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Oral health literacy, knowledge, attitude, and oral health practices among college students at Jenderal Soedirman University

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ABSTRACT

Background: *Oral health literacy (OHL) has an important role as a medium for health promotion and efforts to prevent oral diseases through oral health behavior changes.* ***Purpose:*** *This study aims to determine OHL and its correlation with oral health knowledge, attitude, and oral health practice among college students.* ***Methods:*** *This cross-sectional study was conducted on 583 students of Jenderal Soedirman University in 2020, as the students come from different provinces in Indonesia. The Indonesian Oral Health Literacy Questionnaire was used to assess OHL. A self-designed questionnaire was used to assess oral health knowledge, attitude, and oral health practice.* ***Results:*** *Most students had good OHL, knowledge, and attitude toward oral health (90.7%, 84.6%, and 90.5% respectively). A Pearson correlation test showed a correlation between OHL and oral health knowledge ($p = 0.044$) and attitude ($p = < 0.001$). The Fisher exact tests showed a correlation between OHL and snacking frequency, tooth-brushing frequency, tooth-brushing time, and toothbrush changing time. The better the OHL, the better the knowledge and attitude. There was no correlation between OHL and sweet food eating frequency, the use of cleansing aids, dentist visit frequency, and the first action taken when experiencing toothache.* ***Conclusion:*** *OHL has a correlation with oral health knowledge and attitude. However, OHL is only related to some oral health practice indicators. The results of this study are expected to be taken into consideration when formulating strategies to improve oral health within the university.*

Keywords: *attitude; knowledge; oral health literacy; students*
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INTRODUCTION

Oral health literacy (OHL) is the degree to which individuals have the capacity to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions.[1] OHL is an important determinant of oral health, which should be further discussed in research.[2] Oral health problems are highly influenced by many factors, including the behaviors of many people who are still not aware of the importance of maintaining oral health. An individual's behavior in maintaining health is influenced by knowledge and attitude.[3] The other influencing factor is OHL, which results in oral diseases as well as dental and oral health discrepancies in Indonesia.[4] Individuals with limited health literacy skills make less use of the services designed to prevent and treat disease complications. Limited health literacy is related to poor health.[1] OHL is related to the utilization of oral health services as well as oral health knowledge and behavior[5] and oral health.[6,7] Some studies suggest an association between low levels of OHL and lack of use of preventive or therapeutic services, as well as an understanding of health information provided by health care providers.[8]

Poor knowledge, attitude, and behavior levels toward oral health may greatly influence teeth and oral conditions. According to Indonesian Basic Health Research[9], the prevalence of dental caries in the population of Central Java Province is 43.4%. The mean daily tooth-brushing habit in the community of Java Province is 95%, but the proportion of people brushing their teeth properly is 2.8%, which means that 97.2% of the people still do not brush their teeth regularly and correctly. Someone with a poor knowledge level will be unable to differentiate between behaviors that maintain oral health or those that possibly have negative

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impacts on oral health.[10] Banyumas is one of the regencies in Central Java Province. Previous research has shown that individual perceptions influence repeat visits to oral health services at the Banyumas Regency Health Centre. Seventy percent of primary health centers in Banyumas Regency have fewer old patient visits compared with the number of new patient visits and have increased visits every year.[11] This suggests that individuals may lack the capacity to obtain basic oral health services at the dental polyclinics of the health centers of the Banyumas district because they do not visit again.

OHL is also related to good oral health behavior, such as tooth-brushing frequency and dentist visit frequency.[12] According to a study conducted on college students, increased knowledge and attitude aspects influence behaviors that possibly improve their oral health.[13] Similar research also found that college students from dentistry faculty had better OHL and oral health behavior when compared with those from different faculties.[1] Furthermore, the research also reported that health literacy also showed the relationship between someone's knowledge and attitude.[14] There are some studies on OHL in different ages and specific groups, such as OHL in the dentistry community, adult groups, and caregiver groups.[15,16] College students, as individuals in the adolescence period, can be targeted to prevent oral diseases and build oral health in the future, as they will become caregivers or parents for their children.[15] The evaluation related to the influence of OHL among these age groups is considered an important component in prevention-oriented oral health programs to develop OHL and possibly lead to oral health improvement in the future.[17] One type of intelligence is crystalized intelligence, which improves with the increase in knowledge, experience, and skills possessed by an individual.[18] Based on this theory, knowledge can be determined by the level of intelligence.

Students being agents of change and the younger generation means that they need to have the proper knowledge to enrich their insights in order to bring about change for a nation. Students also serve as agents of change who are expected to be able to pass on positive values to society and the future, including oral health knowledge. Jenderal Soedirman University is the only state university in Banyumas, so it is suitable for use as sample data.[19] Research on OHL in college students is still very limited. However, this study is very important as a basis for formulating health policies at the university level and because students are agents of change. This research aims to determine the relationship between OHL and oral health knowledge, attitude, and behavior of students among college students at Jenderal Soedirman University.

