

Original article

Malignant Tumours of the Lip and Oral Cavity in Libya: A Scoping Review of Epidemiological and Clinicopathological Evidence

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Corresponding email. mohamed.elkobayear@uoz.edu.ly**Abstract**

Published evidence on malignant tumours of the lip and oral cavity in Libya is fragmented across hospital series, pathology archives, institutional reports, and regional cancer registries. This scoping review mapped the epidemiological and clinicopathological evidence on these tumours and identified priorities for surveillance and research. PubMed and supplementary Libyan journal, repository, and citation sources were searched from inception to 13 August 2026. Eligible evidence primarily corresponded to ICD/ICD-O topographies C00–C06; mixed oral/maxillofacial or head-and-neck studies were retained only when relevant findings could be identified and were not pooled. Of 79 records identified, 70 unique records were screened, 16 full-text reports were assessed, and 10 studies were included. The evidence was predominantly retrospective and institution-based, with most studies linked to Benghazi or Sabratha. Squamous cell carcinoma was the leading malignant histology in the reported malignant epithelial cohorts, and the tongue was frequently involved. Information on stage, behavioural risk factors, treatment, recurrence, and survival was limited. Heterogeneous case definitions, different denominators, and possible overlap between institutional cohorts prevented meaningful summation of sample sizes or national estimation. The available evidence suggests a recurring pattern of oral squamous cell carcinoma, frequent tongue involvement, and male predominance in selected Libyan cohorts, but it does not establish national incidence or prevalence. Standardized ICD-O-based registration, explicit reporting of stage and risk factors, deduplication across institutions, and geographically representative surveillance are priorities for future oral-cancer control and research in Libya.

Keywords. Libya, Oral Cancer, Oral Cavity, Oral Squamous Cell Carcinoma, Scoping Review.

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Introduction

Oral cancer is an important public-health concern because it can substantially impair speech, mastication, swallowing, facial appearance, and quality of life. The term generally encompasses malignant tumours arising in the lip and oral cavity, including the oral tongue, gingiva, floor of the mouth, hard palate, buccal mucosa, and other parts of the mouth. These tumours should be distinguished from malignancies of the oropharynx, nasopharynx, and major salivary glands because their epidemiology, risk factors, staging, and clinical management differ [1,2]. Globally, cancers of the lip and oral cavity accounted for an estimated 389,846 new cases and 188,438 deaths in 2022 [1]. Their burden varies according to geographical region, age, sex, socioeconomic conditions, and exposure to established risk factors. Tobacco use in smoked or smokeless forms, alcohol consumption, and areca-nut use are major preventable causes; combined exposure to tobacco and alcohol further increases risk [2,3].

Squamous cell carcinoma (SCC) is the predominant malignant histology, while prognosis is influenced by anatomical site, tumour size and depth, nodal involvement, distant metastasis, and stage at diagnosis. Evidence concerning oral cancer in Libya has historically been limited and fragmented. Studies have originated mainly from selected hospitals, dental schools, pathology departments, and regional registries. Earlier work from Benghazi described malignant orofacial tumours and oral SCC, while a 2015 review highlighted incomplete geographical coverage, inconsistent registration, and the need to strengthen surveillance [4-6]. More recent studies from Benghazi and Sabratha have expanded the evidence base, but frequently use different anatomical definitions and overlapping institutional periods.

Some publications combine oral-cavity tumours with cancers of the pharynx, salivary glands, facial skin, jaws, or the wider head-and-neck region. These inconsistencies may obscure the specific profile of oral-cavity cancer and may lead to duplicate counting if related datasets are pooled. An updated scoping review was therefore undertaken to map the available evidence, clarify case definitions, summarize demographic and clinicopathological patterns, and identify gaps relevant to research and cancer-control planning in Libya.

Methods**Review design and reporting**

A scoping review was conducted following the Joanna Briggs Institute methodology for scoping reviews and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews

(PRISMA-ScR) [7,8]. The review question was: What is currently known about the epidemiological and clinicopathological characteristics of oral cancer in Libya, and what gaps remain in the available evidence? The objective was evidence mapping; therefore, formal critical appraisal or statistical pooling of study estimates was not undertaken.

