

Correlation of Oral Health Literacy with Demographic Factors and Oral Hygiene Among the Elderly

Bayu Brahmana Kridaningrat¹, Anandina Irmagita Soegyanto^{2*},
Yuniardini Septorini Wimardhani²

1. Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia

2. Department of Oral Medicine, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia

Abstract

The increase in life expectancy has affected many aspects related to quality of life, including oral health among the elderly. Oral health literacy (OHL) is the ability to improve oral health status by ensuring good and exploiting health information. This ability in the elderly is very important. Therefore, research on the correlation between the OHL score, oral hygiene, and factors influencing these in the elderly is vital. This study aimed to determine the OHL scores of independent elderly individuals and correlate them with demographic factors and Simplified Oral Hygiene Index (OHI-S) scores. This cross-sectional study included 99 independent elderly individuals in Depok who were administered the Health Literacy in Dentistry questionnaire and underwent oral examination. Seventy-six respondents were finally included, with a mean OHL score of 2.53 ± 0.85 and OHI-S score of 2.8 ± 1.10 . The bivariate non-parametric Spearman test showed correlations between the OHL score and gender, education level, and expenses per month ($P < 0.05$) but no correlation between the OHL and OHI-S scores ($P > 0.05$). The OHL score of independent elderly individuals in Depok is influenced by gender, education level, and expense per month.

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Introduction

Owing to advances in technology, especially technology related to healthcare, life expectancy has increased worldwide. In Indonesia, life expectancy has increased to 70.2 years, as determined in 2010–2015.¹ However, this increase in life expectancy is associated with many problems, ranging from aging-related issues to degenerative diseases, all of which eventually affect quality of life among the elderly.¹ One important aspect that influences quality of life in this subset of individuals is oral health. Good oral health literacy (OHL) is essential in order to ensure good oral health. OHL is the degree to which individuals are able

to obtain, process, and understand basic health information and services needed to make appropriate oral health decisions.² Individuals with good oral hygiene habits, like regular tooth brushing and frequent visits to the dentist, usually have good OHL scores.³ Oral Hygiene Index-Simplified (OHI-S) is one of many methods to assess personal oral hygiene. Someone with good oral hygiene shows clean tooth, free from debris and calculus, and healthy gums (painless and non-bleeding gingiva). Individuals with good oral hygiene usually have a habit such as brushing tooth twice a day, regular visit his/her dentist, and have a good OHL scores.²

Chowdary et al. showed that subjects with low OHL scores had poor oral hygiene and severe dental caries and periodontal disease, indicating a relationship between OHL and the status of oral and dental health.² However, similar research in Indonesia is rare and does

*Corresponding author:

Anandina Irmagita Soegyanto
Department of Oral Medicine
Faculty of Dentistry, Universitas
E-mail: a.irmagita@gmail.com

not focus on the elderly population. Thus, to ensure good oral health, which eventually affects quality of life, it is important for the elderly to have a high OHL score. The present study aimed to determine the OHL score of independent elderly individuals in Depok City, Indonesia, and examine its correlation with demographic factors and the OHI-S score.

Material and Methods

This was a cross-sectional analytical study in which 99 independent elderly respondents in Depok City were administered the Health Literacy in Dentistry (HeLD-29) questionnaire and underwent oral cavity examination.⁴ The inclusion criteria were independence, age ≥ 60 years, willingness to participate in this research, and ability to read and comprehend questions in Indonesian. The exclusion criteria were mental or physical inability to fill in the questionnaire, the availability of less than 2 tooth surfaces for calculating the OHI-S score, and loss of all teeth. All participants signed informed consent prior to data collection. This research was approved by the ethics committee of the Faculty of Dentistry, Universitas Indonesia (51/Ethical Approval/ FKGUI/XII/2016).

This validated and translated HeLD-29 questionnaire was used to calculate the OHL score, oral cavity examination was conducted to determine the OHI-S score, and the demographic questionnaire was administered to obtain demographic data. The oral examinations were performed by 3 dentists who were oral medicine specialists.