MATERIALS AND METHODS

This research is a cross-sectional study employing an observational–analytical design. The research was conducted in November 2020 after obtaining ethical clearance from the Health Research Ethics Commission of Medical Faculty, Jenderal Soedirman University, Number 211/KEPK/X/20202. The respondents involved in this research were 583, calculated based on the minimum sample size based on the Slovin formula. Five hundred eighty-three students of Jenderal were selected from 12 faculties using a proportional sampling technique. It is a type of stratified random sampling where each stratum in the sample is proportionate to the population size of the strata. Proportional sampling has advantages, such as lower cost and faster data collection compared with measuring the entire population. The inclusion criteria of this research were as follows. First, students of Jenderal Soedirman University are registered from 2017 to 2020. Second, students must use Google Forms application to fill out the questionnaires. Third, students are willing to become the research respondents. The questionnaires were distributed to respondents online via Google Forms. After obtaining permits from each faculty, the research team coordinated with the students' representatives (research respondents) from each faculty to collect the data. The questionnaires presented in Google Forms contained information related to the research, including informed consent, respondents' identity, and question items for each variable.

OHL was measured using a research instrument known as the Indonesian Oral Health Literacy Questionnaire.[16] The questionnaire consisted of seven question items divided into five domains: communication, receptivity, understanding, utilization, and support. Each question could be responded to through five answer choices (options): unable to do, experiencing a slight difficulty, experiencing some difficulties, very difficult, and without any difficulty. Each answer choice had scores of 0–4, so the final score range is 0–28. The higher the final score, the higher the respondent's OHL.

Oral health knowledge questionnaires consisted of 15 favorable and unfavorable question items covering basic knowledge on concepts of oral health, oral diseases, and oral bad habits causing oral cavity abnormalities. Each question could be responded to with the dichotomous scales of either "correct" or "incorrect." Each correct answer scored 1, while the incorrect answer scored 0. The final knowledge score was determined by adding up all scores from the respondents' answers. The oral health knowledge questionnaire used in this study was a self-developed questionnaire that went through validity and reliability tests on 40 respondents. The validity test uses the corrected item total correlation. Question items are declared valid if the p value is >0.30. The reliability test using Cronbach's alpha showed a value of 0.728.

The questionnaires on oral health attitudes consisted of 15 favorable and unfavorable question items related to the respondents' tendency to agree or disagree with some statements. The attitude aspect evaluated the respondent's attitude toward maintaining oral health, oral problems, and selecting oral health services. Each question was responded to through four question choices (options): highly agree

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(Score 4), agree (Score 3), disagree (Score 2), and highly disagree (Score 1). The unfavorable questions were scored in reverse. The final attitude score was obtained by adding up all scores of the respondents' answers. The validity test using corrected item total correlation and reliability test questionnaires showed that the Alpha Cronbach coefficient of this self-developed questionnaire was 0.862.

The oral health behavior questionnaires consisted of eight question items modified from similar instruments of the research conducted by Yazdani et al.[12] Those questions covered sweet food consumption frequency, snacking frequency between meals, tooth-brushing frequency, tooth-brushing time, toothbrush changing time, oral cavity cleansing aids instead of a toothbrush, dentist visit frequency, and the first action taken when experiencing a toothache. The data were analyzed using Statistical Package for Social Sciences (SPSS). Pearson and chi square correlation tests were used to analyze the significance at the level of 0.05.

Table 1. Characteristics of respondents

Characteristic of respondents	Number of respondents (n)	Frequency (%)
Sex		
Male	169	71
Female	414	29
Age (years)		
17–20	346	59.3
Faculties		
Animal Science	23	4
Medical	41	7
Cultural Sciences	41	7
Health Sciences	57	10
Law	51	9
Engineering	64	11
Economics and Business	106	18
Agriculture	60	10
Mathematics and Natural Sciences	33	6
Fisheries and Marine Sciences	27	5
Biology	25	4
Social and Politic Sciences	55	9

RESULTS

This research involved 583 respondents with the characteristics presented in Table 1. Most respondents were females (71%), proportionally from 12 faculties. The respondents' age range was 17–24 years old.

Table 2 shows that most respondents had good OHL, oral health knowledge, and attitude levels (90.7%, 84.6%, and 90.5%, respectively). Only 1% of respondents had a poor OHL level. No respondents had poor dental and oral health knowledge and attitude. Chi square test showed that there were significant differences among OHL, oral health knowledge, and attitude of male and female groups ($p < 0.001$, $p < 0.001$, and $p = 0.03$, respectively).

