

Oral health literacy in Malang City, Indonesia

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Abstract

Dental and oral health are the main indicators of health, well-being, and quality of life. The concept of Oral Health Literacy (OHL) has become important because it regards individual capacity to understand and use dental information to transform into oral health behaviours. Thus, the aim of this study was to discover and describe the OHL status of adults in Malang City and its relationship with sociodemographic status so that it can be used as a basis for making policy. This study used observational analytical study design involving 450 respondents in Malang by quota random sampling method. The data was collected by the self-administered 29-item HeLD-ID (Health Literacy in Dentistry Indonesian Version) questionnaire. The study resulted that the overall HeLD-ID score was 3.68 ± 0.69 . The HeLD-ID score significant difference was affected by sex ($p < 0.05$) and the other sociodemographic determinants (age, last education, and income) were not. However, there were significant differences of HeLD scores in communication domain ($p < 0.05$) affected by age, sex, and income.

Introduction

Dental and oral health is a main indicator of overall health, well-being, and quality of life.¹ The Global Burden of Disease Study 2017 assumes that oral disease affects almost 3.5 billion people worldwide, with the majority of cases occurring in permanent dental caries.² Globally, it is estimated that 2.3 billion people suffer from dental caries in permanent teeth and more than 530 million children suffer from primary dental caries.² Meanwhile, according to Basic Health Research (Riskesdas) from 2018, it was stated that the largest proportion of dental problems in Indonesia were damaged/cavities/sick teeth (45.3%),³ whereas the majority of oral health problems experi-

enced by the Indonesian population were swollen gums and/or boils (abscesses) by 14%.³ In East Java, Riskesdas data from 2018 indicated that Malang ranked first with 55.64% of the population who had problems of tooth decay/cavities/pain.⁴

Oral Health Literacy (OHL) is one of the risk factors that affect the degree of dental and oral health within a society. OHL is an important key in preventing oral diseases and promoting oral health.⁵ It is defined as a measure of the capacity and ability of a person to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions.⁶ Several studies show that there is a significant relationship between high OHL and good oral and dental health. The study in accordance with Yazdani et al. (2018) showed that respondents with poor periodontal health had low OHL.⁷ Similar to the study by Bazkarados (2018), low parental OHL leads to children with a high number of missing teeth.⁸ Thus, it can be asserted that increasing OHL is one of the priority efforts to increase knowledge and behavior related to oral health.⁵

There are many tools available to measure OHL, and one of them is Health Literacy in Dentistry (HeLD) questionnaire.⁹ The benefit using HeLD questionnaire besides it concerns in cultural appropriateness, it also covers more domains such as communication, access, economic barriers, receptivity, understanding, utilization, and support.⁹ Based on previous study, HeLD questionnaire has been translated into Indonesian Language (HeLD-ID) and showed as a potential to be a valid and reliable oral health instrument particularly in Indonesia.⁹

As mentioned before, Malang has a very high number of population who had dental and oral health problems. However, very few studies have been done to assess the information regarding OHL among adult in Malang. This may lead to the poor preventive and promotive oral health programs in Malang. Indeed, this information is very important to synergize the OHL status of the people of Malang City with what policies should be implemented in order to improve their oral health status. Therefore, the purpose of this study was to measure OHL using HeLD-ID questionnaire and to analyze the socioeconomic determinants among adults in Malang.

Materials and Methods

This study used observational analytical study design with a cross sectional approach. Residents of Malang City were

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the population used in this study. This research used quota random sampling undertaken in every sub-district in Malang City by taking respondents in each sub-district, based on a report from the Central Statistics Agency (BPS) in 2020 indicating that the number of people in Malang City was 874,890 people.¹⁰ Based on this data, the sample size was calculated using the Slovin formula, so that a minimum sample size of 399.81 respondents was obtained, then it was rounded up to 400 respondents. In the end, samples from 450 respondents were collected in this study. The data about OHL were collected using the HeLD-ID

questionnaire as the main instrument of this study.⁹ Interviews were conducted in order to provide an explanation if the respondents had questions. HeLD-ID score were measured from the participant responses on a 5-point likert scale and the higher score meaning the higher OHL. Sociodemographic characteristics of respondents which is age, sex, last education, and income were analyzed for differences in OHL using the non-parametric Mann-Whitney U-test and Kruskal-Wallis test. All research procedures were approved by the Health Research Ethics Commission of the Health Polytechnic of the Ministry of Health of Malang (Reg. No.:136 / KEPK-POLKESMA/ 2021).

