



Health Literacy and Knowledge of Oral Cancer: A Systematic Review and Meta-Analysis in the Iranian Population

Fahimeh Feili¹, Mohamadali Roozegar^{1*}

Abstract

Background: Health literacy, particularly disease-specific knowledge, is vital for early detection, timely treatment, and effective management of chronic illnesses. Oral cancer (OC), a significant public health concern, is influenced by risk factors such as tobacco use, alcohol consumption, and poor oral hygiene. Despite advancements in treatment, inadequate awareness hinders early diagnosis and effective intervention. This study systematically reviews the knowledge levels of Iranian adults regarding OC to identify gaps and recommend targeted educational strategies. **Methods:** A systematic review and meta-analysis were conducted to evaluate OC knowledge levels among Iranian adults. Relevant studies published between 2010 and 2024 were identified using comprehensive search strategies in scientific databases. Inclusion criteria encompassed original research articles with specific outcomes on OC knowledge. Data extraction included demographics, sample size, knowledge categories (poor, moderate, good), and assessment tools. Statistical heterogeneity was analyzed using the I^2 statistic, and pooled prevalence estimates were calculated using Comprehensive Meta-

Analysis (CMA) software. **Results:** Five studies, encompassing 130 to 1,277 participants, were included. The meta-analysis revealed that 24.6% of participants exhibited poor knowledge [CI=10.9–46.4], 12.4% average knowledge [CI=12.1–12.6], and 4.4% good knowledge [CI=0.5–28.6]. Studies varied in their assessment tools and findings. For example, Amanpour et al. (2018) reported that 65% of participants recognized OC symptoms, while 57.2% identified risk factors. Azimi et al. (2019) found that 74.6% of participants had low knowledge of risk factors. Razavi et al. (2024) indicated that 50% demonstrated moderate knowledge, the highest among the studies reviewed. The heterogeneity highlights regional and methodological disparities in knowledge assessment. **Conclusion:** The findings underscore significant deficiencies in OC knowledge among Iranian adults, particularly regarding risk factors and symptoms. Socioeconomic and educational factors, along with inadequate public health initiatives, contribute to these gaps. Addressing these disparities through culturally tailored educational programs and enhanced health literacy resources is crucial for improving early diagnosis and outcomes. Future research should focus on the design and implementation of targeted interventions to bridge knowledge gaps and reduce the burden of OC in Iran.

Keywords: Oral cancer, Health literacy, Knowledge assessment, Risk factors, Iranian population

Significance | This study underscores insufficient oral cancer knowledge in Iran, highlighting the need for tailored educational interventions to enhance health literacy.

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1. Introduction

Health literacy, the ability to obtain, process, and comprehend basic

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cornerstone of public health, the World Health Organization underscores health literacy's importance in fostering healthier populations and minimizing healthcare disparities (Montazeri et al., 2014; Haghdoost et al., 2015). Limited health literacy is associated with poor health outcomes, particularly for chronic conditions, due to difficulties in interpreting health-related materials, following medical advice, and engaging in preventive measures (Khajouei & Salehi, 2017; Tavakoly Sany et al., 2021).

A vital aspect of health literacy is disease-specific knowledge, which is essential for early detection, timely treatment, and effective management. Deficiencies in this knowledge can delay diagnoses, heighten complications, and exacerbate disease-related morbidity and mortality (Cormier et al., 2020; Silva & Santos, 2021). Cancer remains a leading global health burden, with oral cancer (OC) posing unique challenges due to its invasive treatments, debilitating complications, and impact on patients' quality of life (Zhang et al., 2023; Ryman et al., 2024). Although advancements in medical interventions have improved OC outcomes, early detection and public awareness remain pivotal for reducing the disease's prevalence and impact (Shrestha et al., 2020; González-Ruiz et al., 2023).

OC encompasses malignancies of various oral structures, including the lips, tongue, gums, and salivary glands. Key risk factors include tobacco use, alcohol consumption, poor oral hygiene, and human papillomavirus (HPV) infection (Chou et al., 2023). Despite progress in surgery, radiotherapy, and chemotherapy, the prognosis of OC is intricately tied to early diagnosis and patient adherence to treatment protocols (Umaphy et al., 2023; Hartner, 2018). Public knowledge about OC's risk factors, symptoms, and preventive measures is notably insufficient, creating barriers to early detection and intervention (Kamal et al., 2024; Saglam & Dag, 2024).

