

Early Detection of Oral Cancer in Latin America: Where Are We and Where Are We Going?

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Detecção Precoce do Câncer Oral na América Latina: Onde Estamos e para Onde Vamos?

DetECCIÓN Temprana del Cáncer Oral en América Latina: ¿Dónde Estamos y hacia Dónde Vamos?

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ABSTRACT

Introduction: Oral cancer remains a major global public health problem, with a particularly significant impact in Latin America and Brazil, where incidence and mortality remain high. Early detection improves prognosis, although most cases are still diagnosed at advanced stages. **Objective:** To synthesize and critically analyze early detection strategies for oral cancer in Brazil and other Latin American countries, focusing on current approaches, limitations, and perspectives. **Method:** Integrative literature review and regional experiences addressing early detection strategies, including analysis of current practices and structural challenges. **Results:** Current initiatives rely mainly on visual examination of the oral cavity and sporadic awareness campaigns, with limited use of adjunctive technologies and insufficient targeting of high-risk groups. Multisectoral barriers — including low public awareness, inadequate professional training, weak integration between primary and specialized care, and fragile health information systems — contribute to delayed diagnosis. Marked regional heterogeneity is observed, with structured initiatives in a few countries and fragmented actions in settings with lower healthcare capacity. **Conclusion:** Advancing opportunistic detection strategies requires integrated models combining strengthened primary care, clear referral protocols, telehealth, artificial intelligence, and effective tobacco and alcohol control policies. Targeting high-risk groups and developing risk prediction models may improve efficiency and reduce inequalities.

Key words: Mouth Neoplasms/prevention & control; Early Diagnosis; Primary Health Care; Latin America; Review.

RESUMO

Introdução: O câncer oral permanece um importante problema de saúde pública global, com impacto expressivo na América Latina e no Brasil, onde incidência e mortalidade seguem elevadas. A detecção precoce melhora o prognóstico, embora a maioria dos casos ainda seja diagnosticada em estádios avançados. **Objetivo:** Sintetizar e analisar criticamente as estratégias de detecção precoce do câncer oral no Brasil e em outros países da América Latina, com foco em abordagens, limitações e perspectivas. **Método:** Revisão integrativa da literatura e de experiências regionais sobre estratégias de detecção precoce, incluindo análise das práticas vigentes e de seus desafios estruturais. **Resultados:** As ações baseiam-se predominantemente no exame visual da cavidade oral e em iniciativas pontuais de conscientização, com limitada incorporação de tecnologias auxiliares e baixa focalização em grupos de risco. Barreiras multisectoriais — como baixa conscientização populacional, capacitação insuficiente de profissionais, falhas na integração entre níveis assistenciais e fragilidade dos sistemas de informação — contribuem para o diagnóstico tardio. Observa-se heterogeneidade regional, com iniciativas estruturadas em poucos países e ações fragmentadas em contextos de menor capacidade assistencial. **Conclusão:** O avanço das estratégias oportunísticas requer modelos integrados que combinem fortalecimento da atenção primária, protocolos claros, teleatendimento, inteligência artificial e políticas eficazes de controle do tabaco e do álcool. A focalização em grupos de risco e o desenvolvimento de modelos de predição podem aumentar a eficiência da detecção precoce e reduzir desigualdades.

Palavras-chave: Neoplasias Bucais/prevenção & controle; Diagnóstico Precoce; Atenção Primária à Saúde; América Latina; Revisão.

