

## Oral health literacy status among adult population of Iran: A systematic review

### ABSTRACT

**Background and Objectives:** Oral health literacy (OHL) is an important issue that directly and indirectly affects a person's general health. Inadequate OHL increases poor health outcomes and higher health care costs. This systematic review aimed to explore existing evidence of OHL levels in the Iranian population using a systematic review method.

**Materials and Methods:** A systematic review was performed following the principles of PRISMA. The main databases including PubMed, SID, Magiran, and Google Scholar databases were searched with the keyword OHL and its Persian equivalents, without restrictions in publication time. Only descriptive studies that have reported any consequences of OHL in the adult Iranian population (18 years and above) were selected, and articles published in languages other than English and Persian and without access to the full text of the articles were excluded. Finally, the New Castle-Ottawa Quality Assessment scale was used to measure the quality of the studies.

**Results:** Of the 724 retrieved studies, 68 studies met the inclusion criteria and were reviewed. Nine of the included studies evaluated the state of OHL. Most studies reported gender and education level to be associated with higher OHL. The literature was inconclusive regarding the association between OHL and dental treatment outcomes and oral health perceptions. Meta-analysis was not performed due to the limited data obtained in this review.

**Conclusion:** Evidence shows that OHL in the Iranian population is limited, and warranted the need for high-quality and intervention research by using different standard tools. Also, this review highlights special attention to the sub-groups within the population in oral health education.

**Paper Type:** Systematic review

**Keywords:** Health Literacy, Oral health literacy, Systematic Review, Iran.

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## Introduction

Oral health literacy (OHL) is known as one of the important indicators of the 21st century in public health. The World Health Organization considers it necessary to pay attention to OHL by stating that poor oral hygiene and untreated oral diseases can have a profound effect on the quality of life (1).

It is called 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" (2). Several factors including professional dental care and appropriate personal care along with social measures such as drinking water fluoridation and dental health programs at the school level can play a role in improving oral health, among which one of the important factors is people's OHL which is influenced by the communication abilities of the dental team to improve the personal care of the individual and help in making decisions related to his health (3).

There are many reasons why preventable diseases such as oral problems are so common and why people often do not use methods that have been scientifically shown to be effective in maintaining oral health. These factors include lack of access to oral health care services, complex oral health care systems, lack of oral and dental health information (4), and limited OHL (5). Modern healthcare systems create complex processes for service recipients that make people face many challenges to seek healthcare and related information. As a result, people with limited OHL are not able to enjoy the benefits of available information (6).

Also, limited OHL increases the cases of oral diseases and it is followed by an increase

in costs, which indicates the importance of the issue. In general, people with limited OHL levels are usually at the highest risk of developing oral diseases and problems related to those diseases. Most of the poor, people with low education levels, minorities, and the elderly include people with limited OHL (7).

The promotion of OHL can help people in obtaining better oral health at the individual and social levels by facilitating access to oral health information, criticism of existing information, effective use of information, and informed decisions (8).

In this context, a review study was conducted by Ghafari et al. in 2020 in the field of comparing different OHL measurement tools (9) of the 21 tools examined, 9 tools were in the "weak" category, 19 tools in the "fair" category, 20 tools in the "good" category, and 4 tools in the "good" category in at least one dimension. Category "excellent" in at least one dimension; However, to our knowledge, the first systematic review identified quantitative and qualitative evidence on levels of OHL in Iranian populations.

Although considering the significant role of OHL in the field of oral health, researchers have begun to evaluate the level of OHL in different population groups in Iran (10-12), we did not identify any previous review of existing literature on OHL. The objective of this review is to systematically identify existing evidence of OHL levels in Iranian populations.

## Materials and Methods

### Eligibility criteria

Studies included published, peer-reviewed studies that fulfilled the following three

criteria: 1) a study Iranian population, 2) Cross-sectional study design 3) target sample 18 years and above, and 4) a clearly stated assessment of OHL. Studies published in languages other than English and Persian, as well as the inability to access the full text of the articles, were excluded.

### Information sources

The current study is a systematic review that researchers planned and implemented with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (13). To systematically identify existing literature on the research topic, studies were chosen from the following databases as information sources: PubMed, SID, Magiran, and Google Scholar.

### Search strategy

To access the eligible articles, databases without a time limit and with keywords "Oral Health Literacy" and "Iran" in both Persian and English languages in "title, abstract, keywords, subject or Medical Subject Headings (MeSH)" for articles were searched.

