https://doi.org/10.36377/ET-0067

Oral health literacy and dental anxiety: A study among dental patients in Malaysia

Jegarajan Pillay[1] ✉, Siddharthan Selvaraj[2], Vini Mehta[2] ✉, Elaine You Ee Leng[1], Elin Ting[1], Evangelina Lau Jia Shin[1], Goh Ee Wei[1], Abedelmalek Kalefh Tabnjh[3,4]

[1] AIMST University, Kedah, Malaysia

[2] D.Y. Patil Dental College & Hospital, Dr. D.Y. Patil Vidyapeeth, Pune, India

[3] Institute of Odontology, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

[4] College of Applied Medical Sciences, Jordan University of Science and Technology, Irbid, Jordan

✉ drnjegarajan@gmail.com; vini.mehta@statsense.in

Abstract

AIM. The study's objective was to assess the levels of oral health literacy (OHL) and dental anxiety (DA) among patients and to examine any potential correlation between OHL and DA.

MATERIALS AND METHODS. This study is a cross-sectional analysis of 97 dental patients at AIMST Dental Centre in Malaysia. Oral Health Literacy (OHL) was assessed with the Oral Health Literacy Instrument (OHLI), while Dental Anxiety (DA) was evaluated by the Modified Dental Anxiety Scale (MDAS) questionnaire.

RESULTS. A significant proportion (70.1%) of participants exhibited sufficient oral health literacy, although moderate levels of anxiety were observed in 39.8% of individuals as measured by the MDAS. OHL exhibited a strong correlation with age ($p=0.031$) and education ($p<0.001$), while DA showed no significant association with any sociodemographic parameters. Ultimately, OHL had a substantial correlation with the MDAS ($p=0.004$).

CONCLUSIONS. Our study revealed a substantial correlation between oral health literacy (OHL) and dental anxiety (DA) among participants, indicating a necessity for oral health education to enhance OHL and therefore improve oral health outcomes, perhaps mitigating their DA.

Keywords: oral health literacy; dental anxiety; dental patients; human health

Article info: received – 01.11.2024; revised – 09.01.2025; accepted – 15.01.2025

Conflict of interest: The authors report no conflict of interest.

Acknowledgements: There are no funding and individual acknowledgments to declare.

For citation: Pillay J., Selvaraj S., Mehta V., Leng E.Y.E., Ting E., Shin E.L.J., Wei G.E., Tabnjh A. Oral health literacy and dental anxiety: A study among dental patients in Malaysia. *Endodontics Today.* 2025;23(1):139–147. https://doi.org/10.36377/ET-0067

Грамотность в области здоровья полости рта и стоматологическая тревожность: исследование среди стоматологических пациентов в Малайзии

Д. Пиллай[1] ✉, С. Сельварадж[2], В. Мехта[2] ✉, Э.Ю.И. Ленг[1], Е. Тинг[1], Е.Л.Д. Шин[1], Г.И. Вей[1], А.К. Табндж[3,4]

[1] Университет AIMST, Кедах, Малайзия

[2] Стоматологический колледж и больница Д.Й. Патила, Пуне, Индия

[3] Гетеборгский университет, Гетеборг, Швеция

[4] Иорданский университет науки и технологий, Ирбид, Иордания

✉ drnjegarajan@gmail.com; vini.mehta@statsense.in

Резюме

ЦЕЛЬ. Оценка уровня грамотности в области здоровья полости рта (ОГЗ) и стоматологической тревожности (СТ) среди пациентов, а также изучить возможную корреляцию между ОГЗ и СТ.

МАТЕРИАЛЫ И МЕТОДЫ. Исследование представляет собой поперечный анализ 97 стоматологических пациентов центра AIMST Dental Centre в Малайзии. Грамотность в области здоровья полости рта (ОГЗ) оценивалась с использованием инструмента Oral Health Literacy Instrument (OHLI), а стоматологическая тревожность (СТ) – с помощью модифицированной шкалы стоматологической тревожности (Modified Dental Anxiety Scale, MDAS).

РЕЗУЛЬТАТЫ. Значительная часть участников (70,1%) продемонстрировала достаточный уровень грамотности в области здоровья полости рта, хотя умеренный уровень тревожности наблюдался у 39,8% участников, согласно результатам MDAS. ОГЗ показала сильную корреляцию с возрастом ($p=0,031$) и уровнем образования ($p<0,001$), в то время как СТ не была значимо связана с какими-либо социоде-

мографическими параметрами. В конечном итоге, ОГЗ имела значительную корреляцию с результатами MDAS (p=0,004).
ВЫВОД. Исследование выявило значительную корреляцию между грамотностью в области здоровья полости рта (ОГЗ) и стоматологической тревожностью (СТ) среди участников, что подчеркивает необходимость повышения уровня образования в области здоровья полости рта для улучшения стоматологических показателей и, возможно, снижения уровня СТ.

Ключевые слова: грамотность в области здоровья полости рта; стоматологическая тревожность; стоматологические пациенты; здоровье человека

Информация о статье: поступила – 01.11.2024; исправлена – 09.01.2025; принята – 15.01.2025

Конфликт интересов: авторы сообщают об отсутствии конфликта интересов.

Благодарности: финансирование и индивидуальные благодарности для декларирования отсутствуют.

