

## Relationship Between Oral Health Literacy and Denture Use for Tooth Loss Among Adults in Indonesia

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### Abstract

Oral health literacy (OHL) refers to an individual's competence to obtain process and understand basic oral health information and services needed to seek appropriate oral health care. A high OHL score indicates that a person is able to use oral health information to maintain their oral health and choose treatment, such as treatment to replace lost teeth with dentures. However, the rate of denture use by people in Indonesia remains low.

The aim of this study was to analyze the correlation between OHL score and denture use.

We conducted a cross-sectional study with 70 respondents in Depok, Jawa Barat, using the Health Literacy in Dentistry (HeLD-29) instrument to assess OHL score and clinical examinations for denture use and to classify tooth loss. We observed a correlation between OHL score and denture usage ( $p < 0.05$ ).

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### Introduction

Health literacy is recognized as a determinant of staying healthy, recovering from illness, and enhancing health-related quality of life. Health literacy may improve the knowledge and skills of members of society who act as instruments to address health inequalities.<sup>1</sup> According to the US Department of Health and Human Services "Healthy People 2010" oral health literacy (OHL) refers to an individual's capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.<sup>2</sup>

A study by the US Department of Education and the National Center for Education Statistics in 2013 showed that two-thirds of respondents over 65 years old have a lower health literacy score than younger respondents.<sup>2</sup> A low OHL score is one factor that can influence people's dental problems—a lack of OHL can be a significant barrier to preventing oral disease

and promoting oral health. Such conditions related to the OHL score include tooth caries, temporomandibular joint disorders, malocclusion, tooth loss, and periodontal conditions.<sup>1</sup> Tooth loss is a pathological condition due to progressive dental disease such as caries, periodontal disease, or trauma. Importantly, tooth loss is still a major issue throughout the world. Data from The Indonesia Basic Health Research of 2013 showed that tooth loss in Indonesia registered a 2.9 on the DMF-T Index; the data showed that the Indonesian population lost 290 teeth per 100 people, or about 3 teeth per person.<sup>4</sup> In cases of tooth loss, rehabilitation is needed to restore the function of mastication, aesthetics, and pronunciation.

According to data from Balitbang Kemenkes RI of 2010, among individuals  $\geq 12$  years old in Indonesia, the percentage of dental health services used for tooth extraction was 79.6%, whereas the percentage for prosthetics was only about 4.5%.<sup>5</sup> These data indicate that Indonesians still have a limited understanding of how to maintain their oral health, specifically related to the importance of mastication and preventing tooth loss.

From an economical perspective, there are additional costs associated with creating the prosthesis to replace missing teeth. This and other factors are included in the Health Literacy

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in Dentistry Scale (HeLD); this instrument assesses communication, access, economic barriers, receptivity, understanding, utilization, and support. Before the HeLD was developed, some questionnaires were often used to measure OHL. There are several types of questionnaires, such as the Rapid Estimate of Adult Literacy in Dentistry-99 (REALD-99), Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30), Two-Stage Rapid Estimate of Adult Literacy in Dentistry (TS-REALD), Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D), Health Literacy in Dentistry-29 (HeLD-29), HeLD-14 (the shorter version of HeLD-29), Short Form-36, and the Test for Functional Health Literacy in Dentistry.<sup>6</sup> The HeLD-29 is considered trusted, valid, and culturally acceptable in some populations. HeLD-29 was back-translated and validated in 2014 by Universitas Indonesia's students and by residents of DKI Jakarta in 2015.<sup>7,8</sup> Treating tooth loss with dentures is still relatively uncommon in Indonesia.<sup>4</sup> However, little is known about the OHL regarding tooth loss and denture use in Indonesia. Thus, this research aims to analyze the relationship between OHL, measured by the HeLD-29, and denture use.

### Materials and methods

This was a cross-sectional analytic study that analyzed the relationship between oral health literacy (OHL) score and denture use. Each variable was measured only once at the time of inspection. The independent variable was OHL score. The dependent variable was denture use. Confounding variables were the amount of tooth loss and sociodemographic factors (gender and age). The study was performed in 2017 and conducted in Desa Sapta Kemuning, Pancoran Mas, Depok, Jawa Barat, Indonesia.