Results

The results of the statistical description analysis of research variables cover age, sex, last education, income, receptivity, understanding, support, economic barriers, access, communication, and utilization can be seen in Table 1. The results of characteristic descriptions based on age obtained at most aged 25-50 years, namely as many as 260 people (57.8%). Oral health literacy by age group showed that the <25-year-old group of respondents had the highest literacy (108.04±21.00), while the 25-50-year-old group of respondents had the lowest literacy (106.20±19.29). The results of *oral health literacy* comparison between age groups using the Kruskal-Wallis test showed no significant difference (p -value = 0.395), however in the *Communication* domain, there was a significant difference (p -value = 0.042).

The results of characteristic descriptions based on sex obtained the most are men, which is as many as 273 people (60.7%). Oral *health literacy* descriptions based on sex group showed that the group of female respondents had the highest literacy (109.26±20.69), while the male respondent group had the lowest literacy (105.48±19.47). The results of *oral health literacy* comparison between sex groups using the Kruskal-Wallis test showed a significant difference (p -value = 0.019), then in the *Communication* indicator found a significant difference (p -value = 0.027).

The results of characteristic descriptions based on education obtained the highest school education/ equivalent, which is as many as 156 people (34.7 %). Oral *health literacy* descriptions based on education groups showed that the group of respondents who studied elementary school / equivalent had the highest literacy (108.14±18.76), while the group of respon-

dents who did not study had the lowest literacy (98.80±19.92). Oral *health literacy* comparison results between educational groups using the Kruskal-Wallis test showed no significant difference (p -value = 0.150).

The results of characteristic descriptions based on income obtained at most have income of 1.5-2.5 million rupiah, which is as many as 235 people (52.2%). Oral *health literacy* descriptions based on income groups showed that the group of respondents who had incomes of 1.5-2.5 million rupiah had the highest literacy (107.61±20.29), while the group of respondents who had incomes >3.5 million rupiah had the lowest literacy (99.54±15.61). The results of *oral health literacy* comparison between income groups using the Kruskal-Wallis test showed no significant difference (p -value = 0.077), then in the *Communication* indicator found a significant difference (p -value = 0.019).

Discussion

Based on general health literacy, Oral Health Literacy (OHL) is an important key in preventing oral diseases, as well as regulating and improving oral health.^{5,7} OHL reflects the level a person has to obtain, process, and understand health information and services to make appropriate health decisions.^{11,12} Measuring OHL is considered important because it can reduce dental and oral health disparities in the community, as it is recognized as a basic cause of health disparities and has become a recent health priority.⁸ Berkman *et al.* (2011) also have the same opinion that health literacy can be an effective tool in preventing disease, eliminating health inequalities, increasing diagnosis and effectiveness of treatment or medical care, and increasing health outcomes with minimal costs.¹³ This is due to health literacy representing cognitive and social skills that determine an individual's motivation and ability to gain access, understand, and use information in a way that promotes and maintains good.¹⁴ OHL measurements can be carried out with many instruments, one of which is HeLD. HeLD is an instrument developed by Jones *et al.* (2014) which uses the Health Literacy Measurement Scale (HELM) as a basis. HeLD has advantages such as facilitating epidemiological studies related to OHL in a wide scope with minimal costs.¹⁵ HeLD consists of seven domains including Receptivity, Understanding, Support, Economic Barrier, Access, Communication, and Utilization.⁹