Eligibility criteria

Eligibility was defined using the Population–Concept–Context framework. The population comprised patients in Libya diagnosed with malignant tumours of the lip or oral cavity. The primary anatomical definition followed ICD/ICD-O categories C00–C06, including the lip, oral tongue, gingiva, floor of the mouth, hard palate, buccal mucosa, and other or unspecified parts of the oral cavity. Original observational studies, cancer-registry reports, retrospective or prospective case series, theses, conference reports, and institutional reports were considered when they contained relevant extractable data. Studies combining oral-cavity cancer with oropharyngeal, nasopharyngeal, salivary-gland, maxillofacial, cutaneous, or broader head-and-neck lesions were retained only when oral malignancy could be separately identified. These mixed-site studies were classified separately and were not used to estimate national proportions or pooled frequencies. Individual case reports, editorials, non-data commentaries, studies conducted outside Libya, and studies restricted to benign or potentially malignant lesions were excluded. Previous reviews were used for citation searching but were not treated as primary patient datasets. An unpublished registry extract received from the National Cancer Institute in Sabratha was also excluded from the PRISMA counts and evidence synthesis because it did not meet the predefined evidence-source and accessibility criteria.

Information sources and search strategy

PubMed was searched from inception to 13 August 2026 using the following strategy: ("Mouth Neoplasms"[Mesh] OR "oral cancer" OR "oral cavity cancer" OR "oral squamous cell carcinoma" OR "tongue cancer" OR "lip cancer" OR "lip carcinoma" OR "oral tumour" OR "oral tumor" OR "orofacial malignancy") AND (Libya OR Libyan OR Benghazi OR Tripoli OR Sabratha OR Sabrata OR Sabha). Supplementary searching covered Libyan journal websites, institutional repositories, reference lists, and forward citation tracking. No restrictions on publication date or language were applied during the initial search. The complete supplementary search log, including URLs, dates, and record yields, should accompany the submission as a supplementary file.

Selection of evidence

Retrieved records were consolidated, and duplicates were removed. Titles and abstracts were screened against the predefined eligibility criteria, followed by full-text assessment of potentially eligible reports. Screening and data charting were conducted by a single reviewer. Reasons for full-text exclusion were recorded. Two historical Sabratha registry reports could not be retrieved and were documented as reports not retrieved. The selection process is presented in (Figure 1).