The inclusion criteria were 18–65 years old, tooth loss caused only by caries or periodontal disease, and ability to read and communicate in Bahasa. All participants gave informed consent to procedures approved by the Ethics Committee Faculty of Dentistry, Universitas Indonesia. Participants who were not willing to fill out the approval letter were excluded from the study. Seventy participants were chosen by consecutive sampling (non-probability sampling). Researchers recorded data directly for each subject. Biographical data were recorded at

the time that participants signed the informed consent form.

Participants then completed the Health Literacy in Dentistry-29 (HeLD-29) Questionnaire in Bahasa. The questions that constituted the OHL questionnaire focused on the “difficulty experienced.” The response options were graded on a 5-point Likert-type scale ranging from “without any difficulty” to “unable to do.” Scores were coded 0 to 4, and the possible final score range was 0 to 116. Higher scores indicated greater OHL. After completing the questionnaire, the participants had an oral examination to determine the amount and location of tooth loss, based on the Batista Classification, and the use of dentures. The data were analyzed with SPSS software. Univariate analysis was conducted to determine the frequency distribution and percentage of each variable on the subject. Then, bivariate analysis using comparative analysis test numeric variable unpaired Kruskal–Wallis and Mann–Whitney test to examine the association of each variable.

### Results

Participants ranged in age from 18 to 65 years; 30% were 18 to 24 years old; 44% were 25 to 44 years old; 23% were 45 to 64 years old; and 3% were more than 64 years old (Table 1). Out of 70 participants, 54 (71%) were female. Tooth loss was classified on the basis of Batista et al. as loss of 1 to 4 first permanent molars, loss of up to 12 posterior teeth, excluding subjects who had lost only the first permanent molars, loss of up to 12 teeth including anterior teeth, loss of more than 12 teeth (13–31 teeth), or edentulous. Thirty-six (52%) participants had lost 1–4 first permanent molars, and 49 participants (70%) did not use dentures as a form of tooth-loss rehabilitation. Overall, we found that OHL score correlated significantly with denture use ( $p < 0.5$ ).

In this study, our participants ranged from 18 to 65 years old. Those 18 to 24 years old had the highest OHL score, at  $3.33 \pm 0.52$ . This suggested that younger people have a greater ability to gain and understand basic oral health information and to make appropriate oral health decisions. As suggested by Kanupuru et al., these results could be related to cognitive function, which is strongly related to both age

and health literacy. In older individuals, the ability to obtain, read, and process information decreases because of loss of vision, concentration, comprehension, and memory. At the same time, the current results could have been affected by the range in participants' ages.

Variable	N (%)	Oral Health Literacy	
		Mean	SD
<b>Overall</b>		2.86	0.66
<b>Gender</b>			
Female	16 (29)	2.81	0.51
Male	54 (71)	2.82	0.69
<b>Age (years)</b>			
18-24	21 (30)	3.33	0.52
25-44	31 (44)	2.52	0.58
45-64	16 (23)	2.70	0.61
> 64	2 (3)	2.77	0.36
<b>Tooth Loss Amount</b>			
1 to 4 first permanent molar	36 (52)	2.75	0.77
1-12 permanent posterior teeth	14 (20)	2.82	0.46
1-12 permanent include anterior teeth	17 (24)	2.94	0.17
More than 12 teeth and edentulous	3 (4)	2.79	0.26
<b>Denture Usage</b>			
Yes	49 (70)	<b>2.67</b>	0.57
No	21 (30)	<b>3.16</b>	0.71

**Table 1.** Characteristics of the 70 study participants.

## Discussion

In this study, our participants ranged from 18 to 65 years old. Those 18 to 24 years old had the highest OHL score, at  $3.33 \pm 0.52$ . This suggested that younger people have a greater ability to gain and understand basic oral health information and to make appropriate oral health decisions. As suggested by Kanupuru et al., these results could be related to cognitive function, which is strongly related to both age and health literacy. In older individuals, the ability to obtain, read, and process information decreases because of loss of vision, concentration, comprehension, and memory. At the same time, the current results could have been affected by the range in participants' ages.

