

Evaluation of Oral Health Literacy Level and Oral Health-Related Quality of Life in Patients Admitted to a University Hospital

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Abstract

Objective

Oral health literacy (OHL) plays a crucial role in improving individuals' quality of life by promoting preventive oral and dental health behaviors and raising awareness. This study aimed to investigate the association between OHL levels and oral health-related quality of life (OHRQoL) among adults attending a university hospital.

Material and Method

A total of 423 participants and their relatives aged 18 and over, who attended Eskişehir Osmangazi University Health Practice and Research Hospital between May- July 2024, were included in this cross-sectional investigation. Data were collected using a questionnaire form that included questions about participants' sociodemographic characteristics, oral and dental health behaviors, the Health Literacy Dental Scale-Short Form (HeLD-14), and the Oral Health Impact Profile (OHIP-14). Statistical analyses were performed using descriptive statistics, the Mann-Whitney U test, the Kruskal-Wallis test, Spearman's correlation, and multivariate linear regression analysis, with a significance threshold set at $p < 0.05$.

Results

The mean scores for HeLD-14 and OHIP-14 among the participants were 43.59 ± 11.45 and 11.30 ± 9.8 , respectively. Multivariate linear regression analysis revealed that living in the urban center, having health insurance, reporting good oral health status, and engaging in regular tooth brushing at least once daily and using dental floss were significantly associated with higher OHL levels. A weak negative correlation was observed between HeLD-14 and OHIP-14 scores, indicating that better OHL was associated with an improved OHRQoL.

Conclusion

The study determined that the participants' OHL levels were moderate. Higher OHL levels are associated with more positive health behaviors and better OHRQoL. To improve OHL in the community, it is recommended to raise awareness about oral and dental health through primary healthcare facilities and social media, and to disseminate educational programs using brochures, videos, infographics, and other educational materials.

Keywords: Oral health literacy, Oral health, Quality of life, Oral health behaviors, Cross-sectional.

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Introduction

The World Health Organization (WHO) defines health not merely as the absence of disease or infirmity, but as a state of complete physical, mental, and social well-being. (1) Oral and dental health, a fundamental component of overall health, constitutes a critical factor directly influencing individuals' general health and quality of life. Preventable oral pathologies, including dental caries, periodontal diseases, and tooth loss, are still among the most prevalent health issues worldwide. (2). The main reasons for this situation include socioeconomic disparities, insufficient knowledge regarding oral health, limited access to dental care services, and inadequate health literacy (3).

Health literacy refers to individuals' ability to access, understand, evaluate, and effectively use health information and healthcare services to maintain and improve their health (4). Oral health literacy (OHL), a fundamental subcomponent of health literacy, is defined as individuals' ability to access, process, and effectively utilize the necessary information and services to make correct decisions regarding their oral and dental health (5). Factors such as educational attainment, socioeconomic status, language skills, cultural and environmental characteristics, and access to healthcare services are key determinants that significantly influence individuals' OHL levels. (6). Low oral health literacy (OHL) has been linked to a higher susceptibility to preventable oral conditions such as periodontal disease, dental caries, and oral cancers. These conditions are further associated with negative quality-of-life outcomes, including nutritional deficiencies, social isolation, and reduced self-esteem (7,8).

Oral health-related quality of life (OHRQoL), an integral component of overall quality of life, is a multidimensional concept that reflects individuals' satisfaction with their oral health during essential daily activities such as nutrition, communication, sleep, and social interaction (9). Studies reported that individuals with higher levels of OHL demonstrate greater adoption of preventive health behaviors, experience fewer oral health problems, and consequently enjoy better OHRQoL (10,11). Assessing the impact of individuals' OHL levels on both general and oral health-related quality of life is of significant importance. However, there is a critical lack of local studies and comprehensive data in Turkey on how OHL levels affect these outcomes. (12,13). In addition, there are no studies in Türkiye that evaluate both OHL and OHRQoL together in patients and their relatives.

This study aimed to determine the OHL levels of

patients and their relatives aged 18 years and older who attended a university hospital, to examine associated factors, and to evaluate their OHRQoL.