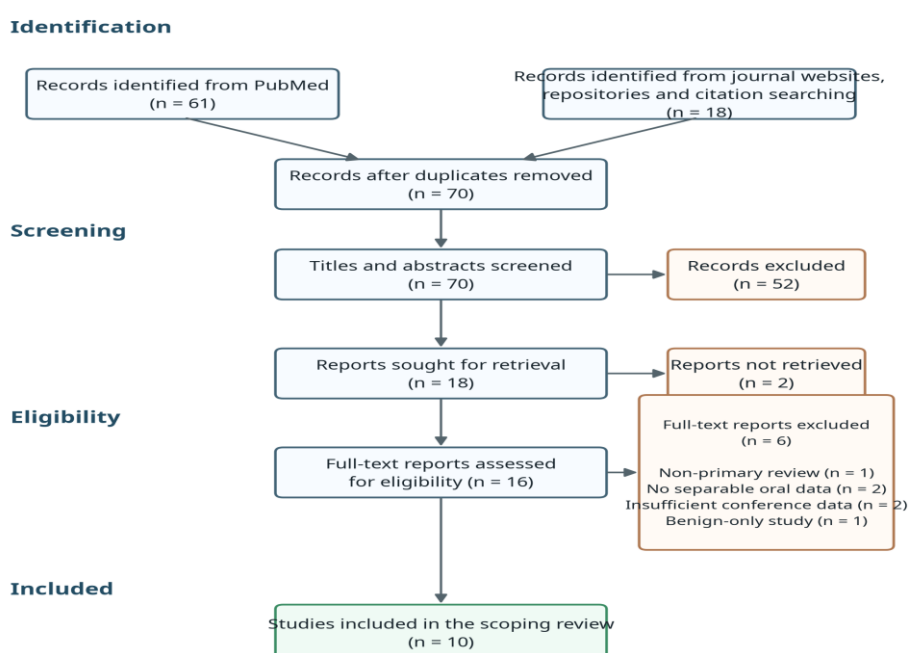


Figure 1. PRISMA-ScR flow diagram for study identification and selection

Data charting

A standardized evidence-charting form was used to record author, publication year, geographical setting, institution, study period, study design, data source, sample size, definition of oral cancer, anatomical sites, age, sex, histopathology, basis of diagnosis, tumour grade and stage, clinical presentation, risk factors, treatment, outcomes, study limitations, and potential overlap with other datasets. When a study included mixed benign and malignant lesions, only the malignant findings were charted where these could be separately identified.

Synthesis and overlap management

Evidence was synthesized descriptively using study-level tables and narrative analysis. Findings were grouped by geographical location, study period, anatomical definition, and clinicopathological domain. Potential overlap between datasets was assessed by comparing institutions, geographical settings, study periods, and reported case characteristics. Where overlap could not be excluded, studies were interpreted separately, and sample sizes were not summed. Strict oral-cavity cohorts were interpreted separately from mixed oral/maxillofacial and broader head-and-neck series. Meta-analysis was not performed because the included studies had heterogeneous case definitions, study populations, anatomical classifications, and denominators.

Ethical considerations

The review used published or publicly accessible sources and did not involve identifiable patient data; therefore, formal research ethics approval was not required.

Results

Search results

The search identified 79 records: 61 through PubMed and 18 through journal websites, repositories, and citation searching. Nine duplicates were removed, leaving 70 records for title and abstract screening. Fifty-two records were excluded. Eighteen reports were sought for retrieval; two historical Sabratha registry reports were not retrieved. Sixteen full-text reports were assessed, of which six were excluded: one non-primary review, two reports without separable oral-cavity data, two conference reports with insufficient extractable evidence, and one benign-only study. Ten studies were included in the scoping review.