RESUMEN

Introducción: El cáncer oral sigue siendo un problema relevante de salud pública global, con impacto significativo en América Latina y Brasil, donde la incidencia y la mortalidad permanecen elevadas. La detección temprana mejora el pronóstico, aunque la mayoría de los casos aún se diagnostica en estadios avanzados. **Objetivo:** Sintetizar y analizar críticamente las estrategias de detección temprana del cáncer oral en el Brasil y otros países latinoamericanos, con énfasis en enfoques, limitaciones y perspectivas. **Método:** Revisión integradora de la literatura y de experiencias regionales sobre estrategias de detección temprana, incluyendo el análisis de prácticas actuales y desafíos estructurales. **Resultados:** Las estrategias se basan principalmente en el examen visual de la cavidad oral y en acciones puntuales de concientización, con limitada incorporación de tecnologías auxiliares y baja focalización en grupos de alto riesgo. Barreras multisectoriales — como baja concientización poblacional, capacitación insuficiente de profesionales, deficiencias en la integración entre niveles asistenciales y fragilidad de los sistemas de información — favorecen el diagnóstico tardío. Se observa heterogeneidad regional, con iniciativas más estructuradas en algunos países y acciones fragmentadas en contextos de menor capacidad asistencial. **Conclusión:** El avance de estas estrategias requiere modelos integrados que combinen el fortalecimiento de la atención primaria, protocolos claros, telesalud, inteligencia artificial y políticas efectivas de control del tabaco y el alcohol. La focalización en grupos de riesgo y el desarrollo de modelos predictivos pueden mejorar la eficiencia de la detección temprana y reducir desigualdades.

Palabras clave: Neoplasias de la Boca/prevenición & control; Diagnóstico Precoz; Atención Primaria de Salud; América Latina; Revisión.

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INTRODUCTION

Oral cancer is a relevant global public health problem, characterized by high morbidity and mortality, especially when diagnosed in advanced stages¹. Early detection, in turn, may increase survival rates to 80% or higher in initial stages (I and II), in contrast with approximately 50% of the late diagnosed cases¹. In Latin America, both oral cancer incidence and mortality remain high, configuring a region with a priority setting for prevention and control strategies², mainly due to the high prevalence of its main risk factors, like smoking and abusive alcohol intake^{1,3,4}.

In addition to the epidemiological magnitude, oral cancer presents important challenges related to the organization of healthcare systems, particularly regarding timely access to diagnosis and treatment. Studies conducted in the Brazilian context highlight prolonged intervals between diagnosis and treatment start, reflecting fragilities in the integration between different levels of care and the structure of oncology care pathways³. Moreover, the epidemiological-clinical profile of patients frequently reveals diagnoses at advanced stages, which suggests limitations in the early detection of lesions and in the access to specialized services⁴.

In the Latin-American context, a recent review noted that strategies for early detection of oral cancer are predominantly opportunistic and heterogeneous across countries, with limited standardization of protocols, limited focus on high-risk groups, and vulnerabilities in health information systems². These elements make it difficult to assess the impact of the implemented actions and compromise the effectiveness of public policies targeted at controlling this disease.

Although literature acknowledges the potential of early detection to reduce morbidity and mortality, important gaps remain in the structured incorporation of these actions within healthcare systems, especially within primary care and oncology care networks. In this scenario, it becomes fundamental to discuss not only the existing strategies but also the limitations and possibilities for improvement, considering aspects related to the organization of care, equity in access, and sustainability of interventions.

In this context, the objective of this study is to critically analyze early detection strategies for oral cancer in Brazil and other Latin American countries, with an emphasis on opportunistic approaches, limitations of population screening, and challenges in implementing structured risk-based models.

METHOD

Integrative literature review based on critical analysis of studies and relevant documents on early detection strategies for oral cancer in Latin America.

The research was done from January 2025 to January 2026. The sources were retrieved from searches in electronic databases, including PubMed/MEDLINE, SciELO, and *Biblioteca Virtual em Saúde* (BVS), complemented by consulting institutional documents available in official Ministry of Health websites, international organizations, such as the World Health Organization (WHO) and the Pan American Health Organization (PAHO), and academic repositories. The terms “oral cancer” and “early diagnosis” were used, as well as their corresponding terms in Portuguese and Spanish, combined with the names of Latin American countries, when applicable.

The research considered publications from the last 20 years, including guidelines, systematic or narrative reviews, observational studies, and official documents related to public health policies. Relevant institutional materials describing strategies, programs, or actions targeted at early detection of oral cancer in the region were also included. The selected references are adequately suggested throughout the text.