Для цитирования: Пиллай Д., Сельварадж С., Мехта В., Ленг Э.Ю.И., Тинг Е., Шин Е.Л.Д., Вей Г.И., Табндж А. Грамотность в области здоровья полости рта и стоматологическая тревожность: исследование среди стоматологических пациентов в Малайзии. *Эндодонтия Today.* 2025;23(1):139–147. https://doi.org/10.36377/ET-0067

INTRODUCTION

Health literacy is the capacity of individuals to acquire, interpret, and understand the essential health information and services that are required to make informed decisions. The American Dental Association (ADA) defined oral health literacy (OHL) as the extent to which individuals can access, comprehend, and apply essential oral health information and services to make informed decisions about their oral health. This includes the ability to read and comprehend written material, effectively communicate health-related information, and achieve and maintain optimal health [1]. Decreased literacy has been associated with postponed medical diagnoses, poor compliance with medical instructions, impaired self-management abilities, heightened mortality risks, negative health outcomes, and escalated healthcare expenses. Health-related information can be obtained from numerous sources. This information can take the form of printed materials including leaflets, magazines, and newspapers. Moreover, audiovisual media, Internet resources, and direct information from healthcare personnel are good ways to access health-related information. However, misunderstanding of health instructions or information can have severe health consequences [2]. According to evidence, OHL plays a crucial role in improving individual oral health, and poor OHL impedes effective communication between dentists and patients, thereby serving as a significant obstacle to patient-centered care [3].

DA is a negative emotional state that dental patients experience in an excessive and unreasonable manner. [4]. It shares homogenous attributes with a spectrum of anxiety disorders, especially those pertaining to specific fears and phobias. These involve several debilitating conditions of different dimensions such as physiological behavioral, cognitive, and emotional components. DA is a common phenomenon that often presents challenges to both dentists and patients during practice [5]. The dentist experiences stress as a result of the reduced collaboration that is required to treat apprehensive patients. This results in an increase in treatment time and resources, which ultimately leads to a negative perception of both the patient and the dentist [6; 7]. Studies have demonstrated that it is a critical factor in the prevention of dental treatment [8; 9]. A variety of negative health outcomes are associated with DA and anxiety [10]. Additionally, DA impairs oral health-related quality of life (OHQOL) and impedes procedures. In 2003, McGrath and Bedi reported a correlation between DA and social and economic disadvantage, unfavourable oral health, and negative impacts on subjects' oral health-related quality of life. High levels of DA are associated with the lowest quality of life in terms of oral health [11]. Owing to the wide-ranging consequences, it is critical to not only recognize DA quickly but also treat them effectively once they attend a dental appointment. The practitioner should try to alleviate patients' anxiety and fear so that they are motivated to return for appointments in the future. The execution of the treatment plan and general management of patients' DA requires effective communication, informative education, and a supportive, trusting dentist-patient relationship [12].

Although a few studies have shown a negative relationship between OHL and DA [13–15], research on this topic remains limited [16]. Therefore, this research aimed to improve our comprehension on the association between OHL and DA.

OHL is a concept that is gaining prominence and has the potential to greatly impact oral health. By incorporating both crucial elements of OHL and DA, patient-centered dental care and the overall oral health of patients can be provided. However, only three publications are available exploring OHL and DA relationship [13–15]. A study by Shin and colleagues in the year 2014, on 187 parents and their kids in the US suggested that individuals with low OHL would have greater DA and that a lack of understanding might be a contributing factor to DA [13]. An association was demonstrated, indicating a relationship between OHL and DA, although the precise pathways remain unknown. Barasuol et al. (2017) conducted a study of 168 Brazilian children and their caregivers. In this study, a Poisson regression model was produced by researchers using DA as the dependent variable. Furthermore, the two domains (OHL and DA) were reported to have a significant association in both

the bivariate and multivariable analyses. Additionally, the authors emphasized the strength of this association across cultures. Both research outcomes emphasize the necessity for additional research in community-based settings since DA can vary significantly in an environment where dental care is actively sought [14].

The objective of this study was to determine the level of OHL and DA among patients attending the AIMST Dental Centre, and to determine whether there is any association between OHL level and DA among these patients.

MATERIALS AND METHODS

This cross-sectional survey was conducted over a period of 5 months, from August 2022 to January 2023. The AIMST University Human Ethics Committee accepted this study (AUHEC/FOD/2022/07). The study subjects were patients aged 15 to 45 years who underwent dental treatment at the AIMST Dental Centre. Participants were chosen using convenience sampling, based on their appointments, availability, and willingness to engage.

Patients who came for dental treatment or regular check-ups at the AIMST Dental Centre and provided written consent were included in this study. Exclusion criteria were patients with mental or psychological problems, those requiring emergency care, those who were not literate in English or Malay, and those who were not willing to participate. The G*Power program 3.1.9.7 was used to calculate the sample size through power analysis, given $\alpha = 0.05$, power = 0.8 [16]. The minimum required sample size of 87 patients was needed from AIMST Dental Centre. The non-response rate was estimated at 10%, necessitating a final sample size of 96 patients from the AIMST Dental Centre.