Out of our 70 participants, 71% were women and 29% were men. Overall, men had a higher OHL score than women. The average score for men was  $2.82 \pm 0.51$ , whereas the average score for women was  $2.81 \pm 0.69$ . However, the Mann-Whitney *U* test demonstrated a correlation between OHL score and denture use in women, possibly because women are more concerned about their

appearance than men. Mukatash et al. stated that gender can influence one's awareness regarding the importance of dentures to replace lost teeth. However, their dataset contained many more women than men.

According to our inclusion criteria, every participant had lost teeth. Here, we used tooth-loss classification criteria developed by Batista et al., where tooth loss was classified on the basis of the number and the location of the loss tooth. The purpose of this classification was to rate the functional and aesthetic impact of tooth loss as a function of the number of teeth lost.<sup>14</sup> Thirty-six subjects (52%) had lost 1–4 first molars. This is consistent with the research done by Silva-Junior et al., where the prevalence of lost molars in the maxilla and mandible was higher compared with the prevalence of lost premolars or anterior teeth.<sup>22</sup> We found that there was a significant relationship between OHL and denture use in the group that had lost 1–4 first molars and lost more than 12 teeth, including anterior teeth. This is consistent with the research done by Elias and Sheiham in Brazil, which revealed that patients who had not lost anterior teeth were still satisfied with their intraoral condition and did not desire treatment.<sup>23</sup> Importantly, patients who have fewer than 20 teeth or fewer than 10 pairs of teeth with good occlusion can have problems with mastication.

The participants who most commonly had tooth loss were 25–44 years old, with loss of 1–4 permanent molars. This is consistent with the research carried out by Silva-Junior et al., which reported that the prevalence of molar loss from the maxilla and mandible was higher than the prevalence of premolar and anterior tooth loss.<sup>22</sup> We found that there was a significant relationship between OHL and participants who had lost more than 12 teeth overall, including 1–4 first molars and anterior teeth. These data are consistent with the research done by Elias and Sheiham in Brazil, which showed that every patient felt satisfied with their intraoral condition and believed that they did not need treatment for tooth loss unless it was an anterior tooth.<sup>23</sup> Importantly, patients who have fewer than 20 teeth or fewer than 10 pairs of teeth with good occlusion can have problems with mastication.

The average score for OHL was  $2.86 \pm 0.66$ . The highest scoring domain was the understanding domain, with an average of  $3.44 \pm 0.64$ , whereas the lowest scoring domain

was the communication domain, with an average of  $2.56 \pm 0.89$ . This low score for the communication domain indicates that the participants had difficulty communicating with their dentist about oral health. Similarly, the average score for the access domain was also low. This is possibly because the participants had limited access to health care because of geographic or economic factors.

Notably, we found that OHL score was related to denture use. Twenty-one of our participants (30%) wore dentures, and the rest did not wear dentures even though they had lost teeth. One's OHL score corresponds with their understanding of the importance of oral health, including the importance tooth-loss rehabilitation. A high OHL score means that the person has a good understanding of his or her oral health.

In this study, the average OHL score of participants who wore dentures was  $3.16 \pm 0.71$ . This score is higher than for those who did not wear dentures, at  $2.67 \pm 0.57$ . A Mann-Whitney *U* test showed that there was a profound relationship between OHL score and the use of dentures ( $p < 0.005$ ). This is consistent with a study by Haridas et al. from India, which stated that OHL score was significantly related with health status, including issues like TMJ problems, a need for prosthesis, a history of dental caries, malocclusion, and periodontal status (but not oral hygiene level). A person with an advanced understanding of oral health will be able to seek, comprehend, and use health information to obtain needed treatments, including dentures for tooth loss.<sup>1</sup>

A limitation of this study is that it does not represent the general population, as it was carried out on a limited scope in Desa Sapta Kemuning, Pancoran Mas, Depok, West Java. Therefore, the results cannot be generalized. We also did not have a balanced number of participants in each sociodemographic group or for each classification of tooth loss. Thus, the statistical analyses are most meaningful for groups with the most participants.

## Conclusions

Here, we found that the OHL score was significantly correlated with denture use. On the basis of tooth-loss status, this relationship between OHL and denture use was only seen for participants who had lost more than 12 teeth,

including 1–4 first molars and anterior teeth.

## Declaration of Interest

The authors report no conflict of interest.

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