The selection of sources was guided by thematic relevance, currentness, and contribution to understanding the strategies adopted in Latin America. No formal systematic search, selection, or methodological quality evaluation criteria were applied to the studies, since the objective of this study was to produce a critical and contextualized analysis of the situation, not an exhaustive literature synthesis.

RESULTS

In addition to prevention measures, early detection is one of the pillars of effective oral cancer management. The available strategies range from routine clinical exams to the use of auxiliary tools and promising biomarkers¹.

The main objective of campaigns targeted at early detection is the early identification of potentially malignant oral lesions (PMOL), tissue alterations with increased risk of transformation in squamous cell carcinoma^{1,5}. Oral cancer screening is based on the premise that the disease is frequently preceded by a pre-malignant phase detectable by visual inspection, which creates relevant opportunities for early diagnosis⁶. Among the more important PMOL, we highlight leukoplakia, characterized by a white spot not removable by scraping, with the non-homogeneous form posing the highest risk of transformation¹, including proliferative verrucous leukoplakia (PVL), in which relevant proteomic biomarkers were identified⁷. Erythroplasia, in turn, presents as a red, velvety lesion, less common than leukoplakia and more prevalent in the oropharynx, however, with a significantly higher risk of malignant transformation, able to show malignancy signs

in up to 85% of cases¹. In addition to those, we highlight oral lichen planus — a chronic inflammatory disease whose erosive and atrophic forms present increased risk of malignization — and submucous fibrosis associated with, among other factors, the habit of chewing betel nuts¹.

Although the clinical exam of the oral cavity is simple and low-cost, early diagnosis is still insufficient, underscoring fragilities in primary care and the need for continuous training of dentists and generalist doctors⁸. Of all screening methods, the most widespread is the visual oral examination (VOE) under proper lighting^{6,9,10}. Routine dental consultations are fundamental opportunities for identifying suspicious lesions^{9,11}. However, the diagnostic precision of VOE is limited: studies show that the specificity of the examination performed by dentists can reach only 31% in the differentiation of malignant lesions¹⁰.

The Family Health Strategy (FHS) constitutes a strategic setting for an active opportunistic approach to risk groups, using domiciliary visits and electronic mapping, which has been effective in early detection^{12,13}. The articulation between dentistry and public health is crucial, since socioeconomic and behavioral factors influence access to early detection actions¹⁴. Successful experiences, such as the Barretos Cancer Hospital (São Paulo), demonstrate that integrating primary care and mobile units increases reach to vulnerable populations¹⁵. However, in countries with low Human Development Index (HDI) values, such as Brazil, the lack of integration between dental services and primary care still compromises the effectiveness of actions¹⁶. Moreover, cultural issues, geographic barriers, and logistic failures¹⁷, added to the insufficient coverage of the National Cancer Control Plans (PNCC) in Latin America¹⁸, contribute to delays in diagnoses and referral to patients^{9,10,19}.

The pathological assessment of PMOL is a fundamental step in adequately managing the disease. There is evidence that the traditional three-tier grading system for classifying oral epithelial dysplasia (mild, moderate, and severe) has a superior performance in predicting malignant transformation when compared to the binary system (present/absent dysplasia). Combining both systems was shown to be even more promising, improving prognostic values⁵. It is important to highlight that the diagnosis stage has a direct impact on prognosis: the five-year survival rate can reach up to 83% when cancer is detected early, while it can drop to approximately 32% in the presence of metastases¹⁰.

Despite oral cancer frequently developing from lesions that could be identified by simple visual inspection, more than two-thirds of diagnoses still occur in advanced stages (III and IV), a widely observed reality in Brazil^{9,10}.

In this sense, training and calibration of primary care professionals are essential to increase diagnostic accuracy, reinforcing the clinical examination as an effective and accessible method for early detection of oral cancer in the population^{6,20}.