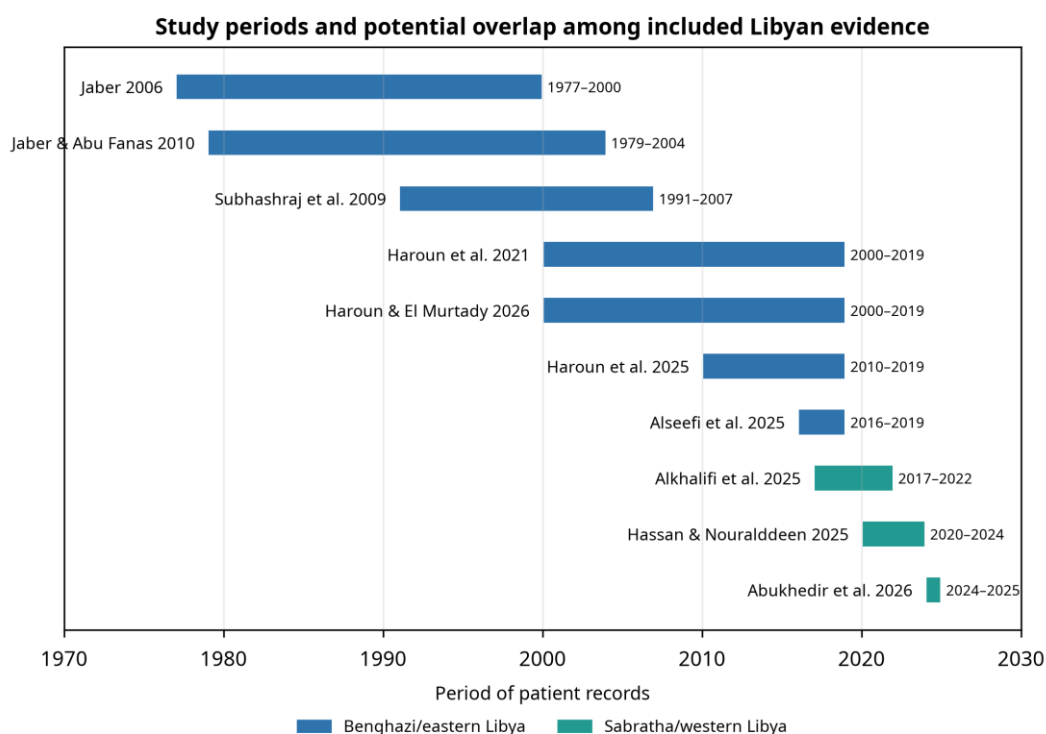


Figure 2. Study periods and potential overlap among included Libyan evidence. Blue bars represent studies conducted in Benghazi/eastern Libya; teal bars represent studies conducted in Sabratha/western Libya

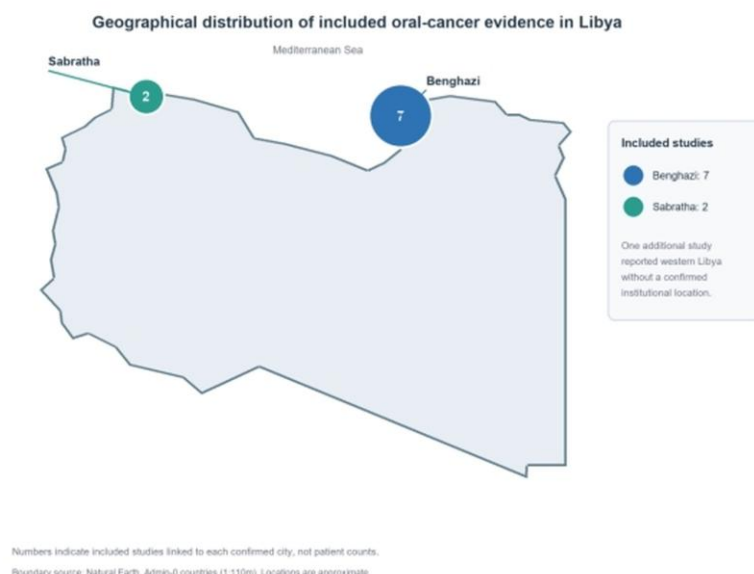


Figure 3. Geographical distribution of included oral-cancer evidence in Libya. Numbers represent studies associated with each confirmed city, not patient counts

Characteristics of included studies

The included evidence spanned records collected from 1977 to 2025 and publications issued between 2006 and 2026. Most studies were retrospective and based on pathology archives, hospital records, or clinical series. Seven studies were linked to Benghazi, two to Sabratha, and one reported a western-Libyan population whose precise institutional setting requires confirmation from the definitive publication record. No included study provided comprehensive national coverage. Study-level characteristics and denominators are presented in (Table 1) [4,5,9-16].

Table 1. Characteristics and principal findings of included studies

Study	Setting/period	Design and data source	Sample/denominator	Principal relevant findings	Key limitation
Jaber 2006 [9]	Benghazi; 1977–2000	Retrospective pathology series	75 intraoral minor salivary gland tumours	61.3% malignant; palate common; mucoepidermoid and adenoid cystic carcinomas prominent	Includes benign tumours; not a mucosal SCC cohort
Subhashraj et al. 2009 [4]	Benghazi; 1991–2007	Retrospective biopsy series	196 primary malignant orofacial tumours	M: F 1.41:1; SCC 50.6% of epithelial tumours	Broad orofacial definition; possible overlap
Jaber & Abu Fanas 2010 [5]	Benghazi/referrals; 1979–2004	Retrospective oral-SCC cohort	122 oral SCC	Mean age 53; tongue 27%; floor of mouth 20.4%; stage III–IV 60.6%; smoking data reported	Single centre; old cohort; incomplete risk-factor data
Haroun et al. 2021 [10]	Benghazi; approximately 20 years	Retrospective pathology series	171 malignant oral/maxillofacial neoplasms	SCC 67.5%; tongue 41.1% of SCC	Broad anatomical definition; overlap likely
Alkhalifi et al. 2025 [11]	Sabratha; 2017–2022	Retrospective clinical/surgical cohort	33 tongue SCC	Late presentation common; lesion >2 cm associated with nodal metastasis ($p=0.008$)	Small, single-centre, tongue-only cohort
Hassan & Nouralddeen 2025 [12]	Sabratha; 2020–2024	Retrospective institutional series	48 oral/head-and-neck tumours	Mean age 54.2; M:F 1.4:1; tongue 42.5%; SCC 69%	Includes nasopharynx and other non-oral sites