The search for this study was conducted in December 2021. A follow-up search was conducted in January 2022 to identify studies published between the initial search and the final draft. Systematic searches were performed in all included databases and downloaded identified studies ( $n = 724$ ). In the initial review, duplicate cases were removed ( $n = 21$ ).

### Study selection and data-collection process

To avoid any bias in the study, the search process, selection of articles, qualitative evaluation of articles, and data extraction were done by three researchers completely independently and any disagreement

between the researchers was reviewed by a fourth person. Ethical points have been observed in the publication of study results and the final article was compiled without any plagiarism. For the full process of study and collection, see Figure 1.

### Data items

Data extracted items included the following basic information: author/year, Aim of study, study population, age, gender, and sampling, setting, and OHL levels.

For risk of bias assessment to secure a high quality of included studies, The Newcastle-Ottawa Scale (NOS) was used (14) and this includes eight assessment items for quality appraisal including 'selection', 'comparability', and 'outcome'. According to the NOS score standard, cross-sectional studies could be classified as low-quality (scores of 0–4), moderate-quality (scores of 5–6), and high-quality (scores  $\geq 7$ ).

### Synthesis of results

Result synthesis was performed using Narrative synthesis in two parts: 1) Demographic determinants, and 2) OHL status and oral health status.

## Results

### Study selection

Of the 724 studies identified, nine were deemed to meet this systematic review's inclusion criteria after full-text screening and quality assessment. After excluding duplicates, 703 studies were screened by title and abstract. A full-text screening of 47 studies undertook. For elaboration on this process, see Figure I: PRISMA Flow Diagram.

### Risk of bias in Studies

A total of nine studies were categorized as 'Finally selected studies' by all authors after

quality assessment using NOS assessment tools. The quality of included studies ranged from moderate to high as illustrated in Table 1.