Material and Method

This cross-sectional study was conducted on patients and their relatives aged 18 and older attending an Eskişehir Osmangazi University (ESOGU) Health Practice and Research Hospital between May 5 and July 28, 2024.

The minimum number of patients and their relatives to be reached in this study was calculated as 384 people using Epi Info™ version 7.2.6.0 (frequency of adequate oral health literacy level 50%, margin of error 5%, and confidence interval 95%). Although the study was not conducted in a dental hospital, OHL and OHRQoL are integral components of general health and are therefore relevant to a broad spectrum of the population. Including both patients and their relatives in a general university hospital setting ensured a heterogeneous and valuable sample, enabling the evaluation of these constructs from a comprehensive public health perspective.

During the data collection period, patients and their relatives who applied to the hospital were interviewed in the waiting rooms of the outpatient clinics and informed about the study's objectives and procedures. A total of 423 people who agreed to participate in the study constituted the study group. The pre-prepared questionnaire forms were filled in by the patients and their relatives under observation; this process took approximately 10-15 minutes.

In this study, data were collected using a questionnaire that was developed based on a comprehensive review of the literature (12-14). The questionnaire included questions regarding participants' sociodemographic characteristics (age, gender, educational and employment status, and the presence of chronic diseases), some variables potentially associated with oral and dental health literacy (nutritional habits, self-reported oral health status, oral and dental care routines, and the presence of oral and dental complaints), the Health Literacy in Dental Scale–Short Form (HeLD-14) and the questions from the Oral Health Impact Profile-Short Form (OHIP-14).

In our study, participants' OHL levels were assessed using the HeLD-14 scale. The original scale was developed by Jones et al. in 2013 and consisted of 29 items rated on a five-point Likert-type scale (15). In 2014, Jones et al. developed a short form of the scale

consisting of 14 questions (16). The Turkish version of the scale, including its validity and reliability analyses, was adapted by Aydin et al. in 2023 (12). HeLD-14 consists of 14 items, each scored on a five-point Likert scale: "0" (unable to do), "1" (very difficult), "2" (with some difficulty), "3" (with little difficulty), and "4" (without any difficulty) points. Total scale score ranges from 0 to 56; as the scores increase, the level of oral health literacy increases.

Patients' and their relatives' OHRQoL was assessed using the OHIP-14 scale. The original scale was developed by Slade et al. in 1994 and consisted of 49 items rated on a five-point Likert scale. The 49-item version of the scale was revised into a 14-item short form by the same researchers in 1997 (17, 18). The Turkish version of the scale, including its validity and reliability analyses, was adapted by Mumcu et al. in 2006 (19). OHIP-14 consists of 14 items with a five-point Likert-type scale, where the responses are scored as "0" (never), "1" (hardly ever), "2" (occasionally), "3" (fairly often), and "4" (very often). The scale total score ranges from 0 to 56; as the scores increase, OHRQoL decreases.

In this study, participants who reported daily consumption of one or more cigarettes were classified as "smokers". Those who consumed five or more sugar cubes (or five teaspoons of granulated sugar) daily were categorized as "yes". Participants' oral health status was categorized by self-perceptions into three groups: "good", "fair", and "poor". In this study, individuals engaged in any form of income-generating employment were classified as "working". Additionally, family income status was assessed based on self-perceptions and categorized as "good", "moderate", and "poor".

The data obtained were analyzed using IBM SPSS Statistics (version 24). Descriptive statistics, including

frequency, percentage, mean, and standard deviation values, were used for analyses. The Kolmogorov-Smirnov test was used to assess the normality of measurable data. As the data did not follow a normal distribution, non-parametric tests (Mann-Whitney U and Kruskal-Wallis) and Spearman's rho for correlation analysis were employed. Multivariate Linear Regression Analysis was also performed. A p-value of ≤ 0.05 was considered statistically significant. The internal consistency of the scales was assessed using Cronbach's alpha. HeLD-14 and OHIP-14 were evaluated separately.