Alseefi et al. 2025 [13]	Benghazi; 2016–2019	Retrospective biopsy series	164 oral tumours; 26 malignant	Malignant tumours 15.9%; mixed histologies	Most cases benign; small malignant subset
Haroun et al. 2025 [14]	Benghazi; 2010–2019	Retrospective pathology series	593 oral/maxillofacial lesions	Malignant 8.9%; SCC 5.4% of all lesions	Mixed non-neoplastic and malignant denominator
Haroun & El Murtady 2026 [15]	Benghazi; 2000–2019	Retrospective OSCC series	105 oral SCC	M:F 1.67:1; mean age 57.6; lateral tongue 39%; conventional SCC 90%	Likely overlaps with earlier Benghazi archives
Abukhedir et al. 2026 [16]	Western Libya; 2024–2025	Retrospective oral-tumour series	152 oral tumours	Mean age 46.3; males 61.8%; tongue 34.2%; malignant 64.5%; OSCC predominant	Mixed benign/malignant cohort; setting requires confirmation

Note: Samples must not be summed because cohorts may overlap and denominators differ. M: F, SCC, and OSCC denote male-to-female ratio, squamous cell carcinoma, and oral squamous cell carcinoma, respectively.

Demographic characteristics

Most malignant cohorts reported male predominance, with male-to-female ratios ranging from approximately 1.3:1 to 1.67:1. Mean age at diagnosis was generally in the early-to-late fifties in malignant cohorts. The mixed 2026 oral-tumour series reported a younger overall mean age of 46.3 years, but its denominator included benign tumours. These differences illustrate why age estimates from mixed tumour populations should not be directly compared with oral SCC-only cohorts [5,11,12,15,16].

Anatomical distribution and histopathology

SCC was the leading malignant epithelial diagnosis in the reported malignant cohorts. The 17-year Benghazi orofacial series reported SCC in 50.6% of epithelial tumours, while SCC accounted for 67.5% of malignant oral/maxillofacial neoplasms in a later single-institution series [4,10]. The 2000–2019 Benghazi OSCC cohort found conventional SCC in 90% of cases, with uncommon verrucous, adenosquamous, and spindle-cell variants [15]. These percentages use different denominators and were not pooled. The tongue was repeatedly identified as a major site. It accounted for 27% of oral SCC in the 1979–2004 cohort, 41.1% of SCC in the 171-case malignant oral/maxillofacial series, 42.5% of tumours in the mixed Sabratha cohort, and 39% of the 2000–2019 OSCC series, in which the lateral border was most affected [5,10,12,15]. Floor-of-mouth involvement was also prominent in the earlier oral SCC cohort. Minor salivary-gland malignancies showed a different distribution, with the palate commonly affected [9].

Stage, clinical presentation, risk factors, and treatment

Stage and risk-factor information was sparsely reported. In the 122-patient oral SCC cohort, 31.1% had stage III and 29.5% stage IV disease, and more than half had symptoms for longer than six months [5]. Among 103 patients with smoking data, 55.3% were regular smokers and 24.3% occasional smokers [5]. The tongue SCC series from Sabratha also reported frequent late presentation and an association between lesion size greater than 2 cm and lymphatic metastasis [11]. Treatment information was available in only a small number of sources and was mainly surgical; recurrence, disease-specific survival, and overall survival were not sufficiently reported for synthesis.

Evidence gaps

Major gaps included limited geographical representation, hospital-based sampling, heterogeneous anatomical definitions, incomplete reporting of stage and grade, limited behavioural-risk data, and sparse treatment and outcome information. The concentration of evidence in Benghazi and Sabratha left Tripoli, southern Libya, and several central regions underrepresented. Potential overlap between institutional datasets was especially important for Benghazi pathology studies covering parts of 1991–2019 and Sabratha studies covering 2017–2024.