Systematic population strategies for early detection of oral cancer are uncommon in Latin America, where opportunistic approaches conducted in primary care and dentistry predominate^{21,22}, in addition to educational actions and isolated campaigns^{23,24}. One systematic review focused on that region² shows significant methodological limitations and flaws in the communication of data from screening studies. VOE was the most frequently reported test. Of the more than 13 million individuals assessed, only 0.01% of oral cancer cases were diagnosed. Relevant gaps remain, such as the low priority of assessing high-risk individuals (smokers and alcohol drinkers). Barriers to early diagnosis are widely described in the region¹⁷. Moreover, the fragility of information systems, with incomplete data on the time elapsed until diagnosis and initial staging, impairs the assessment of outcomes and improvement of public policies^{17,23,24}.

In Brazil, despite the existence of relevant initiatives, such as the *Brasil Sorridente* program and the National Week of Oral Cancer Prevention, there is still no national policy specifically targeted at early diagnosis of the disease, with actions still concentrated in general oral health programs²⁵⁻²⁷. It is worth mentioning that the lack of organized programs for population screening of oral cancer is in line with current international recommendations, which do not support this strategy. In this context, the key challenge is not only implementing universal screening but strengthening structured strategies for early detection, especially those targeted at groups at higher risk.

This distinction is particularly relevant in the context of oral cancer. While universal population screening lacks effectiveness evidence in terms of mortality reduction, strategies aimed at higher risk groups — such as individuals with a history of smoking and abusive alcohol intake — present more clinical plausibility and impact potential. In these groups, the higher prevalence of the disease and potentially cancerous oral lesions increases the predictive value of early detection approaches, favoring a more effective use of health resources and a greater probability of diagnosing cancer in its initial stages.

In the Latin American scenario, summarized in Chart 1, it is possible to observe that in Argentina, there is a predominance of opportunistic actions for early detection in primary care and dentistry^{21,22}, associated with awareness campaigns coordinated by the *Instituto Nacional del Cáncer*. The country has robust tobacco control legislation



and consolidated policies for human papillomavirus (HPV) vaccination^{23,28-32}. In Bolivia, there is a lack of evidence on systematic early detection strategies, with a predominance of opportunistic and educational actions, with the *Programa Nacional de Salud Oral* program aimed mainly at promotion and prevention^{33,34}. In Cuba, the stomatology network integrated into primary care stands out, incorporating visual inspection of the oral mucosa into routine consultations and the active search of lesions in at-risk adults, in addition to the presence of organized oral health programs^{21,22} and national policies for tobacco control³⁵.

In Paraguay, isolated campaigns are conducted, such as the “Oral Cancer Week”. Although a universal organized strategy for the early identification of oral cancer is not a consolidated national policy, the country has its *Instituto Nacional del Cáncer* and oral dental health programs^{21,22}, in addition to advances in tobacco control and vaccination against HPV^{29,36-38}. Uruguay is a regional reference in tobacco control, with strict legislation, and maintains opportunistic strategies in dentistry and primary care, with an emphasis on education and fighting risk factors^{21,22}. The *Comissão Honorária de Lucha contra el Cáncer* has an outstanding performance in preventing and recording the disease^{24,39}. These regional differences directly influence the effectiveness of campaigns aimed at the smoking population and the achieved outcomes.

Chile stands out for having a national cancer law and a structured plan to cope with the disease, with standardized clinical guidelines and public prevention campaigns, such as the “*Saca la Lengua, Prevén el Cáncer Oral*”, although it still faces limitations in early detection⁴⁰⁻⁴⁴. This regional awareness and health education campaign operates in several countries — including Costa Rica, Chile, Peru, Paraguay, Brazil, Guatemala, Ecuador, Mexico, Dominican Republic, and Venezuela⁴⁵. Colombia favors early detection in its oral health policies, promoting visual inspection campaigns and free exams; however, it still lacks official organized protocols⁴⁶⁻⁴⁷. In Ecuador, actions are restricted to general guidance from its Ministry of Health, with no coverage goals or structured programs, resulting in low population awareness and reduced adherence to preventive exams^{48,49}. Mexico presents relevant advances through integrated initiatives between universities and the government, combining health education, self-exam, and free evaluations, which broadens diagnostic reach⁵⁰⁻⁵². In Peru, the Oral Health National Strategy articulates promotional and preventive actions, although it has no specific national program for oral cancer⁵³.