The Spearman Rho correlation test results, as presented in Table 3, showed that there was a positive and significant relationship between OHL and oral health knowledge and attitude (all p value scores < 0.05). The higher the OHL, the higher the oral health knowledge level. In addition, the higher the OHL, the higher the dental and oral health attitude. Oral health knowledge had a positive and significant relationship with attitudes related to oral health.

Table 4 shows the frequency distributions of oral health attitudes belonging to respondents with different OHL levels. Most respondents had the habits of consuming sweet food and drink three times a day (62.1%), snacking between meals one to two times a day (66.8%), visiting a dentist only when experiencing toothache (44.3%), and visiting a dentist as a first treatment when experiencing toothache (42.9%). Conversely, most respondents had good oral

Table 3. Spearman Rho test between OHL, oral health knowledge, and attitude of college students

Variable	Oral health knowledge	Attitude
OHL	p = 0.044* r = 0.084	p < 0.001* r = 0.355
Oral health knowledge	-	p < 0.001* r = 0.145

* Significance at the level of <0.05; r, coefficient of correlation; p, significance value; statistical analysis using Spearman Rho test

Table 2. OHL, oral health knowledge and attitude of college students by sex

Variable	Female n (f)	Male n (f)	p value
OHL			
Good (Score 19–28)	392 (67.2%)	137 (23.5%)	
Fair (Score 10–18)	20 (3.4%)	28 (4.8%)	< 0.001*)
Poor (Score 0–9)	2 (0.3%)	4 (0.7%)	
Oral health knowledge			
Good (Score 10–15)	367 (63%)	126 (21.6%)	
Fair (Score 5–9)	47 (8.1%)	43 (7.4%)	< 0.001*)
Poor (Score 0–4)	0 (0%)	0 (0%)	
Attitude			
Good (Score 40–60)	382 (65.5%)	146 (25%)	
Fair (Score 20–39)	32 (5.5%)	23 (3.9%)	0.03*)
Poor (Score <20)	0 (0%)	0 (0%)	

* Significance at the level 0.05; statistical analysis using chi square test

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health attitude, such as brushing their teeth two times a day (71.7%), tooth-brushing after having breakfast and before sleeping (53.9%), toothbrush changing every one–three months (73.6%), and using additional cleansing aids instead of a toothbrush (62.1%). A Fisher test was conducted to determine the significant differences in dental and oral health behavior made by each OHL group. The results showed that OHL had a relationship with tooth-brushing frequency, tooth-brushing time, and toothbrush changing time. However, there was no relationship between OHL and the other oral health behavioral indicators.

DISCUSSION

The respondents of this study were 17–24 years old and experienced the development of critical thinking skills in processing information and modifying behavior. This research showed that most respondents had good OHL, oral health knowledge, and oral health attitudes (Table 2). Notoatmodjo[20] mentions experience, education level, information source, occupation, culture, interest, and age as factors influencing someone's knowledge. The oral health knowledge levels of students from Jenderal

Table 4. Fisher exact test between OHL and oral health behavior on college students

Variable	OHL poor	OHL fair	OHL good	p value
	n (f)			
Sweet food eating frequency				
More than three times a day	0 (0)	6 (1)	18 (3.1)	0.086
Three times a day	0 (0)	5 (0.9)	357 (61.2)	
Once or twice a day	4 (0.7)	37 (6.3)	77 (13.2)	
Never	2 (0.3)	0 (0)	77 (13.2)	
Snacking frequency				
More than three times a day	0 (0)	3 (0.5)	57 (9.8)	0.023*
Three times a day	2 (0.3)	5 (0.9)	69 (11.8)	
Once or twice a day	2 (0.3)	30 (5.1)	358 (61.4)	
Never	2 (0.3)	10 (1.7)	45 (7.7)	
Tooth-brushing Frequency				
More than twice a day	0 (0)	8 (1.4)	127 (21.8)	<0.001*
Twice a day	3 (0.5)	31 (5.3)	384 (65.9)	
Once in a day	1 (0.2)	9 (1.5)	18 (3.1)	
Never	2 (0.3)	0 (0)	0 (0)	
Tooth-brushing time				
In the morning	1 (0.2)	3 (0.5)	8 (1.4)	0.002*
After having meal	0 (0)	0 (0)	4 (0.7)	
After having breakfast	2 (0.3)	30 (5.1)	221 (37.9)	
After having breakfast and before sleep	3 (0.5)	15 (2.6)	296 (50.8)	
Toothbrush changing time				
After it broke	0 (0)	12 (2.1)	47 (8.1)	<0.001*
One year after using	1 (0.2)	1 (0.2)	1 (0.2)	
Four to six months after using	1 (0.2)	9 (1.5)	82 (14.1)	
One to three months after using	4 (0.7)	26 (4.5)	399 (68.4)	
Cleansing aid				
Toothpick	0 (0)	5 (0.9)	47 (8.1)	0.213
Mouthrinse	2 (0.3)	16 (2.7)	216 (37)	
Dental floss	3 (0.5)	9 (1.5)	64 (11)	
None	1 (0.2)	18 (3.1)	202 (34.6)	
Dentist visit frequency				
When having toothache	1 (0.2)	21 (3.6)	236 (40.5)	0.141
Twice in a year	3 (0.5)	8 (1.4)	98 (16.8)	
Once in a year	0 (0)	6 (1)	103 (17.7)	
Never	2 (0.3)	13 (2.2)	92 (15.8)	
The first action taken when experiencing a toothache				
Don't know	0 (0)	3 (0.5)	28 (4.8)	0.114
Going to dentist	4 (0.7)	12 (2.1)	234 (40.1)	
Self-medication	1 (0.2)	25 (4.3)	204 (35)	
Nothing to do	1 (0.2)	8 (1.4)	63 (10.8)	