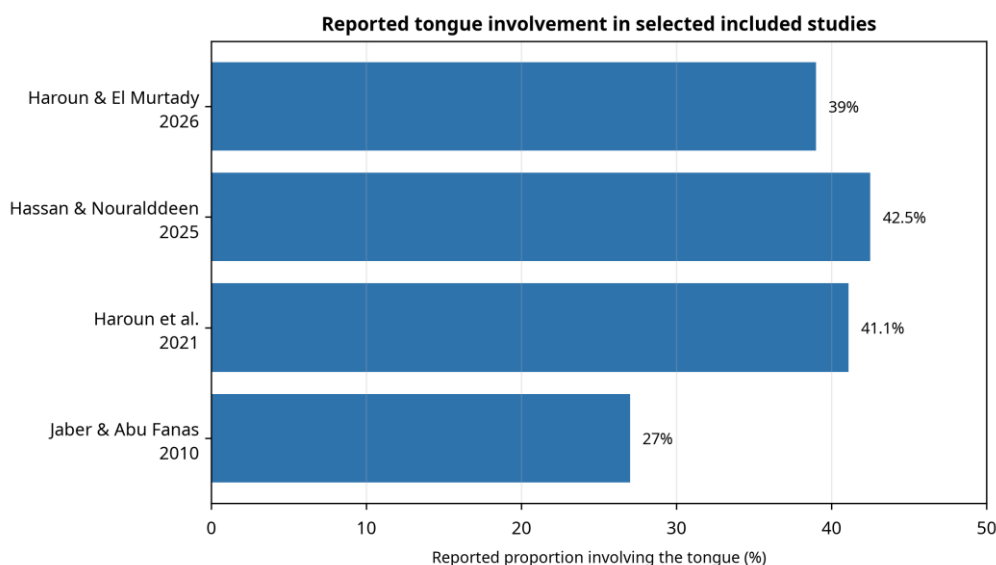


Figure 4. Reported tongue involvement in selected included studies. Percentages represent descriptive study-level values and were not statistically pooled because the studies used different denominators and anatomical definitions

Discussion

Principal findings

This review identified a small but expanding body of Libyan evidence on oral cancer. Across heterogeneous institutional series, three findings were comparatively consistent: SCC predominated among malignant epithelial tumours, the tongue was a leading anatomical site, and malignant disease was more frequently reported among men and middle-aged or older adults. These patterns broadly accord with global evidence, but the available Libyan studies do not permit national incidence estimation or reliable pooled proportions [1-6,9-16]. The most clinically concerning observation was delayed presentation. The earlier Benghazi oral SCC cohort found that approximately three-fifths of patients presented at stage III or IV, while the recent Sabratha tongue SCC study also described advanced disease and nodal involvement [5,11]. Because these findings arise from limited institutional series, they should be interpreted as signals for further investigation rather than national estimates. They nevertheless support public and professional awareness, prompt referral of persistent oral lesions, and strengthened pathways between dental services, pathology units, and oncology centres.

Interpretation of anatomical and pathological findings

Repeated tongue predominance is clinically plausible because the lateral and ventral tongue are recognized high-risk intraoral sites and can be readily examined. Nevertheless, percentages differed substantially because studies used different denominators. A tongue proportion calculated within an OSCC-only cohort cannot be directly compared with a proportion calculated among all oral and maxillofacial lesions or among mixed head-and-neck tumours. The same caution applies to reported SCC frequencies. The inclusion of intraoral minor salivary-gland malignancies broadens the pathological spectrum of cancers arising within the oral cavity, but these neoplasms differ biologically from mucosal OSCC. They should therefore be presented as a distinct subgroup in future registry reports and reviews. Similarly, major salivary-gland, nasopharyngeal, oropharyngeal, tonsillar, and soft-palate cancers should not be combined with C00–C06 oral-cavity cancers unless site-specific data are retained.

