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Do undergraduate Universiti Sains Islam Malaysia (USIM) students with adequate oral health literacy have better oral health status?

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Abstract— **Oral health literacy is the ability of an individual in making an appropriate decision to achieve optimum oral health. This study aimed to assess the oral health literacy and oral health status of undergraduate university students. This is a cross sectional study conducted among students from various faculties in USIM. A written consent was obtained before the administration of OHLI-M questionnaire via Google form. Oral examination was conducted after completing the questionnaire. A descriptive data analysis was performed to determine the adequacy of oral health literacy and oral health status among the students. A total of 280 students participated in this study. The mean age was 22 years old (SD=1.17) with the majority of them being female (82.1%) and coming from urban residences (57.1%). The prevalence of dental caries and periodontal disease was 58.9% (95% CI= 53.2 to 64.6) and 13.2% (95% CI= 9.6 to 17.1) respectively. Students with adequate oral health literacy had better oral health status. Those with inadequate oral health literacy had a high percentage of dental caries.**

Keywords— **Oral health literacy, dental caries, periodontal, oral health status.**

I. INTRODUCTION

Health literacy has become a public health concern in determining the understanding of the public towards the health messages delivered by health care providers. Health literacy is about making the appropriate decision from the health-related information and translated into day-to-day practices [1]. Thus, seeking information behaviour is crucial in educating individuals to make a right decision [2].

Oral health literacy is defined as "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions" [3]. According to Ueno et al., [4] individuals with better oral health literacy were more likely to care for their oral health and had good oral health behaviour. They brushed their teeth daily using a toothbrush and fluoridated toothpaste. They also visited dental clinics regularly, to prevent themselves from common oral diseases such as dental caries and periodontal diseases.

An education level was found to be one of the significant predictor factors associated with health literacy [5]. The higher the education level, the better the health literacy. Undergraduate university students were a group of people that had been categorised as individuals with higher education levels. However, different faculties had shown different oral health literacy level. Health related students were shown to have better oral health literacy compared to non-health related students [6].

People with low oral health literacy had a higher number of dental caries and severe periodontal diseases than those with high oral health literacy [7,8,9]. The same association was also reported among college students by a study in India [10]. The main oral health problems associated with oral health literacy were reported to be dental caries and periodontal diseases [11]. Many studies had reported on this negative association between oral health literacy and oral health status. However, there was a lack of studies performed among undergraduate students in a university, especially looking at the impact on their oral health status [6,12]. Thus, this study aimed to assess the oral health literacy level and oral health status among university students.

II. THE MATERIAL AND METHODS

This study obtained the ethical approval from the University Ethics Committee of Universiti Sains Islam Malaysia (USIM) with a reference number of USIM/FPG-MEC/2016/No.(53). The participants gave written consent before the data collection procedure.

This was a cross-sectional study conducted among undergraduate USIM students from October 2019 to January 2020. A stratified random technique was employed in the selection of samples according to their field of study (Table 1). Mute, deaf and blind undergraduate students were excluded from the study.

Table 1: Nine faculties were classified into three fields of study

Faculty	Field of study
Dentistry	Health stream
Medicine and Health Sciences	
Science and Technology	Science stream
Engineering and Built Environment	
Quranic and Sunnah Studies	Social science stream
Syariah and Law	
Leadership and Management	
Economics and Muamalat	
Major Language Studies	

A self-administered, validated Oral Health Literacy Index questionnaire of Malay version (OHLI-M) which had been translated by Ramlay et al., [13] was randomly distributed among the participants via a Google form. The questions consisted of sociodemographic profiles, oral health behaviour/practices and the reading comprehension and numeracy of OHLI-M. Description of the OHLI-M scoring in this study can be accessed from studies conducted elsewhere [14]. The scoring was classified as inadequate (0 to 59), marginal (60 to 74) and adequate (75 to 100).

After the completion of the OHLI-M questionnaire, the participants were scheduled for an oral examination within USIM's facilities. The oral examinations were performed using a portable dental chair in an open area to ensure adequate lighting and ventilation. The dental caries and periodontal conditions were recorded using the DMFT (decayed, missing, filled) index and modified Community Periodontal Index (CPI) respectively. The periodontal pocketing is scored as no pocketing (0 to 3mm), pocketing between 4 to 5mm and pocketing of more than 6mm. Periodontal disease in this study was described as healthy and periodontal problem (pocketing ≥4mm). Information on participant's oral health status was recorded using standard dental charting proforma [15].