In Iran, the incidence of OC is steadily rising, necessitating a comprehensive understanding of the population's knowledge about the disease. Existing evidence suggests that inadequate awareness about OC may contribute to delayed diagnosis and suboptimal outcomes (Montazeri et al., 2014). This calls for systematic efforts to evaluate and address knowledge gaps within the population. The present study aims to systematically review the knowledge levels of Iranian adults about OC, as captured in peer-reviewed studies from 2010 to 2024. By synthesizing these findings, the study seeks to highlight the prevalence of poor knowledge and advocate for targeted educational interventions to enhance health literacy and reduce the burden of OC in Iran.

2. Materials and Methods

This study utilized a systematic review and meta-analysis to evaluate the knowledge status of individuals in Iran regarding oral cancer (OC). Eligible studies were identified and analyzed according to the following inclusion criteria are Articles reporting

results related specifically to knowledge about OC, Original research articles and Availability of full-text articles. Studies that focused on knowledge of other types of cancer or oral diseases unrelated to OC were excluded. The search strategy was conducted independently by two members of the research team to ensure comprehensiveness and accuracy. Multiple scientific databases were searched using the keywords cancer, oral cancer, knowledge, Iran, patient, and health literacy in various combinations.

Following the identification of relevant articles, duplicates were removed, and abstracts were screened. Full-text reviews were then performed for studies meeting the inclusion criteria. Each article's quality was assessed using standardized criteria to ensure the reliability and validity of the extracted data.

The extracted data included publication year, sample size, participant demographics, data collection tools, and reported knowledge levels categorized as poor, moderate, or good. Heterogeneity among the included studies was evaluated using the I^2 statistic. Comprehensive Meta-Analysis (CMA) software was used for quantitative data synthesis, with results presented as pooled prevalence estimates and confidence intervals (CIs). The screening process was discussed in Figure 1.

3. Results

After screening the search results from scientific databases (Figure 1), a total of five articles were included in the analysis. These articles, published between 2010 and 2024, reported sample sizes ranging from 130 to 1200 participants. Various questionnaires with differing numbers of items were utilized across studies, leading to variability in the assessment of knowledge related to oral cancer (OC).

The meta-analysis revealed that the prevalence of poor knowledge was 24.6% [CI=10.9–46.4], while the prevalence of average knowledge was 12.4% [CI=12.1–12.6]. The prevalence of good knowledge was reported to be 4.4% [CI=0.5–28.6], as illustrated in Figures 2–3.

In the study conducted by Amanpour et al. (2018) in Kerman, 1200 participants (550 men and 650 women) were assessed using a researcher-designed questionnaire comprising 24 items on OC symptoms and risk factors. It was found that 65% of participants demonstrated knowledge of symptoms, while 57.2% demonstrated knowledge of risk factors, resulting in an overall average knowledge level of 58.8%. Regarding age and gender, 56.5% of participants perceived OC to affect men and women equally, and 19.6% recognized individuals over the age of 45 as being at higher risk.

Azimi et al. (2019) investigated 1277 participants (489 men and 788 women) in Tehran using a questionnaire consisting of 15 items on risk factors and 11 items on symptoms, with scores ranging from 0 to 26. The findings indicated that 74.6% of participants were categorized as having low knowledge regarding risk factors, 24.6%

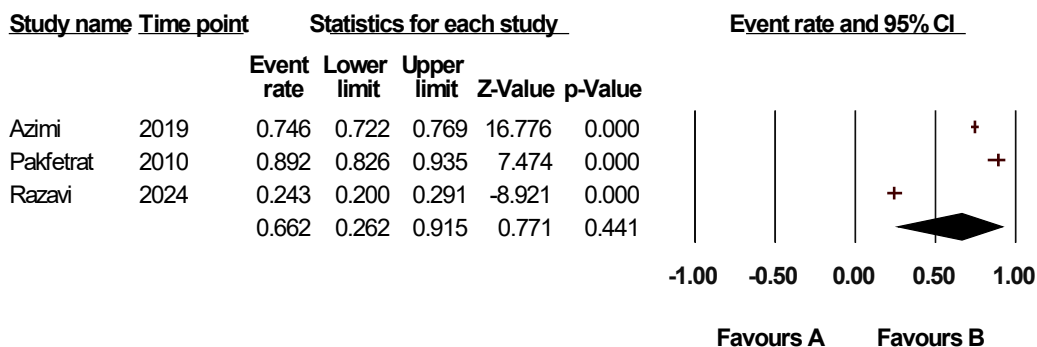


Figure 1. Percentage analysis Patients with a low level of knowledge in the field of OC