Several previous studies have examined

the impact of OHL on oral health status and behavior. They indicate that there is a significant relationship between high OHL and overall oral health.¹⁶ People with high OHL levels have a good dental and oral health status.¹⁷ According to Yazdani *et al.* (2017), there is a significant correlation between OHL and oral health behavior, where people with high OHL tend to brush their teeth more frequently in a day, use toothpaste, and visit the dentist regularly.¹⁷ This shows that high levels of OHL have an impact on adequate health habits that encourage individuals to improve their health conditions.¹⁷ In contrast, low health literacy is associated with poor health outcomes.¹⁸ In accordance with Firmino *et al.* (2017), low OHL levels can interfere with the ability of an individual to process and understand information about preventing dental and oral health disease, as well as in seeking and complying with treatment so that it will have a positive impact on worsening oral health conditions and the risk of developing dental and oral diseases.¹¹ For example, there are dental plaque/biofilm,¹⁹ periodontitis,²⁰ dental bleeding, pocket formation,²¹ dental caries,²² cavitory caries/lesions,²³ a decrease in the number of teeth and reduction of tooth adhesion,¹¹ and there even tends to impact depressive symptoms.¹³ This proves the statement of Hongal *et al.* (2013) where people with inadequate OHL tend to have worse oral health knowledge and, as a result, they rarely visit the dentist so they are prone to delays in the diagnosis of dental conditions which impact the worsening of the condition of the teeth and mouth.²⁴

This study used the translated Indonesian version of Health Literacy Dental (HeLD) scale to assess OHL of the people in Malang City, Indonesia. The former HeLD-ID questionnaire was implemented in Jakarta.¹¹ and this study focused on people in Malang City to implement HeLD-ID in a more generalized setting in Indonesia. There was strong internal consistency with Cronbach's α coefficient was 0.854 and CITC values for all items were above 0.3. This mean that HeLD-ID questionnaire can be implemented for larger population in Indonesia, moreover for population in urban areas.

Health literacy is effected by many factors, including education, income, socio-culture, demographics, ethnicity, race, mental and physical conditions, health systems, and geographical conditions.^{18,25} According to N. Sistani *et al.* (2013), the imbalance in dental and oral health status is caused by various factors including environmental, biological, behavioral, cultural, socio-economic, political, and access to health ser-

vices, as well as OHL.²⁶ Socio-economic factors are the strongest risk factors for influencing OHL and poor health result.²³ The overall HeLD-ID mean score was 3.68 ± 0.69 . This score was higher than from previous study in Indonesia.^{10,27} Also, there is a tight and negative relationship between OHL and sex at the confidence level of 95% in this study. This implies that women are more concerned with OHL than men. Further, among several factors, the sex factor merely gives a difference in the OHL results at the confidence level of 95% where women tend to behave according to OHL more than men. The results of this study are supported by Mohammedi *et al.* (2018) who argue that women pay more attention to dental and oral health and hygiene, and more often access dental and oral health information through the media.²⁰

Another determinant which is income level, even though not significantly affect the OHL, the HeLD scores in communication domain were significantly difference in this study. Higher income showed the higher score in communication domain which mean the ability to communicate their dental and oral problems were higher. Previous study showed the significant relationship between income and OHL, where high family income tend to supports the availability of financial resources and easy access to dental and oral health services so that it may contribute to better OHL.²⁸ Further, people with adequate income tend to be able to report their oral health independently, thus, they have better dental and oral health status than those who live with less than optimal conditions.²⁵ According to Bae & Wicakrama (2015) when it is viewed in the long term, among socio-economic factors, family income will affect children's academics.²⁹ This is due to a child from a lower socio-economic level who may show a low literacy rate, so the OHL level tends to be low, as well.²⁹ Whereas in a country with universal coverage for dental and oral health such as Brazil, the use of health services is still influenced by socioeconomic inequalities.³⁰ However, the statement from Somkotra & Detsomboonrat (2009) can explain the results of this study. They argue that people with low incomes are more likely to access and utilize services in subsidized public facilities. Santoso *et al.* (2020) also share the opinion that the availability of health insurance will increase an individual's opportunity to use dental services. In addition, health insurance with easy access may also affect the use of dental health services in Indonesia. Other studies that show a positive correlation between income and OHL have different characteristics of respondents from this study. For example,

Table 1. Mean Oral Health Literacy (OHL) domain scores among various sociodemographic characteristics of adult respondents living in Malang City, Indonesia.