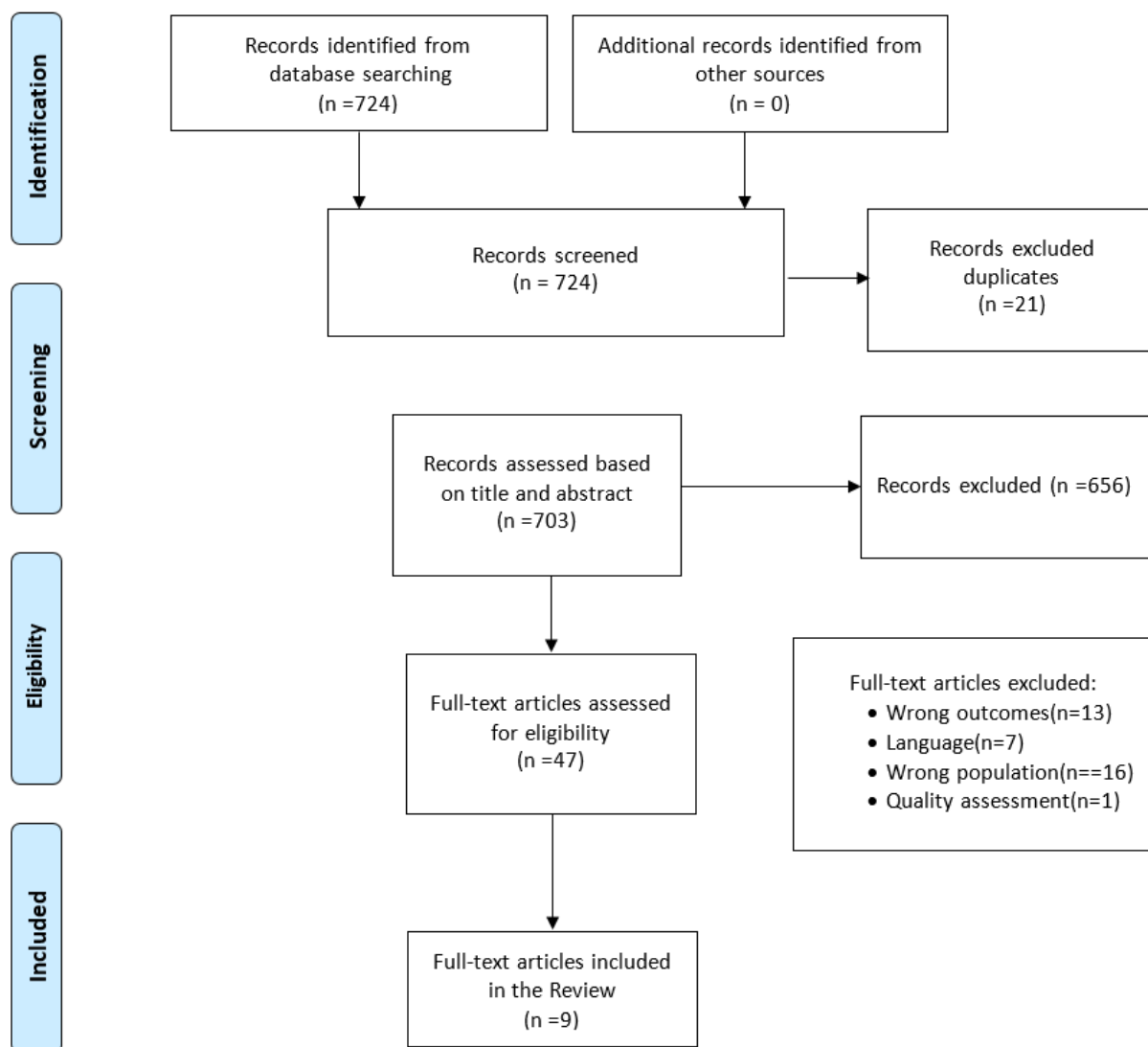


Figure 1. PRISMA flowchart for study

### Study description

Table 2 provides a summary of details of the quantitative research studies included in this review, characterized by author/year, Aim of study, study population, age, gender, sampling, setting, and OHL levels. Most studies were published from 2018 onwards, but the earliest identified publication is from 2013. Of the nine studies reviewed, three were conducted in Kerman (17, 19, 20), two

were conducted in Tehran (21, 23), and the other four in Sari, Birjand, Babol, Isfahan (15, 16, 18, 22). Sample sizes across studies ranged from 164 to 1031. The minimum age of samples was 18 years and the maximum was 67 years. The data from four studies had been collected from adult citizens, two studies from students, one study from dental clinic clients, one study from teachers, and one study from pregnant women.



Table 2. Data extracted from identified studies on oral health literacy in Iran

Author/Year	Aim of the Study	study population	Age	Gender	sampling	design	OHL levels
Zamanzadeh et al(15) 2021	Assess the level of OHL among the citizens of Sari City	855 adult citizens	18-55 years	Female/ Male	random sampling	Sari city in, February-July 2018	43% had sufficient OHL. The OHL of people with more education and less family size was higher.
Goldani Moghadam et al (16) 2021	Examine the association between OHL, missed appointments, and DMFT in adults attending the orthodontic clinic of Birjand.	172 adults attending the orthodontic clinic	18-42 years	Female/ Male	Simple random sampling	Birjand dental school orthodontic clinic in 2016	The OHL of the participants was $12\pm 3.2$ . There was no significant association between OHL and gender, missed appointments, and DMFT index ( $P > 0.05$ ), but education was an effective factor for the level of OHL ( $P < 0.002$ ).
Karimi Afshar et al (17) 2020	Evaluation of OHL and oral health behavior in pregnant women referring to health centers in the south of Kerman	164 pregnant women referring to health centers	22-34 years	Female	cluster random sampling	Health government institute in Jiroft & Roodbar, in 2018	11% had sufficient OHL. The OHL of people with higher education and income was higher.
Mirzapour et al (18) 2019	Evaluation of OHL and health behavior of primary school teachers in Babol	410 primary school teachers	22-67 years	Female/ Male	convenience sample	The primary school in Babol, by in April-August 2017	78.8% had sufficient OHL. The OHL of female teachers with more education was higher.
Gheibipour et al (19) 2019	Investigate the OHL among the nomadic population in Kouhrang City	200 nomadic adults	18-60 years	Female/ Male	cluster random sampling	nomadic population in Kouhrang City in 2018	7% had sufficient OHL. The OHL of educated and unmarried people was higher.
Mohammadi et al (20) 2018	Assessment of OHL level and its related factors among adult patients	264 visitors to Kerman dental clinic	29-45 years	Female/ Male	cluster random sampling	Kerman Dental School Clinic in 2018	62.5% had sufficient OHL. There is a significant relationship between OHL scores with gender, high education level and oral, and dental health behavior.
Yazdani et al (21) 2017	to assess the level of OHL of senior medical and pharmacy students	300 senior medical and pharmacy students	10-65 years	Female/ Male	convenience sample	Tehran University of Medical Sciences in 2015	55.9% of medical students and 40.7% of pharmacy students had sufficient OHL. Father's university degree and Being a medical student had a significant correlation with a higher level of OHL.
Saied Moalleni et al (22) 2016	Assessing OHL among adult citizens of Isfahan	758 adult citizens of Isfahan	21-41 years	Female/ Male	random sampling	Isfahan City in 2014	53% had sufficient OHL. The OHL score was higher among women, older adults, and people with more education.
Naghbi Sistani et al (23) 2013	assess OHL level and oral health information of Iranian adults in Tehran	1031 adult citizens	18-65 years	Female/ Male	random sampling	Tehran City in 2013	40% had sufficient OHL. Women's health literacy and people with more education were higher.