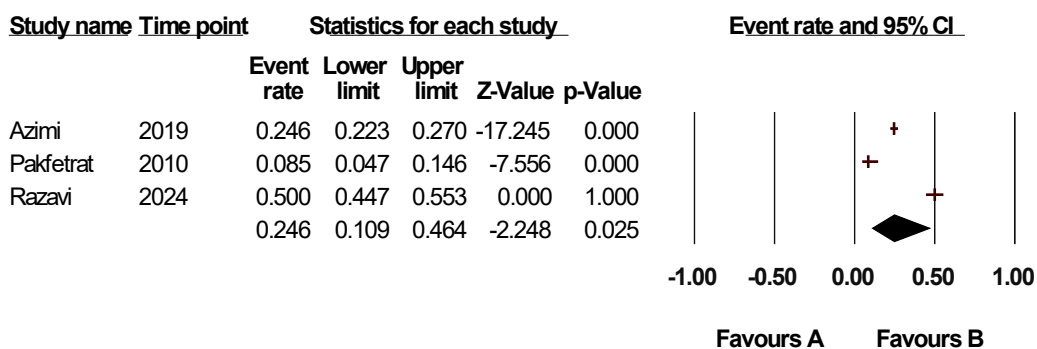


Figure 2. Percentage analysis Patients with a Moderate level of knowledge in the field of OC

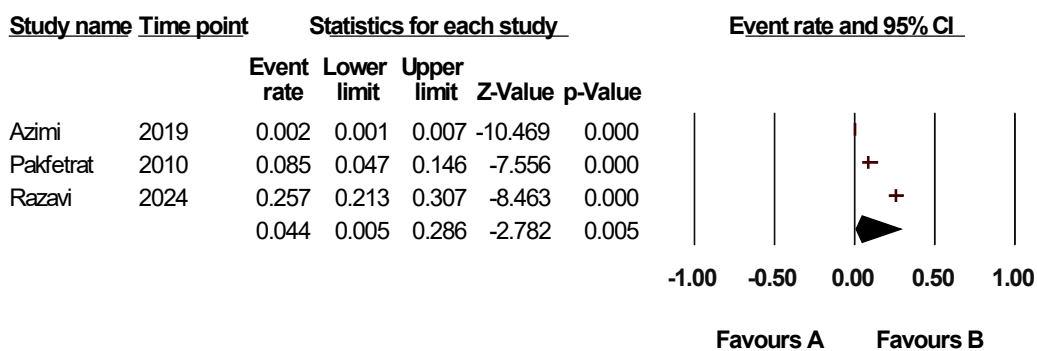


Figure 3. Percentage analysis Patients with a Good level of knowledge in the field of OC

as moderate, and 0.9% as high. Regarding knowledge of symptoms, 58.5% were classified as low, 29.2% as moderate, and 8.1% as high.

The mean age ($M \pm SD$) of participants was 37.8 ± 9.02 years.

Pakfetrat et al. (2010) assessed 130 participants in Mashhad, with a mean age of 33.7 ± 11.16 years, using a questionnaire that addressed attitudes, clinical symptoms, epidemiology, and prognosis. Among participants, 89.4% demonstrated low knowledge, 8.1% moderate knowledge, and 2.5% high knowledge.

Razavi et al. (2024) examined 334 participants in Isfahan with a mean age of 49.3 ± 21.4 years. A questionnaire with 25 items covering OC symptoms, knowledge, and common types of OC was employed. Results indicated that 24.4% of participants had low knowledge, 50% moderate knowledge, and 25.6% good knowledge.