The questionnaire [17–20] comprised of two parts. The first section consists of a tool to assess OHL which is Oral Health Literacy (OHLI), and a Modified Dental Anxiety Scale (MDAS), an instrument to measure DA. Overall, 62 items were included in the questionnaire, and the approximation of the completion time was 20 minutes.

The overall performance of the OHLI was determined by aggregating the weighted scores, resulting in a total score that varied between 0 and 100. The greater an individual's OHLI score, the greater is their functional OHL. Furthermore, the OHLI score can be divided into three groups: inadequate (0–59), marginal (60–74), and adequate (75–100).

DA was determined using the Modified Dental Anxiety Scale (MDAS). The MDAS is a concise, self-administered questionnaire comprising five questions and a five-point rating scale ranging from "not anxious" to "extremely anxious". The scores from each question were added together, yielding a total score that ranged between a minimum of 5 and a maximum of 25. It has good psychometric properties; a short period of time is sufficient to complete, and scoring is easy. In addition, the completion process does not increase the respondents' anxiety. The MDAS scores can be categorized into three DA levels: normal anxiety (5–10), moderate anxiety (11–18), and extreme anxiety (19–25). A value of 19 or higher was found through empirical determination to signify a high DA, which warrants special attention from dental professionals.

The data were analysed utilising SPSS software for Windows (version 27, SPSS Inc., IBM). Descriptive statistics for socio-demography were presented as means and standard deviations (SD) or medians and interquartile ranges (IQR) for numerical variables, while frequencies and percentages (%) were utilised for categorical variables. Pearson's chi-square test was employed to determine any statistically significant association between two category variables. All statistical analyses were two-tailed, and a p-value <0.05 was deemed statistically significant.

RESULTS

The study sample consisted of 97 dental patients from the AIMST Dental Centre (ADC), which achieved a 100% response rate. The characteristics of the study participants were presented through descriptive statistics.

The sample characteristics were comprised of four general sociodemographic factors. Of the 97 participants, 53 (44.9%) were aged between 15 and 25 years and 44 (37.3%) were aged 26 years and above.

Most participants were female (57.6%). Twenty (20.6%) participants were Malay and Indian, and 77 (79.4%) were Chinese. 71 (73.2%) were either at their undergraduate or diploma level, whereas 26 (26.8%) had completed only primary or secondary education (Table 1).

Oral Health Literacy (OHL) and Modified Dental Anxiety Scale (MDAS)

Most of the participants (70.1%) attained scores correlating to sufficient OHL levels, while 29.9% corresponded to inadequate OHL levels. 29 (24.6%) participants had scores of normal or no anxiety, 47 (39.8%) had experienced moderate anxiety, and 21 (17.8%) were categorised as potentially phobic due to their history of encountering extreme DA (Table 2).

Table 1. Characteristics of participant's sociodemographic factors (*n* = 97)

Таблица 1. Характеристики социодемографических факторов участников (*n* = 97)

Factors	Characteristics	*n* (%)
Age	15 to 25	53 (44.9)
	26 and above	44 (37.3)
Gender	Male	29 (24.6)
	Female	68 (57.6)
Race	Malay and Indian	20 (20.6)
	Chinese	77 (79.4)
Education	Primary and secondary	26 (26.8)
	Undergraduate and diploma	71 (73.2)

Table 2. Distribution of OHL and MDAS scores (*n* = 97*)*

Таблица 2. Распределение показателей ОГЗ и MDAS (*n* = 97)

Variables	Characteristics	*n* (%)[a]
OHL	Inadequate	29 (29.9)
	Adequate	68 (70.1)
MDAS	Normal	29 (24.6)
	Moderate	47 (39.8)
	Extreme	21 (17.8)

Note: [a] Inadequate OHL refers to scores ⩽ 74 and Adequate OHL refers to scores ⩾ 75

Примечание: [a] Недостаточный уровень ОГЗ относится к значениям ⩽ 74, а достаточный уровень ОГЗ – к значениям ⩾ 75.

Association between sociodemographic factors and oral health literacy

The participants aged 15 to 25 years showed a more adequate OHL than those aged 26 years and above, with a p-value of 0.031. Therefore, there was a significant association between age and OHL levels. More female participants (75%) showed adequate OHL compared to males (25%), with a p-value of 0.107. Thus, there was no significant association between gender and OHL levels. Among the participants of the three races, the Chinese showed a higher level of adequate OHL than Malays and Indians, with a *p*-value of 0.591. Hence, race and OHL had no significant association. The *p*-value for education is less than 0.001 which means education and OHL were significantly associated (Table 3).

Association between sociodemographic factors and DA based on the MDAS

The p-value for age was 0.197 which meant there was no significant association between age and DA. The *p*-value for gender was 0.512 which meant that there was no significant association between gender and DA. The p-value for race was 0.978, indicating that there was no significant association between race and DA. The *p*-value for educational level was 0.599. Hence, there was no significant association between educational level and DA (Table 4).

Association between oral health literacy and dental anxiety

Of the 97 participants, 25 (36.8%) with adequate OHL levels showed normal levels of DA compared to four (13.8%) with inadequate OHL levels. 34 (50%) participants with adequate OHL levels showed moderate anxiety compared with 13 (44.8%) participants with inadequate OHL levels. Only nine (13.2%) participants with adequate OHL levels showed extreme levels of DA compared to 12 (41.4%) participants with inadequate OHL levels. The p value is 0.004. Hence, there was a significant association between OHL and DA (Table 5).