Cancer registration and geographical coverage

The Libyan evidence base remains dominated by institutional archives. This is useful for describing patients who reach specific centres but cannot establish population incidence without a defined catchment population and complete case ascertainment. The lack of recent, consistently published population-based oral-cancer statistics limits comparisons between regions and over time. Standardized recording of ICD-O topography, morphology, basis of diagnosis, stage, treatment, vital status, and follow-up would substantially improve both clinical audit and epidemiological research [6].

Implications for dental practice and early detection

Dentists and oral-health professionals have a central role in opportunistic detection because the oral cavity is accessible to visual and tactile examination. Persistent ulceration, unexplained induration, erythroplakia or leukoplakia, non-healing extraction sites, and unexplained cervical lymphadenopathy warrant timely investigation or referral. However, this review

did not identify sufficient Libyan intervention evidence to conclude that a population screening programme would be effective. Initial priorities should include standardized clinical examination, risk-based case finding, referral protocols, and evaluation of diagnostic delay.

Strengths and limitations

This scoping review provides an updated synthesis of the available evidence on oral cancer in Libya, extending the earlier review published in 2015 and incorporating relevant studies published up to 13 August 2026. The review applied predefined eligibility criteria and an explicit anatomical definition of oral-cavity cancer, documented the reasons for full-text exclusion, and considered the possibility of overlap between institutional datasets. Strictly defined oral-cavity cancer cohorts were distinguished from studies that included broader oral, maxillofacial, or head-and-neck tumour populations, thereby avoiding inappropriate pooling of clinically heterogeneous samples. The review also has several limitations. The database search was restricted to PubMed and was supplemented by searches of publicly accessible journal websites, institutional repositories, and reference lists; relevant studies indexed exclusively in other bibliographic databases may not have been identified. Two historical cancer-registry reports could not be retrieved for full-text assessment.

Screening, study selection, and data charting were conducted by a single reviewer rather than by two independent reviewers. Although the workflow followed predefined eligibility criteria and reasons for full-text exclusion were recorded, the absence of dual independent screening and duplicate data charting may have increased the risk of missed studies, selection decisions, or data-extraction errors. This is an important methodological limitation because dual independent screening is recommended in PRISMA-ScR-informed evidence-synthesis practice. Several included studies used broad anatomical definitions or combined benign and malignant tumours, limiting direct comparisons. Some institutional cohorts covered overlapping geographical settings and study periods and may therefore have included some of the same patients. Considerable heterogeneity in case definitions, study populations, and reported outcomes precluded meta-analysis. Finally, because the available evidence was predominantly hospital- or pathology-based and geographically concentrated, national incidence and prevalence estimates could not be derived.

Conclusion

Published evidence indicates that oral SCC is the predominant malignant oral tumour reported in Libya, with frequent tongue involvement and a tendency to affect men and adults in the fifth decade of life or later. Limited evidence also suggests that delayed presentation and advanced disease remain important concerns. However, the available literature is geographically concentrated, largely hospital-based, and methodologically heterogeneous. Standardized and geographically representative oral-cancer registration is required before national burden or temporal trends can be estimated reliably.

Recommendations

Future Libyan surveillance should adopt a standardized oral-cavity definition based on ICD-O C00–C06, report oropharyngeal, nasopharyngeal, and major salivary-gland cancers separately, and apply deduplication procedures across pathology laboratories, hospitals, and cancer registries. Population-based registration should be strengthened across western, eastern, central, and southern Libya, with standardized reporting of histology, diagnosis, TNM stage, grade, treatment, recurrence, vital status, and follow-up. Dental and primary-care referral pathways for suspicious or persistent oral lesions should be established and evaluated, while tobacco exposure and other locally relevant risk factors should be recorded using standardized categories. Multicentre prospective studies and survival analyses should be prioritized when adequate follow-up data are available. Targeted awareness and high-risk case-finding strategies should be evaluated before any consideration of population-wide screening.

Author's Contributions

Mohamed Ali Elkobayear contributed to the conception and design of the review, literature searching, screening, data charting, synthesis, manuscript drafting, critical revision, and approval of the final version.

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