Oral hygiene was graded on the basis of the OHI-S score, which was calculated by the addition of the debris and calculus indices. To determine these indices, each of 6 pre selected tooth surfaces was first examined for debris and then for calculus.⁵ The grading system for the debris score or the Simplified Debris Index (DI-S) score is as follows: 0, no debris or stain present; 1, soft debris covering not more than one-third of the tooth surface or the presence of extrinsic stains without debris regardless of surface area covered; 2, soft debris covering more than one-third but not more than two-thirds of the exposed tooth surface; 3, soft debris covering more than two-thirds of the exposed tooth surface. The mean debris score

of six teeth is considered as DI-S.⁵ Similarly, the grading system for the Simplified Calculus Index (CI-S) score is as follows: 0, no calculus present; 1, supragingival calculus covering not more than one-third of the examined tooth surface; 2, supragingival calculus covering more than one-third but not more than two-thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth; 3, supragingival calculus covering more than two-thirds of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth. The mean calculus score of six teeth is considered as CI-S.⁵ The OHI-S score range from 0-1.2 is categorized as good oral hygiene, 1.3-3.0 as moderate oral hygiene, and 3.1-6.0 as poor oral hygiene.

Collected data were analyzed using the SPSS program for Windows, version 18 from SPSS Inc. Univariate data analysis was conducted to determine the frequency and percentage distribution of each variable, and the correlation between variables was analyzed using the Spearman and Mann-Whitney tests.

Results

Of the 99 subjects who participated in this research, 23 did not meet the inclusion criteria since they could not understand or read the questionnaire well enough. Thus, the data of only 76 individuals were processed. The demographic data of the subjects are shown in Table 1, and the average HeLD-29 scores are shown in Table 2. Most subjects were female and aged 60 to 69 years. Additionally, most subjects had only graduated from grade school, and the average monthly expenses among the subjects were 1–3 million.

The subjects had an average OHL score of 2.53 ± 0.85 ; the lowest score was 0.24 and the highest score was 4. The average OHI-S score was 2.8 ± 1.10 . Thirty-seven subjects had poor OHI-S scores (48.7%), while 34 had moderate scores (44.7%) and only 5 had good scores (6.6%).

The findings of the bivariate non-parametric Spearman and Mann-Whitney tests showed that the OHL score was correlated with gender ($P=.03$) as shown in table 3, education level ($P<.001$), and expenses per month ($P=.01$) as shown in table 4.

Demographic data	Category	n	(%)
Gender	Female	54	71.1
	Male	22	28.9
Age (years)	60–69	68	89.5
	70–79	4	5.3
	>79	4	5.3
Education level	Not educated	6	7.9
	Not graduated from grade school	7	9.2
	Grade school	27	32.9
	Junior high school	19	25
	Senior high school	14	18.4
	Diploma/bachelor's degree/postgraduate	5	6.6
Expenses per month (IDR)	<1 million	22	28.9
	1–3 million	51	65.4
	>3 million	3	3.8

Table 1. Distribution of demographic data.

Domain	Average
Receptivity	2.97 ± 1.06
Understanding	2.84 ± 1.38
Support	2.74 ± 1.29
Economic barrier	2.43 ± 1.47
Access	2.07 ± 1.37
Communication	2.06 ± 1.28

Table 2. Average scores for each HeLD-29 domain.

Variable	Average OHL score	P value	Average OHI-S score	Pvalue
Gender				
Male	2.90±0.14	0.033*	2.8±0.24	0.51
Female	2.38±0.12		2.9±0.13	

*: $P < 0.05$ indicating significance.

Table 3. Correlation between gender and OHL and OHI-S scores.

Demographic factors	OHL score	Pvalue	OHI-S score	Pvalue
Age	-0.126	0.279	-0.059	0.966
Education level	0.456	0.00**	0.059	0.612
Expenses per month	0.290	0.011*	-0.123	0.290

*: $P < 0.05$ indicating significance.

Table 4. Correlation between other demographic factors and OHL and OHI-S scores.

However, no significant correlation was found between this score and age ($P=.28$). No

significant correlations were found between the OHI-S score and any demographic factor ($P>0.05$). Lastly, the findings of the test to determine the correlation between the OHL and OHI-S scores showed no correlation between these scores ($P=.36$).

Discussion

In the present study, Depok City was chosen as the research location because the local government wants to make an elderly-friendly city and our findings may help the government formulate policies to support this vision.

The statistical analysis in the present study showed a correlation between gender and the OHL score, wherein male subjects had higher OHL scores than female subjects ($P=.03$). This finding contradicts that of research conducted by Blizniuk et al. in Russia, which found that female subjects have higher OHL scores than malesubjects.⁶ The reason they proposed for this difference was that women in Russia had considerable access to health information, particularly during pregnancy and breastfeeding.⁶

Similar results were obtained in a questionnaire-based study conducted by students from the University of Indonesia, in that female respondents had higher OHL scores than male ones.⁷

The differences in results between our study and these previous studies can probably be explained by the fact that the female participants in our study had limited access to education and healthcare information as they were growing up in the 1960s;⁸ at that time, society believed that education was only for males.