Reliability Analysis

The internal consistency of the scales was evaluated using Cronbach's alpha. HeLD-14 demonstrated a Cronbach's alpha coefficient of 0.89, indicating high reliability. Similarly, OHIP-14 yielded a Cronbach's alpha coefficient of 0.91, confirming strong internal consistency. Item-total correlation analysis revealed that one item in each scale (HeLD-14 item 6 and OHIP-14 item 5) showed relatively low correlations with the total score. However, exclusion of these items resulted in only marginal increases in the alpha values (from 0.89 to 0.91 for HeLD-14, and from 0.91 to 0.93 for OHIP-14). Therefore, both scales were retained in their original form for subsequent analyses.

Results

Among the study group, 237 (56.0%) were female and 186 (44.0%) were male. Participants' ages ranged from 18 to 75 years (mean age=41.49±15.18; median 41.0). The study population's HeLD-14 scores spanned 0-56, with a mean of 43.59±11.45 (median 46.0). Table 1 presents the distribution of HeLD-14 scores according to some sociodemographic characteristics in the study group.

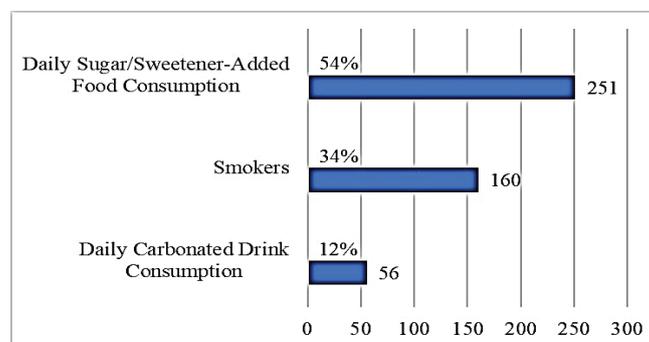


Figure 1

The distribution of oral health-related risky behaviors in the study group.
*Numbers are calculated based on the answers given, not on individuals.

Among the patients and their relatives, 56 individuals (12%) reported daily consumption of carbonated or acidic beverages, 251 individuals (54%) consumed sugar- or sweetener-added foods daily basis, and 160 individuals (34%) were smokers. Figure 1 presents the distribution of oral health-related risky behaviors in the study group.

Participants' OHIP-14 scale scores varied from 0 to 54, with an average score of 11.30 ± 9.8 (median: 9.0). Analysis revealed a weak negative correlation between scores on the HeLD-14 and OHIP-14 scales among

patients and their relatives ($r = -0.263$; $p = 0.001$). Figure 2 presents a scatterplot of the HeLD-14 and OHIP-14 scale scores for the study group.

The findings indicated that participants who defined their dental health status as "good", who reported no dental caries, who maintained toothbrushing at least once daily, who used dental floss, and who attended regular dental check-ups demonstrated higher levels of OHL. Table 2 presents the distribution of HeLD-14 scale scores according to some oral health-related behaviors in the study group.

Table 1

The distribution of HeLD-14 scale scores according to some sociodemographic characteristics in the study group

Sociodemographic Characteristics	n (%)	HeLD-14 Scale Score Median (min-max values)	Test Statistic (z/KW)*; p value
Gender			
Female	237 (56.0)	47.0 (0.0-56.0)	2.044; 0.041
Male	186 (44.0)	44.5 (0.0-56.0)	
Age Group			
≤ 40	210 (49.6)	48.0 (0.0-56.0)	2.598; 0.009
>41	213 (50.4)	45.0 (1.0-56.0)	
Education Status			
High school and below	182 (43.0)	43.5 (0.0-56.0)	4.808; < 0.001
University	241 (57.0)	48.0 (1.0-56.0)	
Employment Status			
Yes	182 (43.0)	48.0 (0.0-56.0)	2.159; 0.031
No	241 (57.0)	46.0 (1.0-56.0)	
Family Income Status			
Poor	138 (32.6)	46.0 (1.0-56.0)	2.870; 0.238
Moderate	83 (19.6)	46.0 (11.0-56.0)	
Good	202 (47.8)	47.0 (0.0-56.0)	
Place of Residence			
Province	301 (71.2)	48.0 (0.0-56.0)	24.016; < 0.001
District	90 (21.3)	44.5 (0.0-56.0)	
Village	32 (7.6)	38.5 (4.0-55.0)	
Presence of Health Insurance			
Yes	379 (89.6)	47.0 (0.0-56.0)	2.094; 0.036
No	44 (10.4)	42.5 (0.0-56.0)	
Total	423 (100.0)	(0.0-56.0)	-

(z/KW)*: z=Mann-Whitney U test statistic; KW=Kruskal-Wallis test statistic

Table 2

The distribution of HeLD-14 scale scores according to some oral health-related behaviors in the study group.