Variables	n (%)	Receptivity	Understanding	Support	Economic Barrier	Access	Communication	Utilization	Oral Health Literacy	OHL Mean $\pm$ SD
Total	450 (100%)	19.40 $\pm$ 3.22	11.68 $\pm$ 3.19	11.74 $\pm$ 3.18	10.62 $\pm$ 2.08	14.40 $\pm$ 4.39	24.70 $\pm$ 6.46	14.44 $\pm$ 3.61	106.96 $\pm$ 20.02	3.68 $\pm$ 0.69
Age										
<25 years old	100 (22.2)	19.19 $\pm$ 3.27	11.26 $\pm$ 3.47	11.27 $\pm$ 3.48	10.54 $\pm$ 2.09	14.89 $\pm$ 4.47	25.97 $\pm$ 6.13	14.92 $\pm$ 3.43	108.04 $\pm$ 21.00	3.72 $\pm$ 0.72
25-50 years old	260 (57.8)	19.48 $\pm$ 3.13	11.74 $\pm$ 3.08	11.77 $\pm$ 3.11	10.65 $\pm$ 2.08	14.17 $\pm$ 4.40	24.06 $\pm$ 6.52	14.34 $\pm$ 3.59	106.20 $\pm$ 19.29	3.66 $\pm$ 0.66
>50 years old	90 (20.0)	19.43 $\pm$ 3.47	11.98 $\pm$ 3.19	12.17 $\pm$ 3.03	10.61 $\pm$ 2.11	14.50 $\pm$ 4.31	25.13 $\pm$ 6.49	14.18 $\pm$ 3.87	108.00 $\pm$ 21.09	3.72 $\pm$ 0.72
p-value		0.774	0.262	0.222	0.862	0.285	0.042*	0.350	0.395	0.395
Sex										
Female	177 (39.3)	19.62 $\pm$ 3.24	11.88 $\pm$ 3.14	11.93 $\pm$ 3.16	10.79 $\pm$ 2.18	14.82 $\pm$ 4.43	25.51 $\pm$ 6.33	14.71 $\pm$ 3.51	109.26 $\pm$ 20.69	3.76 $\pm$ 0.71
Male	273 (60.7)	19.27 $\pm$ 3.22	11.55 $\pm$ 3.23	11.61 $\pm$ 3.20	10.50 $\pm$ 2.02	14.12 $\pm$ 4.36	24.17 $\pm$ 6.51	14.26 $\pm$ 3.68	105.48 $\pm$ 19.47	3.63 $\pm$ 0.67
p-value		0.198	0.360	0.297	0.103	0.058	0.027*	0.193	0.019*	0.019*
Last education										
None	10 (2.2)	19.30 $\pm$ 3.30	10.80 $\pm$ 3.52	10.80 $\pm$ 3.52	9.60 $\pm$ 1.84	13.00 $\pm$ 5.98	22.20 $\pm$ 7.24	13.10 $\pm$ 4.51	98.80 $\pm$ 19.92	3.41 $\pm$ 0.68
Elementary School	148 (32.9)	19.41 $\pm$ 3.13	11.79 $\pm$ 3.19	11.88 $\pm$ 3.16	10.86 $\pm$ 1.90	14.50 $\pm$ 4.28	24.86 $\pm$ 6.21	14.84 $\pm$ 3.46	108.14 $\pm$ 18.76	3.72 $\pm$ 0.64
Middle School	90 (20.0)	19.64 $\pm$ 3.39	11.89 $\pm$ 3.11	11.93 $\pm$ 3.11	10.63 $\pm$ 1.86	14.38 $\pm$ 4.17	24.47 $\pm$ 6.75	14.42 $\pm$ 3.77	107.37 $\pm$ 20.00	3.70 $\pm$ 0.68
High School	156 (34.7)	19.54 $\pm$ 3.06	11.70 $\pm$ 3.28	11.71 $\pm$ 3.29	10.64 $\pm$ 2.21	14.68 $\pm$ 4.36	25.40 $\pm$ 6.20	14.46 $\pm$ 3.51	108.13 $\pm$ 20.11	3.72 $\pm$ 0.69
Diploma/undergraduate	46 (10.2)	18.46 $\pm$ 3.69	11.07 $\pm$ 3.02	11.20 $\pm$ 2.99	9.93 $\pm$ 2.51	13.43 $\pm$ 4.91	22.83 $\pm$ 7.19	13.35 $\pm$ 3.82	100.26 $\pm$ 22.70	3.45 $\pm$ 0.78
p-value		0.414	0.521	0.556	0.120	0.626	0.188	0.132	0.150	
Income										
< Rp. 1,499,999	38 (8.4)	19.74 $\pm$ 2.99	12.13 $\pm$ 3.05	12.32 $\pm$ 3.01	10.89 $\pm$ 2.20	14.84 $\pm$ 4.14	25.71 $\pm$ 6.20	14.97 $\pm$ 3.96	110.61 $\pm$ 20.65	3.81 $\pm$ 0.71
Rp. 1,500,000 - 2,499,999	235 (52.2)	19.44 $\pm$ 3.11	11.71 $\pm$ 3.09	11.72 $\pm$ 3.11	10.59 $\pm$ 2.11	14.46 $\pm$ 4.35	25.12 $\pm$ 6.60	14.57 $\pm$ 3.61	107.61 $\pm$ 20.29	3.71 $\pm$ 0.69
Rp. 2,500,000 - 3,499,999	153 (34.0)	19.37 $\pm$ 3.49	11.64 $\pm$ 3.41	11.73 $\pm$ 3.36	10.67 $\pm$ 2.07	14.30 $\pm$ 4.64	24.29 $\pm$ 6.48	14.24 $\pm$ 3.45	106.24 $\pm$ 19.91	3.66 $\pm$ 0.68
$\geq$ Rp. 3,500,000	24 (5.3)	18.75 $\pm$ 3.04	11.00 $\pm$ 3.02	11.00 $\pm$ 3.02	10.08 $\pm$ 1.67	13.63 $\pm$ 3.74	21.58 $\pm$ 4.44	13.50 $\pm$ 4.17	99.54 $\pm$ 15.61	3.42 $\pm$ 0.53
p-value		0.732	0.606	0.450	0.345	0.613	0.019*	0.225	0.077	