## Results of synthesis of results

### Demographic determinants:

The demographic factors examined in the nine identified studies are shown in Table 3.

Education level, gender, and age were commonly included factors. Eight of the identified studies investigated associations between OHL and gender. The results of four studies showed that OHL is higher in women,

but in four studies, there was no difference between men and women.

Only four out of six studies reported a significant relationship between age and OHL, and in two studies this relationship was inverse. Evidence shows that OHL is associated with socioeconomic factors including education level, employment, Household size, and marital status.

**Table3. Results synthesis Demographic factors of included identified studies (n = 9)**

author	Demographic factors	Findings
Zamanzadeh et al(15)	Gender, Age, Education employment Household size	OHL was higher among educated and employed people, as well as those with smaller households (P < 0.001).
Goldani Moghadam(16)	Gender, Education	Education was an effective factor for the level of OHL (P< 0.002).
Karimi Afshar (17)	Education, monthly income	A statistically significant correlation was seen between OHL and education level (p=0.009).
Mirzapour (18)	Gender, Age, Education, Job status	OHL was higher in female teachers and teachers with higher education (P <0.001). There was a significant negative correlation between OHL and the age of teachers (r = -0.19; p <0.001).
Gheibipour (19)	Gender, Age, Education marital status	There was a significant relationship between OHL with age (>30), marital status, and high level of education (P <0.001).
Mohammadi (20)	Gender, Age, Education Living area	There was a significant relationship between OHL with gender (P < 0.05), and high level of education (P < 0.002).
Yazdani(21)	Gender, Education	University degree of the father (P<0.001) and being a medical student (P=0.002) were significantly correlated with a higher level of OHL.
Saied Moallemi (22)	Gender, Age, Education	Women (p < 0.001), older adults (p < 0.05), and those with higher education scored higher for OHL (p < 0.001).
Naghibi Sistani (23)	Gender, Age, Education Living area	Women, younger and better educated participants (p<0.001) had higher OHL-AQ scores.

### OHL status and oral health status:

The results of the nine original research studies are illustrated in Table 2.

The highest mean oral score was among teachers ( $13.98 \pm 2.86$ ) and the lowest among the nomadic population ( $7.65 \pm 2.88$ ) and pregnant women ( $7.01 \pm 3.38$ ). In the five studies that reported oral subgroups, the highest score was related to the number comprehension part, and the lowest score was related to the listening part.

### Discussion

This systematic review aimed to explore existing evidence of OHL levels in the Iranian population. Two themes were synthesized: 1) Demographic determinants, and 2) OHL status and oral health status. The majority of the studies included in the review indicate that the Iranian population does have not an adequate OHL level.

Factors social-economic associated with limited OHL were lower formal educational

level, unmarried, more household size, and Unemployed.

In most of the studies, higher education led to higher OHL (7). It seems that a higher level of education leads to more use of available educational tools, and as a result, promotes the level of OHL. People with higher education may have received oral health information during their school time. On the other hand, these people have a better chance to benefit from educational and counseling programs. In addition, they have a better understanding of the training and the teachings influence them more effectively.

In most of the studies, with increasing age, the level of OHL increases. Except in two studies (18, 23), this relationship was reversed and it could be because younger people have access to more information sources (18).

The reported data on gender were inconsistent. The OHL level among women was slightly higher as compared to men in half studies which were assessed gender (18, 20, 22, 23) which is comparable to the studies done in India (25). This is in contrast to four studies (15, 16, 19, 21) and studies done in Pakistan and USA (26, 8), which hadn't a significant difference between the men's and women's OHL levels. The probable reason for this might be that the women were more aware of their oral health compared to that of men. Also, this can be related to their level of access to and use of information resources and educational tools.