Some Oral Health-Related Behaviors	n (%)	HeLD-14 Scale Score Median (min-max values)	Test Statistic (z/KW)*; p-value
Oral Health Status			
Poor	67 (15.8)	37.0 (0.0-56.0)	49.390;< 0.001
Moderate	167 (39.5)	45.0 (0.0-56.0)	
Good	189 (44.7)	49.0 (15.0-56.0)	
Presence of Carious Tooth			
Yes	203 (48.0)	45.0 (0.0-56.0)	3.265;< 0.001
No	220 (52.0)	48.0 (0.0-56.0)	
Frequency of Tooth Brushing			
Never	29 (6.9)	39.0 (0.0-56.0)	28.332;< 0.001
At least once a week	78 (18.4)	41.0 (0.0-56.0)	
At least once a day	316 (74.7)	48.0 (1.0-56.0)	
Dental Floss Use Status			
No	301 (71.2)	45.0 (0.0-56.0)	5.092;< 0.001
Yes	122 (28.8)	50.0 (4.0-56.0)	
Dentist Examination Status			
Never	33 (7.8)	40.0 (0.0-56.0)	7.514; 0.023
When there is a complaint	283 (66.9)	46.0 (0.0-56.0)	
Regularly	107 (25.3)	48.0 (1.0-56.0)	
Total	423 (100.0)	(0.0-56.0)	-

(z/KW)*: z=Mann-Whitney U test statistic; KW=Kruskal-Wallis test statistic

Table 3

Multivariate Linear Regression Analysis (Enter Method) of variables associated with OHL level in the study group

Variables	HeLD-14 Scale Score				
	Unstandardized β	SE	p	Standardized β	95% CI
Gender	0.015	0.018	0.413	0.039	-0,020; 0.049
Age	0.017	0.018	0.354	0.046	-0.019; 0.052
Education Status	0.025	0.019	0.182	0.067	-0.012; 0.061
Active Employment Status	0.004	0.019	0.848	0.010	-0.034; 0.041
Place of Residence	0.036	0.014	0.013	0.120	0.007; 0.064
Presence of Health Insurance	0.069	0.029	0.016	0.114	0.011; 0.127
Oral Health Status	0.049	0.014	<0.001	0.192	0.021; 0.076
Presence of Caries in Teeth	0.056	0.018	0.059	0.152	0.021; 0.091
Frequency of Tooth Brushing	0.041	0.016	0.010	0.131	0.010; 0.072
Use of Dental Floss	0.039	0.019	0.042	0.096	0.001; 0.076
Dentist Examination Status	0.001	0.016	0.928	0.004	-0.029; 0.032
R²	0.184				0.001
F	7.651				

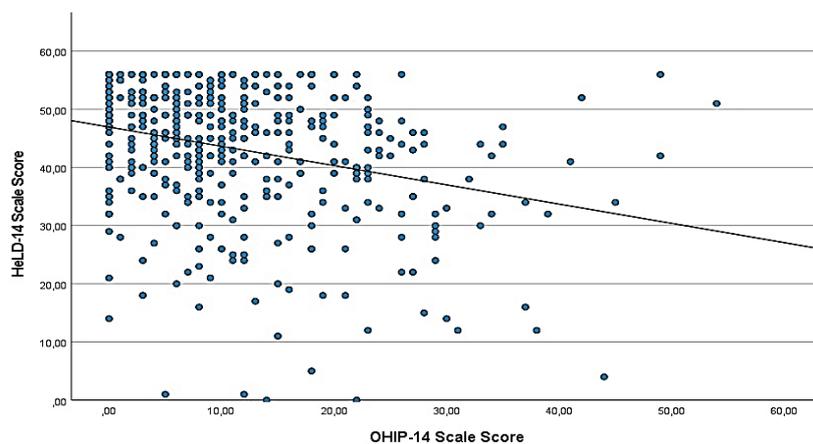


Figure 2

The scatterplot shows the correlation between HeLD-14 and OHIP-14 scores for the study group.