Table 3. Association between sociodemographic factors (age, gender, race and education) with OHL (*n* = 97)

Таблица 3. Ассоциация между социодемографическими факторами (возраст, пол, раса и образование) и уровнем ОГЗ (*n* = 97)

Factors	Inadequate[b], *n* (%)	Adequate[b], *n* (%)	*p*-value[a]
Age			
15 to 25	11 (37.9)	42 (61.8)	0.031
26 and above	18 (62.1)	26 (38.2)	
Gender			
Male	12 (41.4)	17 (25.0)	0.107
Female	17 (58.6)	51 (75.0)	
Race			
Malay and Indian	5 (17.2)	15 (22.1)	0.591
Chinese	24 (82.8)	53 (77.9)	
Education			
Primary and secondary	17 (58.6)	9 (13.2)	<0.001
Undergraduate and diploma	12 (41.4)	59 (86.8)	

Note: [a] chi-square test for independence; [b] inadequate OHL refers to scores ⩽ 74 and Adequate OHL refers to scores ⩾ 75

Примечание: [a] критерий χ^2 для проверки независимости; [b] недостаточный уровень ОГЗ относится к значениям ⩽ 74, а достаточный уровень ОГЗ – к значениям ⩾ 75.

Table 4. Association between sociodemographic factors (age, gender, race and education) with dental anxiety based on MDAS (*n* = 97)

Таблица 4. Ассоциация между социодемографическими факторами (возраст, пол, раса и образование) и стоматологической тревожностью на основе MDAS (*n* = 97)

Factors	Normal, *n* (%)	Moderate, *n* (%)	Extreme, *n* (%)	*p*-value[a]
Age				
15–25	14 (48.3)	30 (63.8)	9 (42.9)	0.197
26 and above	15 (51.7)	17 (36.2)	12(57.1)	
Gender				
Male	11 (37.9)	12 (25.5)	6 (28.6)	0.512
Female	18 (62.1)	35 (74.5)	15(71.4)	
Race				
Malay and Indian	6 (20.7)	10 (21.3)	4 (19.0)	0.978
Chinese	23 (79.3)	37 (78.7)	17 (81.0)	
Education				
Primary and secondary	6 (20.7)	13 (27.7)	7 (33.3)	0.599
Undergraduate and diploma	23 (79.3)	34 (72.3)	14 (66.7)	

Note: [a] Chi-square test for independence.

Примечание: [a] Критерий χ^2 для проверки независимости.

Table 5. Association between OHL and MDAS (*n*=97)

Таблица 5. Ассоциация между уровнем ОГЗ и MDAS (n = 97)

OHL	MDAS			
	Normal, *n* (%)	**Moderate, *n* (%)**	**Extreme, *n* (%)**	***p*-value[a]**
Inadequate	4 (13.8)	13 (44.8)	12 (41.4)	0.004
Adequate	25 (36.8)	34 (50.0)	9 (13.2)	

Note: [a] Chi-square test for independence; [b] Inadequate OHL refers to scores ⩽ 74 and Adequate OHL refers to scores ⩾ 75.

Примечания: [a] критерий χ^2 для проверки независимости; [b] недостаточный уровень ОГЗ соответствует значениям ⩽ 74, а достаточный уровень ОГЗ – значениям ⩾ 75.

DISCUSSION

This study presents the results of OHL and DA among 97 dental patients at the AIMST Dental Centre. The sample characteristics, including age, gender, race, and education, were described using appropriate descriptive statistics. In addition, this study examined the association between these variables against OHL and DA.

Most participants were female, Chinese, and had either undergraduate or diploma education levels. Most participants had adequate OHL, whereas almost 18% experienced extreme DA and were classified as potentially phobic.

Age and education had a substantial correlation with OHL, while gender and race did not demonstrate a significant association with OHL. Participants aged 15–25 had a more adequate OHL than those aged ⩾ 26 years. There are a few possible reasons; for example, people in the 15–25 age group are typically still in school or college, where they may receive education on oral health and hygiene as part of their curriculum. In contrast, older individuals may not have had access to a similar education or may have forgotten what they have learned in school. A study by Nunes et al. showed that younger individuals may be more exposed to oral health information through social media and other online resources, which can help increase their knowledge and awareness [21]. Additionally, they may be more likely to visit dentists regularly, which can provide them with more opportunities to learn about their oral health. According to Nicola J Gray et al.,2005, one way to help young people develop health literacy skills is by including internet-based health interventions in school programs. Since the younger generation has more exposure to the Internet and social media, this can be done by teaching them how to search for and select information from electronic sources, which can provide valuable opportunities to learn about health-related topics [22].

In addition, participants with undergraduate and diploma education had higher OHL than those with primary and secondary education. In this study, OHL scores were significantly higher among undergraduates and diplomas (89.9%) than among primary and secondary levels (10.1%). The current findings indicate that individuals with higher education levels are proficient in assessing health-related information and services, hence improving their capacity to make informed decisions regarding their oral health [23–26]. In contrast, those with lower educational attainment may lack the essential skills to comprehend and utilise health-related information, recognise the need for timely action, and navigate intricate healthcare systems.