Tadbir et al. (2013) evaluated 783 participants in Shiraz, with a mean age of 35.38 ± 11.96 years, using a questionnaire divided into two sections: one on OC symptoms and another on risk factors, containing nine questions. Participants identified smoking, alcohol consumption, consumption of hot and spicy food, chronic cheek or lip biting, and sunlight exposure as significant risk factors for OC.

4. Discussion

Cancer presents substantial challenges, significantly diminishing patients' quality of life due to its associated complications (Mohammadi et al., 2024; Erfani et al., 2024). Oral cancer (OC) is no exception, where inadequate health literacy and knowledge contribute to poorer outcomes (Nourmohammadi et al., 2019; Borji et al., 2019). The findings of this study indicate that most participants displayed insufficient knowledge about OC, corroborating observations in prior investigations.

This review revealed that many patients exhibited limited understanding of OC risk factors and symptoms. For instance, Formosa et al. (2015) reported that only 19% of Australian adults demonstrated adequate knowledge of OC risk factors, with 92% correctly identifying smoking as a major contributor. Similarly, Keten et al. (2017) found that Turkish high school students achieved an average score of 7.55 ($SD = 5.03$) out of 25 on OC knowledge, consistent with the low knowledge levels observed in this meta-analysis.

However, some studies reported comparatively higher levels of OC knowledge. Al-Maweri et al. (2017) found that 62.4% of Saudi Arabian dental patients demonstrated sufficient awareness of OC, with 68.2% identifying tobacco and 56.2% recognizing alcohol as risk factors. Similarly, Zachar et al. (2020) observed that 73.8% of Australian dental patients exhibited knowledge about OC, exceeding the scores reported in this study.

International comparisons highlight significant disparities in OC knowledge across regions. Studies in Jordan (Hassona et al., 2015), Brazil (de Mattos Camargo Grossmann et al., 2021), Sri Lanka (Ariyawardana & Vithanaarachchi, 2005), Yemen (Al-Maweri et al.,

2014), and India (Reddy et al., 2012) reported higher levels of knowledge, with high knowledge scores ranging from 45.6% in Jordan to 95% in Sri Lanka. These differences likely reflect variations in educational attainment, access to health education programs, and societal health literacy levels.

Socioeconomic and environmental factors significantly impact cancer awareness, particularly in OC knowledge. Educational attainment is a critical determinant. Individuals with higher education levels benefit from greater access to resources such as formal schooling, higher education institutions, and digital platforms, enabling them to acquire a more comprehensive understanding of cancer-related topics (Alcaraz et al., 2020; Coughlin, 2019). Societies with robust health education programs are often better positioned to mitigate disparities in cancer knowledge and health outcomes.

This study emphasizes the urgent need for targeted interventions to improve OC awareness, particularly in populations with limited educational opportunities and restricted access to health literacy resources. Addressing these gaps could help reduce the risks associated with delayed diagnosis and improve patient outcomes. Future research should focus on developing culturally tailored educational campaigns and promoting equitable healthcare access to bridge knowledge disparities and enhance cancer prevention and management strategies.

5. Conclusion

This study underscores the critical need for improving oral cancer (OC) awareness in Iran, where knowledge levels remain alarmingly low. Despite some regional variations, the findings highlight that a substantial proportion of individuals lack sufficient understanding of OC risk factors, symptoms, and preventive measures. International comparisons further emphasize disparities influenced by educational, socioeconomic, and environmental factors. Notably, participants with limited education and restricted access to health literacy resources exhibited the lowest awareness levels. This calls for comprehensive, culturally tailored educational interventions to bridge knowledge gaps and promote early detection and timely treatment. Enhancing public awareness through robust health education programs, equitable healthcare access, and leveraging digital platforms can play a pivotal role in reducing OC's prevalence and morbidity. Future research should prioritize innovative approaches to health communication, particularly targeting vulnerable populations, to mitigate disparities and improve outcomes associated with this increasingly prevalent disease.

Author contributions

M.R., F.F. conceived the study, performed data analysis, and wrote the manuscript, collected data and wrote the manuscript,

interpreted the results and wrote the manuscript, designed the study, wrote, and edited the manuscript.

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Competing financial interests

The authors have no conflict of interest.

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