The average score of OHL among pregnant women in our study was lower than other target groups (17), which may be due to the

different socioeconomic characteristics of the participants. A similar result was reported among a group of Sudan pregnant women attending the Omdurman maternity hospital (27).

This finding is important due to its possible effect on a child's oral health status, as several studies have indicated the association between parents' OHL and their child's dental health status (28-30).

In this review, we also found no good tool for investigating the status level of OHL. All the studies used the OHL-AQ. Although the current OHL assessment tool may apply to some extent in a clinical setting, it cannot capture all dimensions of OHL such as oral health knowledge and understanding, cultural and conceptual knowledge, critical thinking skills, etc. to depict in the Persian version. Therefore, more studies using better tools are needed (23).

Also, a significant relationship was observed between hygiene behavior and OHL. People who have a lower OHL level have poor oral and dental hygiene and brush their teeth less often, and OHL has an effective role in the oral and dental health outcomes of each individual (10). Similar results were obtained in a study in Tehrani and Brazilian (31, 32). The subjects with limited OHL levels had a high mean decayed, missing, filled (DMFT) score (16, 17), which can even lead to tooth loss as the essential markers of tooth loss are dental caries and periodontal disease (33).

This negative correlation between OHL and DMFT scores has also been observed in studies conducted in Virajpet (34) and USA

(8). Similar findings have been reported in studies conducted with populations from Japan (35), and Belarus (36).

This could be due to the reason that individuals with limited OHL are more prone to delayed diagnosis of any dental condition and as a result, their conditions get worsen.

Thus the study discusses an association between OHL and oral health status as well as the socioeconomic status of an individual. OHL is as an efficient role in influencing the oral health outcome of any individual. In particular, studies have shown that limited OHL is associated with poorer oral health outcomes (35, 37). In addition to health determinants, OHL can be an intermediate factor that impacts oral health outcomes, oral health behaviors, and the use of dental services.

**Strengths and limitations:** The strength of the present systematic review is that it offers a breadth an overview of current evidence on the topic of OHL in the Iranian population. Studies using the NOS assessment tool were included in the review with quality assurance, thereby ensuring the quality of the included studies and minimizing the risk of bias in the included studies.

In addition, a comprehensive search strategy was used that included a wide range of databases. Blind and independent evaluation of all literature ensured the objectivity and transparency of the review process. However, our review study cannot provide the necessary evidence about OHL and the outcome of oral and dental health, because all selected studies are cross-sectional epidemiologic, and more

prospective studies with advanced methodology are recommended.

It should be noted that this review has some potential limitations. Due Limiting of the date the search may have missed out few publications in this review. We acknowledge that the scoping review methodology that we used, does not systematically conduct quality assessment and critical appraisal of the research studies.

The considerable variation in present oral health-literacy results among identified studies limits valid comparisons between studies' results. Hence, we were not able to conduct a meta-analysis and compare the quantitative results statistically. In addition, included studies were conducted in different cities with different cultures, and social structures.

Settings thus varied significantly, and this should be considered when interpreting the results of this review. We included English-written papers only in the review, which limited the possibility of including relevant articles written in other languages.

Future evaluations are needed to determine how OHL interventions can produce sustainable oral health-related behavioral changes among populations with limited OHL in diverse sociocultural contexts. Improving limited OHL through oral health care providers can empower individuals and communities to make informed and appropriate decisions to promote oral health that can have positive outcomes for oral health and, as a result, reduce and empower oral health inequalities.

## Conclusion

We found that limited OHL is quite common among the Iranian population and is most likely to be present in those with lower levels of educational attainment. The results demonstrate that important sub-groups within the population may be at greater risk of having fewer OHL skills and resources than others. Further studies are needed to assess effective factors on OHL. A broader understanding of these relationships will facilitate the development of targeted interventions to improve OHL, quality of dental care, and outcomes in the Iranian population.

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**Availability of data and materials:** The data sets used and/or analyzed during the current study was available from the corresponding author on reasonable request.

**Conflict of interest:** The authors declare that there is no conflict of interest

**Consent for Publication:** Not applicable

**Ethical considerations:** All procedures comply with the principles of the Declaration of Helsinki. Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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manuscript. All authors read the final draft of the manuscript and confirmed it.

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