There were more female participants (75%) who showed adequate OHL than males (25%), but there was no significant association between gender and OHL. Studies conducted across multiple nations have failed to exhibit any discernible disparity among various levels of OHL and gender. In Tehran, research conducted by Naghibi et al. demonstrated that female participants exhibited a greater level of OHL, aligning with the findings of this study. This disparity is attributed to women's heightened emphasis on oral health and hygiene, along with their more frequent engagement with oral health services, pertinent facts accessible via media outlets [27].

Furthermore, Chinese participants had higher OHL than Malay or Indian participants. According to the study by Zolkifli et al., such disparity may be due to differences in educational level, with Chinese participants having higher levels of education on average compared to Malays and Indians. Cultural and language differences, particularly in a country like Malaysia with its multi-ethnicity can be barriers that may influence the variation in knowledge levels of oral health between the groups [23]. A further study [24] indicated that Chinese individuals exhibited superior oral health status and greater oral health awareness compared to Indian participants. However, in our study, ethnicity was not found to be significantly associated with OHL, which could be because our study population was predominantly Chinese (79.4%). A limitation of this study is that the current sample may not adequately represent the ethnic variety among dental patients in Malaysia's OHL.

Regarding the association between sociodemographic factors and DA, the study found no significant association between age, gender, race, education, and DA. Some studies have found no association between DA and age. One possible explanation for this lack of association is that DA may be related to other factors such as personality traits, prior dental experiences, or cultural background rather than age alone [28; 29]. In 2003, Beaton et al. found that DA was more strongly related to the performed dental treatment type, such as root canal treatment, extraction, or restoration, than to the age of the patient [30]. A 2003 study by Haaglin et al. revealed that psychological factors, including fear of pain and loss of control, exhibited a stronger correlation with DA than age [31]. Furthermore, a 2008 study by Armfield JM et colleagues identified a significant correlation between cognitive vulnerability, a characteristic linked to anxiety and negative thought patterns, and DA [32]. This indicates that personality features could influence the emergence of DA, and age may not be the primary determinant in forecasting DA.

Regarding gender, female participants exhibited higher scores on the MDAS (moderate or extreme DA) than their male counterparts; nonetheless, the study indicated no significant correlation between gender and DA, a finding commonly observed in prior DA investigations [33–35]. The literature indicates that women often possess lower pain tolerance and exhibit elevated anxiety levels, data that align with this study's results. The findings of this study indicated no significant correlation between race and DA, a conclusion further corroborated by additional research [36; 37]. Chellapah determined that there were no substantial racial disparities in the prevalent rate of DA [36]. Another study by Tan A. et al. (2019) found that ethnicity was not a significant predictor of DA [37]. According to the limited studies available, it was indicated that there were were no statistically significant correlations between race and DA. Nonetheless, additional research with bigger sample sizes and varied populations may enhance our comprehension of the intricacies between race and DA.

An elevated degree of education may result in improved oral health and hygiene, together with an increased frequency of routine dental examinations [38]. Recent studies indicate that a higher degree of education correlates with a reduction in DA [38; 39]. Nevertheless, the results of this study indicated no substantial correlation between DA and educational achievement. This discovery corresponds with the work of Özdemir et al. [40] and Ay et al. [41], indicating that dental anxiety (DA) is a complex phenomenon influenced by various factors, including prior dental experiences, personality characteristics, and cultural perceptions of dentistry, indicating that the relationship between education and DA is likely intricate. Hence, a comprehensive understanding of the various factors that contribute to DA is required to effectively address and manage this issue.

Identifying the correlation between OHL and DA in dental patients at the AIMST Dental Centre was the primary focus of the current research. This study's results indicated a strong connection between OHL and DA levels, which persisted at the multivariable level. More subjects in the category of having adequate OHL (86.8%) scored significantly lower on the MDAS (normal or moderate DA) than those with inadequate OHL (58.6%), while more participants who showed inadequate OHL (41.4%) scored significantly higher on the MDAS (extreme DA) than those with adequate OHL (13.2%), which indicated a negative correlation between OHL and DA. These outcomes further support the findings of three previously published studies [13–15] that found a significant negative correlation between OHL and DA. These studies implied that the negative impact of poor understanding of basic dental knowledge during dental visits and inadequate comprehension of diagnosis and management plans led to helplessness and uncertainty, which advanced or aggravated DA. The constraints of the study include the limited ability of the self-administered questionnaire to provide a complete assessment of the participants' OHL level, as the questionnaires were based on the perceived responses of the participants. In addition, due to the self-administered nature of the questionnaires, a lack of understanding of the questions may arise because of language barriers, as the questionnaires are only in two languages, English and translated Malay. Furthermore, the findings of our study pertained exclusively to the OHL and DA of patients visiting the AIMST Dental Centre. Furthermore, there is also the inherent limitation in reporting biases with questionnaires and surveys. Therefore, additional research should be conducted in other regions of Malaysia to validate our results.

These findings underscore the necessity for customised oral health education initiatives that take into account the sociodemographic variables linked to oral health literacy. Overall, this research contributes to the comprehension of the factors that influence OHL and DA among dental patients and provides valuable insights that can be used to inform the progression of strategies to improve dental health literacy and reduce DA among dental patients.

