and decayed, missing, and filled teeth (DMFT) index (sum of all the DT, MT, and FT). The prevalence of dental caries was

calculated as the percentage of respondents who suffered from crown or root caries among the total respondents.

Statistical Analysis

We used Epidata software to establish a data input template. We ensured the integrity of data through a data verification program. The final data was analyzed by SPSS 22.0. The statistical analysis included descriptive statistics, such as the T-test, Pearson $\chi 2$ test, and rank sum test, as well as logistic regression. For continuous variables, the Kolmogorov-Smirnov test was applied to test normality. Then, the T-test (for normally distributed variables) or the Mann-Whitney test (for non-normally distributed variables) was used for comparison analysis. For categorical variables, chi (χ^2) square tests or Fisher's exact test were calculated depending on the expected values of the contingency table [18]. Statistical significance was considered if the p-value was <0.05.

Ethical Consideration

The Ethics Committee of the Hanoi Medical University approved this cross-sectional study. Ethical guidelines were followed, and respondents were recruited after obtaining informed written consent.

RESULTS

Demographic Characteristics

The study's demographic characteristics for each province (Can Tho and Binh Duong) are shown in Table 1. A total of 2,700 respondents completed the interviews and were subsequently examined for dental caries. About 32.3% of older adults had dental caries. The results had no statistical significance in demographic characteristics. Females had a lower rate of dental caries compared to males (31.9% vs. 33.0%). Respondents with lower education also had a higher rate of dental caries (29.8% in respondents with secondary school and lower level vs. 32.9% in respondents with high school and higher level). The respondents with higher income had a higher rate of dental caries (33.6% on average and in the rich group vs. 32.0% in the poor and near-poor group).

Table 1: Demographic characteristics and their association with the prevalence of dental caries in the older adults in two Southern provinces, Vietnam

Variable		Total		Dental Caries		p
		N = 2700	%	N	%	
Total		**2700**	**100**	**873**	**32.3**	
1	**Sex**					
	Male	1103	40.9	364	33.0	0.538
	Female	1597	59.1	509	31.9	
2	**Age**					
	60-64	765	28.3	256	33.5	0.657
	65-74	1089	40.3	352	32.3	
	≥75	846	31.4	265	31.3	
3	**Living areas**					
	Rural areas	798	29.6	250	31.3	0.470
	Urban areas	1902	70.4	623	32.8	
4	**Educational level**					
	Secondary school and lower	514	19.0	153	29.8	0.167
	High school and higher	2186	81.0	720	32.9	

5	**Previous occupation**					
	Simple work (housework, farming, unemployment)	2393	88.6	772	32.3	0.822
	Government officials	307	11.4	101	32.9	
6	**Household economic**					
	Poor and average	2185	80.9	700	32.0	0.497
	Rich	515	19.1	173	33.6	

Dentition Status

Among the 2,700 older adults who participated in this study, approximately a third (similar in both provinces) had some decayed, missing, or filled teeth, with a mean DMFT of 13.36 teeth per person (Table 2).

Table 2: Dentition status of older adults in the two Southern provinces, Vietnam

Province	Dental Caries		DT	MT	FT	DMFT
	n	%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Binh Duong	434	32.1	0.9±1.95	12.29±9.94	0.08±0.89	13.26±9.72
Can Tho	439	32.5	0.97±1.93	12.36±9.86	0.09±0.89	13.41±9.58

Abbreviations: DT: decayed teeth with crown or root caries, MT: Missing teeth due to caries, FT: Filled teeth due to caries, DMFT: Decayed, missing, and filled teeth, SD: Standard deviation

Oral Health Related Quality of Life (OHRQoL) Amongst Older Adults

Table 4: OHRQoL amongst older adults in the two Southern provinces, Vietnam

Provinces	Dimensions	No dental caries	Dental Caries	p*
		Mean ± SD	Mean ± SD	
Binh Duong	Functional limitation	1,20±1,73	1,27±1,53	0,054
	Physical pain	**1,73±2,04**	**1,99±1,78**	**0,045***
	Psychological discomfort	1,08±1,72	1,10±1,65	0,843
	Physical disability	1,09±1,76	1,27±1,61	0,148
	Psychological disability	0,83±1,69	0,94±1,50	0,588
	Social disability	0,73±1,55	0,79±1,38	0,917
	Handicap	0,85±1,60	0,87±1,49	0,786
Can Tho	Functional limitation	1,31±1,69	1,36±1,69	0,567
	Physical pain	**1,91±1,93**	**2,14±2,04**	**0,049***
	Psychological discomfort	1,11±1,72	1,23±1,77	0,305
	Physical disability	**1,14±1,70**	**1,34±1,79**	**0,050***
	Psychological disability	0,91±1,59	0,99±1,66	0,541
	Social disability	0,83±1,62	0,91±1,62	0,312
	Handicap	0,89±1,65	0,96±1,61	0,307

**p< 0.05*

Table 3 presents the differences between older adults with and without dental caries in the two provinces, which are statistically significant. Results show that older adults with dental caries had significantly higher physical pain and physical disability than those without dental caries (p<0.05).

DISCUSSION

This study is one of the first community-based surveys on dental caries, featuring a representative sample of older adults (2,700 respondents) from both urban and rural areas in southern provinces, Vietnam. The prevalence of dental caries amongst older adults was 32.3% which is much lower than that observed in previous studies conducted in Southern Vietnam (>60%) [13], in other

lower-income countries such as China (>65%) [19]. The DMFT, however, was 13.36 teeth per person, which is higher than the range from 6.09 to 11.66 amongst people aged 45 years and over [20]. This suggested that the higher the age, the higher the risk of dental caries and the higher the DMFT score. Dental caries is the most common reason for DMFT (91% for molars, 88% for premolars, and 82% for anterior teeth) [21]. In a previous study, tooth extraction was the most common treatment for decay in Vietnam [20].

The prevalence of dental caries amongst older adults was not significantly different between demographic characteristics. These findings are not in line with previous studies stating that oral health was strongly related to some demographic factors, such as living areas (urban vs. rural areas) [12, 13]. This could be attributed to the rapid socioeconomic development in our studied settings, as it may lead to improved oral care among adults.

Our study shows that older adults with dental caries had significantly higher physical pain and physical disability than those without dental caries. The OHIP-14VN still uses the seven key domains as the original version (functional limitation, bodily pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap) [16]. Compared to a study using OHIP-14 in 188 older people in Can Tho in 2014, our score for physical pain is higher than theirs at 1.58 [22]. In previous studies, oral health is closely linked to the quality of life of older adults [14, 20]. Thus, to promote better health for the rapidly growing older population in Vietnam, oral health should be prioritized in daily and regular healthcare under a health promotion program.

CONCLUSIONS

The current study is one of the first community-based surveys to use representative samples on dental caries among older adults in southern provinces, Vietnam. The percentage of older adults with dental caries was 32.3%. Results show that older adults with dental caries had significantly higher physical pain and physical disability than those without dental caries. This suggested that dental caries should be a priority in daily and regular healthcare under a health promotion program in Vietnam.

Author Contributions

DMD, BTP and LTV participated into data analysis and prepared the manuscript. All supported data analysis and manuscript revision. All authors read and approved the final manuscript.

Competing Interests

The authors declare that they have no competing interests.

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