Table 3 presents the results of the multivariate linear regression analysis performed with variables found to be associated with OHL level in the analyses (gender, age, educational and employment status, place of residence, presence of health insurance, self-rated oral health status, presence of dental caries, tooth-brushing frequency, dental floss usage, and frequency of dental visit).

Discussion

A critical determinant of general health and quality of life, oral health is a multidimensional concept that includes not only the presence of teeth but also the absence of pain and infection, as well as the functionality and social well-being of an individual. In this context, WHO has emphasized the need to integrate targets related to the prevention of oral and dental diseases and the enhancement of OHRQoL into its global objectives established for the prevention of non-communicable diseases (2). OHRQoL is an important health indicator that evaluates the physical, psychological, and social impacts of individuals' oral and dental health on their daily lives. Improving individuals' OHL levels is essential for the adoption of preventive and protective oral health behaviors and for enhancing OHRQoL (20).

Findings from this study indicate that the OHL level of participants was moderate. However, some studies have reported low OHL levels among participants (7,8). Educational and socioeconomic conditions, cultural and linguistic characteristics, and access to healthcare services are primary factors influencing health literacy. Differences in these factors across populations lead to variations in both general health and OHL levels.

With advancing age, older adults experience a decline in cognitive functions and face limitations in understanding and utilizing digital resources, which can reduce their ability to access, interpret, and apply current health information (3). This decline can lead to a reduction in health literacy levels concerning both general and oral health (21). In the present study, OHL was found to be higher among participants aged 40 and below. However, this difference was not observed following further analysis. Murakami et al reported that participants under 45 years of age had higher OHL levels (22). In a study conducted by McCarlie et al. among patients attending a university dental hospital in America, it was also found that OHL levels decreased with advancing age (23). Some studies have reported no significant association between age and OHL (24,25). The differences reported in these findings may be due to variations in the sociodemographic characteristics of societies, such as education level and access to health services, as well as differences in cultural norms.

Gender is one of the key sociodemographic variables associated with OHL. It is well known that hormonal changes during menstruation, pregnancy, and menopause in women can lead to a higher prevalence of certain oral diseases, such as gingivitis, periodontitis, and xerostomia (26). This situation may enhance women's awareness and preventive behaviors regarding oral health, potentially increasing their OHL levels. Furthermore, factors such as women's generally greater sensitivity towards health issues and the higher priority of aesthetic concerns may also contribute to the expectation of higher OHL levels in women (27). Our study found that the level of OHL was higher in women than in men. Further analysis showed

that this difference disappeared. Studies conducted in India and Iran have also reported that women have higher OHL levels than men (11,27). In various studies, no significant difference in OHL between men and women has been reported (20,28). In contrast, the study by Lee et al. reported that men have higher OHL levels (29). The discrepancies in findings across various studies may be attributed to factors such as differences in the measurement tools employed, the sociocultural characteristics of the participants, and variations in access to healthcare services.

Place of residence is a determining factor affecting individuals' health behaviors, access to services, and health literacy levels. In rural areas, healthcare provision is often more limited compared to urban regions. Restricted access to healthcare services due to geographical conditions, inadequate oral health education, and constrained access to digital health resources are among the reasons reported for lower OHL levels among rural residents (30). The results of this study indicated that individuals living in the urban center had higher levels of OHL. Various studies have also reported that OHL levels are lower among rural residents (31,32).

The presence of health insurance increases individuals' health literacy levels by facilitating their access to and use of healthcare services and enabling them to obtain accurate health information from healthcare institutions (33). In our study, it was found that those with health insurance had higher levels of OHL compared to those without insurance. Studies conducted in Sweden and the United States have also reported that participants with health insurance or coverage had higher OHL (33,34).

In this study, participants with "good" oral health were found to have higher levels of OHL. Similar results have been reported in studies conducted in China by An et al. and Iran by Naghibi-Sistani et al. (35,36). Individuals with higher levels of OHL are more likely to demonstrate positive health behaviors such as regular toothbrushing, flossing, attending regular dental check-ups, adherence to recommended interventions or treatments, and maintaining a healthy diet, which consequently is expected to result in "better" oral health outcomes.