CONCLUSION

Within the limitation of the study, our findings offer an understanding on OHL and DA among dental patients at the AIMST Dental Centre. The findings suggest that OHL was significantly associated with age and education, whereas sociodemographic factors (age, gender, race, and education) were not significantly associated with DA, except for a significant association between OHL and DA.

REFERENCES / СПИСОК ЛИТЕРАТУРЫ

1. Ratzan S.C., Parker R.M. Introduction. In: Selden C.R., Zorn M., Ratzan S.C., Parker R.M. (Eds.), *National library of medicine current bibliographies in medicine: Health literacy*. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services; 2000.
2. Jaafar A., Al-Kadhim A.H.A., Ab Malik N. Oral health literacy among public university undergraduate students and associated factors. *IIUM Medical Journal Malaysia*. 2020;19(3):73–79. https://doi.org/10.31436/imjm.v19i3.1668
3. Schiavo J.H. Oral health literacy in the dental office: the unrecognized patient risk factor. *J Dent Hyg*. 2011;85(4):248–555. Available at: https://jdh.adha.org/content/85/4/248 (accessed: 13.02.2025).
4. Cianetti S., Lombardo G., Lupatelli E., Pagano S., Abraha I., Montedori A. et al. Dental fear/anxiety among children and adolescents. A systematic review. *Eur J Paediatr Dent*. 2017;18(2):121–130. https://doi.org/10.23804/ejpd.2017.18.02.07
5. Bernson J.M., Hallberg L.R., Elfström M.L., Hakeberg M. "Making dental care possible: a mutual affair":

a grounded theory relating to adult patients with dental fear and regular dental treatment. *Eur J Oral Sci*. 2011;119(5):373–380. https://doi.org/10.1111/j.1600-0722.2011.00845.x