*significant at p-value < 0.05.

differences in age and geographic ranges also affect the results of OHL.

Even though all respondents have a toothbrush and brush their teeth every day, most of the respondents are not aware of the importance of going to the doctor for a check-up. This can be seen from the large percentage of respondents who had their teeth checked by a dentist more than one year ago and less than one year ago. In fact, when it is viewed from the OHL indicator, the average score per respondent indicator is in the high category. Foncesa *et al.* 2017 argue that the use of dental and oral health services reflects the level of awareness and individual need.³⁰ In Indonesia, the percentage of utilization of dental and oral health services is very low. The results of research by Santoso *et al.* (2020) state that 86.4% of adults in Indonesia have never visited a dentist. Besides socioeconomic factors, the distance between residence and the location of dental and oral health services also affects the decision of an individual to take care of their dental and oral health.³⁰ Especially in the era of the COVID-19 pandemic, many challenges are found in dental care where the majority of procedures produce droplets and aerosols that pose a risk of transmitting the SARS-COV-2 virus.

One of the study limitations was the convenience nature of sampling method which mean that the HeLD-ID questionnaire may alter in more representative sample. We used quota random sampling based on the sub district in Malang City, which caused bias because of the proportion of population in each sub district may differ. Also, this study only focused on the urban area which can be a limitation for HeLD-ID to be implemented in a more generalized setting in Indonesia.

Conclusions

This study is the first study to assess OHL in Malang City. Dealing with the results of the study, it resulted that the OHL scores of respondents were high despite the high prevalence of the oral and dental problems in Malang City. More researchs are needed to be done to analyze the relationship between prevalence of the oral and dental problems and OHL score using HeLD-ID in Indonesia. The higher score of OHL among women is indicating that men needed to be focused target for the education of oral health. Therefore, it is necessary to have a socialization program for the use of dental and oral health services to improve public health status and prevent oral diseases, especially in the era of the COVID-19 pandemic.

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