Tooth brushing and flossing are effective methods for preventing plaque formation and dental caries; it has been reported that such oral and dental care practices are more common among individuals with higher levels of OHL (37). In our study, it was found that participants who brushed their teeth at least once daily and used

dental floss exhibited higher levels of OHL (for both, $p < 0.05$). The study by Joshi et al. also reported that individuals with a regular daily toothbrushing habit exhibited higher levels of OHL (38). Similarly, Yan et al., in their research conducted in China, found that individuals who regularly used dental floss had higher levels of OHL (39).

OHL is a concept that refers to individuals' capacity to access, understand, evaluate, and utilize information related to oral health in their daily lives. As OHL increases, individuals are more likely to adopt positive oral health behaviors such as preventive oral and dental care habits, regular dental check-ups, and adherence to recommended treatments, while harmful habits, including tobacco use or excessive sugar consumption, may decrease. Consequently, OHRQoL is expected to improve. In this study, it was observed that as the level of OHL increased, OHRQoL also improved. Various studies have also reported that as OHL increases, individuals' OHRQoL improves accordingly (7,20,29).

Limitations

Due to its cross-sectional nature, this study can not determine a cause-and-effect relationship between OHL and OHRQoL. Furthermore, as the study was conducted with patients and their relatives who presented to a single university hospital, the generalizability of the findings to other populations or regions may be limited. As the data were collected through self-report, the possibility of social desirability and recall bias cannot be ruled out.

Conclusion and Recommendations

In our study, the participants' level of OHL can be described as moderate. Higher levels of OHL were observed among individuals residing in the urban center, those with health insurance, those with good oral health status, those who regularly brushed their teeth at least once daily, and those with a habit of using dental floss. Additionally, as OHL increased, OHRQoL also improved. In our study, individuals with higher levels of OHL were found to exhibit more favorable oral health behaviors and to report better OHRQoL. These findings suggest that interventions aimed at improving OHL in the community may not only enhance oral and dental health but also contribute to strengthening general health perceptions and overall quality of life. However, being a single-center, cross-sectional study based on self-reported data, the results should be interpreted with caution, as generalizability is limited and potential biases such as social desirability and recall cannot be entirely excluded.

Based on the findings of this study, we propose the following recommendations:

Implement targeted oral health literacy interventions. Practical oral care training and education on preventive methods should be delivered by experienced healthcare professionals in public education centers, primary healthcare facilities, and dental hospitals, with a focus on younger individuals through school-based curricula and campus oral health clubs.

Address the needs of vulnerable populations. Mobile dental clinics and outreach education for rural and uninsured populations, along with age-friendly educational materials for older adults, can help overcome access barriers and improve OHL in at-risk groups.

Utilize modern communication channels. Informative videos, infographics, and consistent oral health messages should be disseminated through official social media accounts of health institutions and national television channels to enhance public awareness.

Advocate for policy-level changes. National oral health strategies should be expanded to include the monitoring of OHL indicators, and insurance coverage should be broadened to encourage regular dental visits, thereby supporting sustainable improvements.

Conduct further large-scale research. To fully understand the relationship between OHL and OHRQoL, future studies should include a wider range of age groups, geographic regions, and educational levels.

Conflict of Interest Statement

There is no financial conflict of interest with any organization, institution, or person related to our article and there is no conflict of interest between the authors.

Ethical Approval

Approval for the conduct of this study was obtained from the Eskişehir Osmangazi University (ESOGU) Non-Interventional Clinical Research Ethics Committee (dated May 2, 2024; approval no: E-25403353-050.99-2400082849), and the necessary written permissions were also obtained from the hospital's chief physician. The study was conducted in accordance with the principles set forth in the Declaration of Helsinki.

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Availability of Data and Materials

The data is available upon reasonable requests from the Corresponding Author.

Artificial Intelligence Statement

The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

Authors Contributions

OA: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Validation; Visualization; Writing-original draft., Writing-review & editing,

MFO: Conceptualization; Formal analysis; Investigation; Validation; Supervision,

AU: Conceptualization; Formal analysis; Investigation; Validation; Supervision,

OE: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Validation,

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