6. Brahm C.-O., Lundgren J., Carlsson S.G., Nilsson P., Corbeil J., Hägglin C. D Dentists' views on fearful patients. Problems and promises. *Swed Dent J.* 2012;36(2):79–89.
7. Carter A.E., Carter G., Boschen M., AlShwaimi E., George R. Pathways of fear and anxiety in dentistry: A review. *World J Clin Cases*. 2014;2(11):642–653. https://doi.org/10.12998/wjcc.v2.i11.642
8. Armfield J.M., Spencer A.J., Stewart J.F. Dental fear in Australia: who's afraid of the dentist? *Aust Dent J*. 2006;51(1):78–85. https://doi.org/10.1111/j.1834-7819.2006.tb00405.x
9. Berggren U., Meynert G. Dental fear and avoidance: causes, symptoms, and consequences. *J Am Dent Assoc*. 1984;109(2):247–251. https://doi.org/10.14219/jada.archive.1984.0328
10. Armfield J.M. How do we measure dental fear and what are we measuring anyway? *Oral Health Prev Dent*. 2010;8(2):107–115.
11. McGrath C., Bedi R. The association between dental anxiety and oral health-related quality of life in Britain. *Community Dent Oral Epidemiol*. 2004;32(1):67–72. https://doi.org/10.1111/j.1600-0528.2004.00119.x
12. Appukuttan D.P. Strategies to manage patients with dental anxiety and dental phobia: literature review. *Clin Cosmet Investig Dent*. 2016;8:35–50. https://doi.org/10.2147/CCIDE.S63626
13. Shin W.K., Braun T.M., Inglehart M.R. Parents' dental anxiety and oral health literacy: effects on parents' and children's oral health-related experiences. *J Public Health Dent*. 2014;74(3):195–201. https://doi.org/10.1111/jphd.12046
14. Barasuol J.C., da Silva Assunção L.R., Fraiz F.C., Menezes J.V.N.B. Oral health literacy as a predictor of dental anxiety in parents of children undergoing dental treatment. *J Dent Child (Chic)*. 2017; 84 (3):125–131.
15. Sriram K., Leelavathi L. Effect of parent's dental anxiety and oral health literacy on children's oral health. *Drug Invention Today.* 2019;11(10).
16. Sekertzi C.G. *An empirical investigation of oral health literacy and its relationship with dental anxiety among university students. Thesis*. Thessaloniki; 2021. 128 p. Available at: https://dspace.lib.uom.gr/bitstream/2159/25543/1/SekertziChristinaMSc.pdf (accessed: 13.02.2025).
17. Sabbahi D.A., Lawrence H.P., Limeback H., Rootman I. Development and evaluation of an oral health literacy instrument for adults. *Community Dent Oral Epidemiol*. 2009;37(5):451–462. https://doi.org/10.1111/j.1600-0528.2009.00490.x
18. Ramlay M.Z., Saddki N., Tin-Oo M.M., Arifin W.N. Cross-cultural adaptation and validation of Oral Health Literacy Instrument (OHLI) for Malaysian adults. *Int J Environ Res Public Health*. 2020;17(15):5407. https://doi.org/10.3390/ijerph17155407
19. Humphris G.M., Freeman R., Campbell J., Tuutti H., D'Souza V. Further evidence for the reliability and validity of the Modified Dental Anxiety Scale. *Int Dent J*. 2000;50(6):367–370. https://doi.org/10.1111/j.1875-595x.2000.tb00570.x
20. Sitheeque M, Massoud M, Yahya S, Humphris G. Validation of the Malay version of the Modified Dental Anxiety Scale and the prevalence of dental anxiety in a Malaysian population. *J Investig Clin Dent*. 2015;6(4):313–320. https://doi.org/10.1111/jicd.12106
21. Nunes C., de Almeida C.V., Belim C. Health literacy in younger age groups: Health care perceptions: Informed people will be more prepared people. *Open Access Library Journal*. 2020;7:e6187. https://doi.org/10.4236/oalib.1106187
22. Karobari M.I., Siddharthan S., Adil A.H., Khan M.M., Venugopal A., Rokaya D. et al. Modifiable and non-modifiable risk factors affecting oral and periodontal health and quality of life in South Asia. *Open Dent J* 2022;16(1): e187421062209270. https://doi.org/10.2174/18742106-v16-e2209270
23. Akram Z., Safii S.H., Vaithilingam R.D., Baharuddin N.A., Javed F., Vohra F. Efficacy of non-surgical periodontal therapy in the management of chronic periodontitis among obese and non-obese patients: a systematic review and meta-analysis. *Clin Oral Investig*. 2016;20(5):903–914. https://doi.org/10.1007/s00784-016-1793-4
24. Singh S.K.N., Maykanathan D., Xing J.T.Y. Oral Health Related Quality of Life (OHRQoL) and its association with socio-demographics and weight status among adults in Klang Valley, Malaysia. *Journal of Oral Health & Research*. 2015;6(4):1–10.
25. Pillay J., Natarajan M., Selvaraj S., Rao S.M., Chandrasekaran N.D. Oral health related quality of life among Malaysian rural children: A study using Child-OIDP index. *Res J Pharm Technol*. 2023;16(5):2347–2342. https://doi.org/10.52711/0974-360X.2023.00386
26. Ho M.H., Montayre J., Chang H.R., Joo J.Y., Naghibi Sistani M.M., Lin Y.K. et al. Validation and evaluation of the Mandarin version of the oral health literacy adult questionnaire in Taiwan. *Public Health Nurs*. 2020;37(2):303–309. https://doi.org/10.1111/phn.12688
27. Naghibi Sistani M.M., Yazdani R., Virtanen J., Pakdaman A., Murtomaa H. Determinants of oral health: does oral health literacy matter? *ISRN Dent*. 2013;2013:249591. https://doi.org/10.1155/2013/249591
28. Atchison K.A., Gironda M.W., Messadi D., Der-Martirosian C. Screening for oral health literacy in an urban dental clinic. *J Public Health Dent*. 2010;70(4):269–275. https://doi.org/10.1111/j.1752-7325.2010.00181.x
29. Jones M., Lee J.Y., Rozier R.G. Oral health literacy among adult patients seeking dental care. *J Am Dent Assoc*. 2007;138(9):1199–1208. https://doi.org/10.14219/jada.archive.2007.0344
30. Beaton L., Freeman R., Humphris G. Why are people afraid of the dentist? Observations and explanations. *Med Princ Pract*. 2014;23(4):295–301. https://doi.org/10.1159/000357223
31. Scandurra C., Gasparro R., Dolce P., Bochicchio V., Muzii B., Sammartino G. et al. The role of cognitive and non-cognitive factors in dental anxiety: A mediation model. *Eur J Oral Sci*. 2021;129(4):e12793. https://doi.org/10.1111/eos.12793
32. Armfield J.M., Slade G.D., Spencer A.J. Cognitive vulnerability and dental fear. *BMC Oral Health*. 2008;8:2. https://doi.org/10.1186/1472-6831-8-2
33. Locker D. Psychosocial consequences of dental fear and anxiety. *Community Dent Oral Epidemiol.* 2003;31(2):144–151. https://doi.org/10.1034/j.1600-0528.2003.00028.x

34. Bergdahl M., Bergdahl J. Temperament and character personality dimensions in patients with dental anxiety. *Eur J Oral Sci*. 2003;111(2):93–98. https://doi.org/10.1034/j.1600-0722.2003.00028.x

35. Jeevan M.B., Yah T.S., Chen T.Y., Shan T.K., Rao S.M., Selvaraj S. OPG based study to analyze essential parameters of impacted lower third molar among north Malaysian population: A retrospective study. *Res J Pharm Technol*. 2023;16(6):2979–2974. https://doi.org/10.52711/0974-360X.2023.00492

36. Chellappah N.K., Vignehsa H., Milgrom P., Lam L.G. Prevalence of dental anxiety and fear in children in Singapore. *Community Dent Oral Epidemiol*. 1990;18(5):269–271. https://doi.org/10.1111/j.1600-0528.1990.tb00075.x

37. Tan A., Lee S.T., Lim L.P. Factors associated with dental anxiety among adults in Malaysia: A systematic review. *Journal of Oral Health and Dental Management*. 2019;18(2):75–82.

38. Ekanayake L., Dharmawardena D. Dental anxiety in patients seeking care at the University Dental Hospital in Sri Lanka. *Community Dent Health*. 2003;20(2):112–116.