Table 2: Sociodemographic profile of participants

Variables	N (%)
Gender	
Male	50 (17.9)
Female	230 (82.1)
Residency	
Rural	120 (42.9)
Urban	160 (57.1)
Field of study	
Health	37 (13.2)
Science & Technology	66 (23.6)
Social science	177 (63.2)

Data collected was analysed using IBM SPSS version 24.0 to identify the prevalence of oral health status and describe the adequacy of oral health status among the participants. The description of data was tabulated by mean and standard deviation for continuous data, and frequency and percentage for categorical data. Chi-square data analysis was performed to indicate the associated factors. The p-value was set to less than 0.05.

III. RESULTS

A total of 280 undergraduate university students participated in this study (80% response rate). The mean age was 22 years old (SD=1.17). The majority of the students were female (82.1%), came from urban residences (57.1%) and studied social sciences (63.2%) [Table 2].

Table 3: Oral hygiene practice/behaviour

Variables	N (%)
Frequency of tooth brushing a day	
<2 times	46 (16.4)
≥2 times	234 (83.6)
Using fluoridated toothpaste	
No	27 (9.6)
Yes	253 (90.4)
Flossing	
No	179 (63.9)
If necessary	85 (30.4)
Yes	16 (5.7)
Using mouthrinse	
No	167 (59.6)
If necessary	88 (31.4)
Yes	25 (8.9)
Last dental visit	
Less frequent	161 (57.5)
Within 12 months ago	119 (42.5)

The majority of the participants brushed their teeth two times or more a day (83.6%) using fluoridated toothpaste (90.4%). However, most of the participants did not use floss (63.9%) and mouthrinse (59.6%). A majority of the participants did not visit the dentist as recommended (57.5%). Table 3 shows the details of oral hygiene practice of the students.
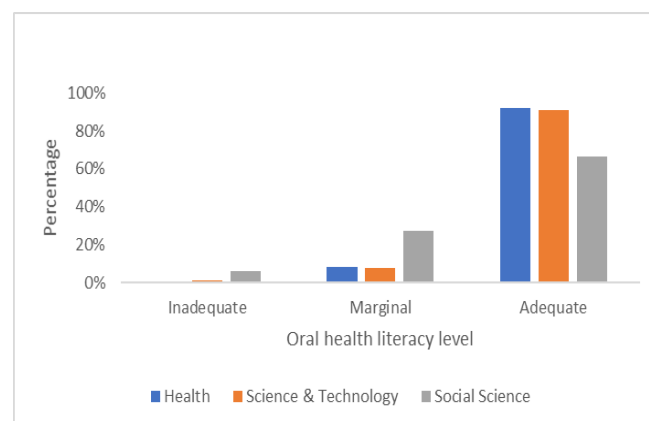

*chi-square test shows a significant association ($p<0.001$)
Figure 1: Oral health literacy level among students in different fields of study

About three quarters of the students had adequate oral health literacy. Figure 1 depicts the level of oral health literacy in the different fields of study in USIM. There was an association between the field of study and oral health literacy level ($\chi^2=21.840$, df=4, $p<0.001$). Health, and science & technology students had better (adequate) oral health literacy than social science students. The percentage point difference was approximately 20%. Conversely, social science students had a higher percentage of marginal and

inadequate oral health literacy compared to health, and science & technology students.