In the present study, no correlation was found between gender and the OHI-S score ($P=.51$). In contrast, it was found that females have a better oral hygiene index than males do, because they pay more attention to and are more conscious about maintaining oral cavity cleanliness.⁹ It could be that elderly Indonesian women lack awareness about oral hygiene since they have busy households and limited education.⁸

Our findings showed no correlation between age and the OHL ($P=.28$) or OHI-S

score ($P=.97$). These results contradict those of studies conducted by Kanupuru et al., who found a positive correlation between age and the OHL score, that is, older people had a higher OHL score than younger ones did.¹⁰ The ability to read declines as age increases, vision, concentration, comprehension, memory, and the ability to process information all decline with age.¹⁰ One reason for the differences in findings could be that we included only individuals aged 60 years or more. Tjahja, too, found that age and oral health status has a significant relationship, that is, as age increases, dental health status decreases.¹¹ The reason for the difference between our findings and those of this previous study could again be we only included elderly subjects.

In our study, we found a significant relationship between the level of education and the OHL score ($P<.001$). This indicates that the OHL score increases as the education level increases. Undoubtedly, individuals educated at high levels would find it easy to obtain, read, and understand healthcare information and improve their health. Similar results were found by studies conducted in Russia.⁶

In contrast, our findings showed no correlation between the level of education and the OHI-S score ($P=.62$). However, it was found that education levels have an effect on the OHI-S score; decayed, missing, and filled teeth index; and gingival index.¹¹ Education level influences the utilization of health services: persons with higher education levels tend to have good knowledge and information, so their health status is better.¹¹

The reason our findings differ from these previous findings could be that most of the elderly subjects in this study only graduated from grade school. Moreover, having a high level of education does not guarantee the ability to imbibe oral health behavior and maintain the cleanliness of the oral cavity. The most important aspect of personal health management is the ability to understand health information and determine how to obtain the necessary treatment.

The present study found a correlation between expenses per month and the OHL score ($P=.01$). Karina conducted a study in Brazil and found that individuals with low OHL scores are usually at a low socioeconomic level or are unemployed.¹² Low socioeconomic status

is also associated with lower levels of education and limited access to information or health services.

In contrast, our findings showed no correlation between expenses per month and the OHI-S score ($P=.29$). Similar results were obtained by Tjahja et al.¹¹ Because most subjects had average monthly expenses of less than 1 million IDR, subjects were reluctant to obtain dental and oral healthcare.¹¹ Further, an individual's socioeconomic level would in affect the availability of healthcare for their primary, secondary, and tertiary kin.

Finally, no correlation was found between the OHL score measured using the HeLD-29 questionnaire and the OHI-S score ($P=.36$). A study conducted in Iraq found that a low OHL score was significantly associated with poor self-reported oral health.¹³ Self-reporting of oral health is influenced by various factors, such as age, education level, and economic status. Thus, the oral health status of a person is not directly related to the OHL score.¹³

In a study conducted in Indian, Haridas et al. showed that the OHL score was significantly associated with temporomandibular joint problems, the need for prostheses, a history of dental caries, malocclusion status, and periodontal status but not to the level of oral hygiene.¹⁴ However, research conducted in Japan showed a significant relationship between the OHL score and oral health and oral hygiene.¹⁵

The differences in findings are probably due to differences in the intervention policies applied in developed and developing countries. Japanese individuals with a high level of OHL brush frequently or have their own dentures, assess their own oral condition with a mirror, and regularly visit the dentist, so they have good oral hygiene.¹⁵

Kanupuru et al. also concluded that OHL had a negative relationship with the status of oral hygiene and caries prevalence: a person with a low OHL score has poor oral hygiene and high caries prevalence.¹⁰

Our findings indicated that the OHI-S is not appropriate for assessing the oral hygiene status among elderly individuals because this population subset has substantial tooth loss. Therefore, further research is needed to assess the relationship between OHL and oral hygiene using an index other than the OHI-S.

Conclusion

The OHL score among independent elderly individuals in Depok City is influenced by some demographic factors (gender, education level, and expenses per month), but the OHL and OHI-S scores are not correlated. Further research is needed to assess the relationship between OHL and oral hygiene using an index other than the OHI-S.

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