*Significance at the level of <0.05; p, significance value; statistical analysis using the Fisher exact test

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Soedirman University were classified into a good category, as they were influenced by the education level. This is in accordance with the research conducted by Rahtyanti et al.[21] on the high level of oral health knowledge belonging to new students, which was classified into a good category. The higher someone's education level, the better the knowledge level.[21] Education is obtained from not only formal but also non-formal education in the form of individuals' interactions with their environments.[22] This research also reported that oral health knowledge had a positive significant relationship with attitude (Table 2). Attitude is a closed response from a person to a stimulus. Attitude has not yet become an action but is a predisposition to behavior. To turn attitude into real action, supporting factors are greatly needed, such as facilities and support from other parties.[23]

This research also showed that there was a significant difference between oral health knowledge and attitude related to oral health of male and female respondent groups. This is in line with a previous research result mentioning that women had better dental and oral health knowledge than men.[24,25] This finding is possibly caused by women's greater awareness of esthetics. Women were more proactive by visiting dentists and tended to receive dental health treatments more often; therefore, women had more opportunities to obtain oral health knowledge.[26]

This research showed that OHL had a significant relationship with oral health knowledge and attitude. An individual with a high OHL score also showed a high oral cavity knowledge level. This is in accordance with the previous research.[27–29] A young adult or adult individual in a community with poor health literacy had difficulties and obstacles in understanding and implementing information.[30] Poor OHL could limit the ability to find information when needed[31], such as processing, understanding, and utilizing information to make the right decision related to oral health.[27] Conversely, high OHL gave extensive opportunities for individuals to obtain better information and knowledge. Besides, there was a significant OHL difference between respondents in male and female groups. Sistani et al.[2] evaluated adults' health literacy in Teheran, which showed a higher average health literacy level of women than those of men. Women tended to pay more attention to health and oral cleanliness, so they frequently used information related to oral health provided by the media.[32]

The Fisher test results on the relationship of OHL with oral health behavior (Table 4) showed that an individual with high OHL has the tendency to have a low snacking frequency between meals, proper tooth-brushing frequency and time, and proper toothbrush changing time. Conversely, Khan et al.[33] reported that an individual with poor OHL also tends to have poor tooth-brushing frequency. It is easier for an individual with a good understanding of and information on managing health treatments to follow instructions to treat him/herself, post-operation preventive actions, medications, and other follow-up health behaviors.[34] This means that high OHL will result in good oral health behavior. Better health behavior can improve an individual's health status. This research reported that OHL had no relationship with sweet food and drink consumption frequency, utilization of oral cavity cleansing aids instead of toothpaste, first treatment made only when experiencing toothache, and dentist visit frequency. There was no correlation between OHL and sweet food eating frequency, the use of cleansing aids, dentist visit frequency, and the first action taken when experiencing toothache. The results of the meta-analysis asserted that OHL had no relationship with dentist visit frequency.[35] Since oral health behavior is influenced by knowledge and attitude variables, a dynamic balance between such variables promoting both positive dental and oral hygiene habits and results was to be expected.[36]

This study concludes that the better the OHL, the better the knowledge and attitude. A research limitation is that the data collection processes performed were self-administered, so the social desirability factor may have influenced the validity of the obtained data. Moreover, a cross-sectional research design is unable to deeply analyze the cause–effect relationships among variables. Another limitation of this study is that it did not compare the various ways or media used by each respondent to receive information, which may be influenced by faculty origin. It can be assumed that dental students have a higher exposure to OHL compared with students from other faculties. The results of this study are expected to be taken into consideration when formulating strategies to improve oral health within the university. This is important as one of the efforts toward a health-promoting university. Further research is needed to measure oral health status as OHL outcomes. Clinical examinations combined with the utilization of questionnaires may obtain more accurate results for future research.

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