39. Selvaraj S., Naing N.N., Wan-Arfah N. Effect of periodontal health in marital life. *Res J Pharm Technol*. 2021;14(8):4463–4465. https://doi.org/10.52711/0974-360X.2021.00775

40. Özdemir A.K., Özdemir H.D., Coşkun A., Taşveren S. Diş Hekimliği Fakültesinde profitez kliniği ile diğer kliniklerde hasta anksiyetesinin araştırılması. *CÜ Diş Hek Fak Derg*. 2001;4:71–74.

41. Ay S., Özdemir D., Öztürk M., Polat S. An assessment of dental anxiety in oral surgery patients. *Gülhane Tıp Dergisi*. 2002;44(4):395–398.

INFORMATION ABOUT THE AUTHORS

Jegarajan Pillay – Faculty of Dentistry, AIMST University, Kedah, Malaysia; https://orcid.org/0009-0000-7431-545X

Siddharthan Selvaraj – Department of Dental Research Cell, D.Y. Patil Dental College & Hospital, Dr. D.Y. Patil Vidyapeeth, Pune 411018, India; https://orcid.org/0000-0002-7776-3335

Vini Mehta – Department of Dental Research Cell, Dr. D.Y. Patil Dental College & Hospital, Dr. D.Y. Patil Vidyapeeth, Pune 411018, India; https://orcid.org/0000-0003-4174-907X

Elaine You Ee Leng – Faculty of Dentistry, AIMST University, Kedah, Malaysia; https://orcid.org/0009-0002-5969-4409

Elin Ting – Faculty of Dentistry, AIMST University, Kedah, Malaysia; https://orcid.org/0009-0001-9444-415X

Evangelina Lau Jia Shin – Faculty of Dentistry, AIMST University, Kedah, Malaysia; https://orcid.org/0009-0009-9655-0552

Goh Ee Wei – Faculty of Dentistry, AIMST University, Kedah, Malaysia; https://orcid.org/0009-0008-8422-3143

Abedelmalek Kalefh Tabnjh – Department of Cariology, Institute of Odontology, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; Department of Applied Dental Sciences, College of Applied Medical Sciences, Jordan University of Science and Technology, Irbid, Jordan; https://orcid.org/0000-0001-8263-4944

ИНФОРМАЦИЯ ОБ АВТОРАХ

Джегараджан Пиллай – факультет стоматологии, Университет AIMST, Кедах, Малайзия; https://orcid.org/0009-0000-7431-545X

Сиддхартан Сельварадж – кафедра стоматологических исследований, Университет Д.Й. Патила, Пуне, Индия; https://orcid.org/0000-0002-7776-3335

Вини Мехта – кафедра стоматологических исследований, Университет Д.Й. Патила, Пуне, Индия; https://orcid.org/0000-0003-4174-907X

Элейн Ю И Ленг – факультет стоматологии, Университет AIMST, Кедах, Малайзия. https://orcid.org/0009-0002-5969-4409

Элин Тинг – факультет стоматологии, Университет AIMST, Кедах, Малайзия; https://orcid.org/0009-0001-9444-415X

Эванжелина Лау Джиа Шин – факультет стоматологии, Университет AIMST, Кедах, Малайзия; https://orcid.org/0009-0009-9655-0552

Го И Вей – факультет стоматологии, Университет AIMST, Кедах, Малайзия; https://orcid.org/0009-0008-8422-3143

Абдельмалек Калефх Табндж – кафедра кариесологии, Институт стоматологии, Академия Сальгренска, Гетеборгский университет, Гетеборг, Швеция; кафедра прикладных стоматологических наук, Колледж прикладных медицинских наук, Иорданский университет науки и технологий, Ирбид, Иордания; https://orcid.org/0000-0001-8263-4944

AUTHOR'S CONTRIBUTION

Jegarajan Pillay – a substantial contribution to the concept or design of the article; drafted the article or revised it critically for important intellectual content

Siddharthan Selvaraj – a substantial contribution to the concept or design of the article; drafted the article or revised it critically for important intellectual content

Vini Mehta – a substantial contribution to the concept or design of the article; the acquisition, analysis, or interpretation of data for the article

Elaine You Ee Leng – drafted the article or revised it critically for important intellectual content; approved the version to be published.

Elin Ting – the acquisition, analysis, or interpretation of data for the article; approved the version to be published

Evangeline Lau Jia Shin – drafted the article or revised it critically for important intellectual content; approved the version to be published.

Goh Ee Wei – a substantial contribution to the concept or design of the article; drafted the article or revised it critically for important intellectual content

Abedelmalek Kalefh Tabnjh – drafted the article or revised it critically for important intellectual content; approved the version to be published.

ВКЛАД АВТОРОВ

Д. Пиллай – значительный вклад в разработку концепции или дизайна статьи; написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания.

С. Сельварадж – значительный вклад в разработку концепции или дизайна статьи; написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания.

В. Мехта – значительный вклад в разработку концепции или дизайна статьи; сбор, анализ или интерпретация данных для статьи.

Э.Ю.И. Ленг – написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания; утверждение версии для публикации.

Э. Тинг – сбор, анализ или интерпретация данных для статьи; утверждение версии для публикации.

Э.Л.Д. Шин – написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания; утверждение версии для публикации.

Г.И. Вей – значительный вклад в разработку концепции или дизайна статьи; написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания.

А.К. Табндж – написание статьи или ее критический пересмотр с учетом важного интеллектуального содержания; утверждение версии для публикации.