The prevalence of dental caries was 58.9% (95% CI= 53.2 to 64.6) with a median DMFT score of 1 (IQR=1.0), whereas the prevalence of periodontal disease was 13.2% (95% CI= 9.6 to 17.1). Figure 2(a) shows the percentage of dental caries among USIM students based on the level of oral health literacy. The proportion of participants with at least one carious tooth was high in each group according to the level of oral health literacy. On the other hand, participants with periodontal pocketing of more than 4mm were low and similar across the group (Figure 2b). No significant association was found for both dental caries and periodontal problem with oral health literacy (p>0.05).
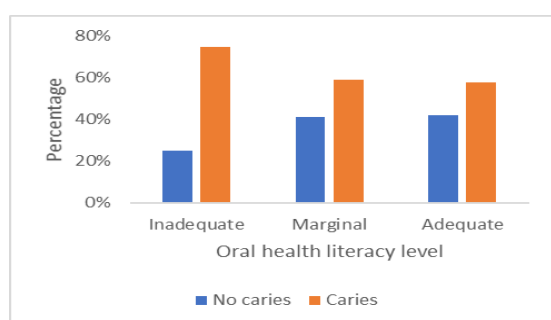
*chi-square test (*p*=0.504)

a) dental caries
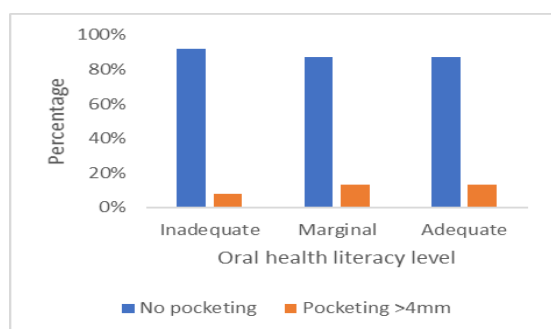
*chi-square test (*p*=0.873)

b) periodontal condition

Figure 2: Proportion of oral health status among USIM students according to level of oral health literacy.

IV. DISCUSSION

Several validated measuring tools had been used to measure oral health literacy including the Rapid Estimate of Adult Literacy in Dentistry (REALD), Test of Functional Health Literacy in Dentistry (ToFHLiD) and Oral Health Literacy Index (OHLI). Although REALD and ToFHLiD were among the most widely used measuring tools for oral health literacy, it merely assessed word recognition and not oral health literacy *per se* [16]. The OHLI questionnaire was used in this study because the tool measured reading, comprehension and numeracy skills. Moreover, the OHLI was available in a Malay language version and had good validity and reliability scores [13]. Therefore, this OHLI was a cross-cultural adaptation questionnaire which was suitable for Malaysians and very useful to be used among USIM's undergraduate students.

In this study we were more interested to determine the adequacy of oral health literacy and its relationship with oral health status among the USIM students. Other cofounding factors including seeking of health information behaviour, self-efficacy, diet intake, perceived oral health status and health-related behaviour were not tested. This may give an impact to their oral health literacy as reported in other literatures [4,7,17].

USIM is one of the public universities offering three different types of streams: health, science & technology and social sciences (Table 1). The students in health sciences were known to have more exposure in health-related knowledge giving them better insights of health literacy compared to their counterparts. Our findings showed almost three quarters of USIM's undergraduate students had adequate oral health literacy. The highest scores were among health and science & technology stream students compared to social science stream students. Studies reported health streams had adequate oral health literacy compared to non-health science streams [6,12]. On the other hand, a study conducted among newly registered students of USIM indicated that science stream students had better oral health literacy compared to non-science students [18]. However, there were no concrete studies to explain the finding. Further study is needed to determine the reason.

Kanupuru et al. [10] indicated a strong negative correlation between oral health literacy and oral health status i.e. dental caries and periodontal disease. Their study indicated that students with low oral health literacy had a high number of dental caries and periodontal disease than students with high oral health literacy. In this study, dental caries was found to be higher among students with inadequate oral health literacy compared to marginal and adequate oral health literacy. Meanwhile, periodontal pocketing of more than 4mm was found to be lower across the groups. Our result was inconsistent with other findings which reported a high number of periodontal disease among individuals with low oral health literacy [9,10,13]. Thus, this indicates a need for future research on the oral health literacy interventions to improve the oral health status and oral health behaviour.

V. CONCLUSION

In general, the majority of the USIM students had adequate oral health literacy, but the prevalence of dental caries was unsatisfactory. Those with inadequate oral health literacy had a high percentage of dental caries. Thus, it is essential to ensure that the health message delivered is well understood. Improving oral health literacy among undergraduate students may help to reduce oral health problems and improve the adherence to good oral health behaviour.

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