In Costa Rica, oral cancer control is among the most structured programs in the region. The country has the *Red Nacional para la Detección Temprana del Cáncer Bucal*,

which integrates specialists and clinical services targeted at early detection⁵⁴. The *Caja Costarricense de Seguro Social* maintains an official program with clear guidelines, based on easy-to-use flowcharts aimed at early diagnosis⁵⁵. The *Universidad de Costa Rica* plays an outstanding role in extension projects that involve assessment exams and educational actions within the community⁵⁶. Together, these initiatives reveal an efficient articulation between teaching, public policies, and community participation.

Panama has adopted a particularly proactive approach. The *Caja de Seguro Social* and *Ministerio de Salud* host widespread educational and early detection campaigns across the media, reinforcing alert signs and the importance of early detection. These actions are followed by epidemiological studies and reports that broaden understanding of the magnitude of the disease in the country⁵⁷⁻⁶¹. A relevant milestone was the *Campaña Nacional de Prevención*, coordinated by the *Instituto Conmemorativo Gorgas*, which conducted an expressive number of exams and biopsies, with publicly divulged results — a fundamental step for transparency and impact assessment⁶¹. In the Dominican Republic, a recent movement of institutional strengthening can be observed: the *Servicio Nacional de Salud* announced new actions for oral cancer prevention and treatment⁶², while the *Instituto Nacional del Cáncer Rosa Emilia Sánchez Pérez de Tavares* created an Oral Medicine and Pathology Unit, increasing the diagnostic capacity of the country⁶³. The *Colegio Dominicano de Cirujanos Dentistas* has strengthened educational campaigns targeted at both professional development and population awareness⁶⁴.

In other countries, the situation is strikingly distinct. In Haiti, the assistance capacity in oncology and oral health is limited, and there is no national program for early detection. The existing initiatives are mostly conducted by non-governmental organizations, with a focus on education and opportunistic detection, and epidemiological data remain scarce^{36,65}. In El Salvador, a recent study conducted at the main reference hospital of the country did not find campaigns or early detection programs, not even opportunistic, between 2014 and 2018⁶⁶. The system still depends on the referral of symptomatic cases to tertiary centers, where diagnoses are often given in advanced stages. The study reinforces the need for early detection programs, highlighting a relevant gap in public policies⁶⁶. In Honduras, there have been advances in institutional acknowledgment of the issue: the *Secretaría de Salud* has included oral cancer prevention in its Institutional Strategic Plan for 2023-2026⁶⁷. Yet, population-based early detection campaigns face significant barriers to widespread and continuous implementation. Nicaragua acknowledges the lack of

Chart 1. Existing national policies and early diagnosis campaigns for oral cancer in Brazil and other Latin American countries

Countries	National Policy	Campaigns
Argentina	No specific policy for early diagnosis	<i>Instituto Nacional del Cáncer</i> campaigns, primary care, and dentistry opportunistic actions
Brazil	No specific policy for early diagnosis	<i>Programa Brasil Sorridente</i> ; <i>Semana Nacional de Prevenção do Câncer Bucal</i> (Law N. 13,230/2015)
Bolivia	No specific policy for early diagnosis	Educational actions and opportunistic exams
Chile	Cancer Law (2020) and specific National Plan	<i>Saca la Lengua, Prevén el Cáncer Oral</i> (annual national campaign); <i>Día Latinoamericano de la Lucha Contra el Cáncer Bucal</i> (December 5th)
Colombia	No specific policy for early diagnosis	Visual inspection actions and free exams
Costa Rica	<i>Red Nacional para Detección Temprana del Cáncer Bucal</i> , official guidelines	<i>Caja Costarricense</i> programs and community campaigns through universities; <i>Saca la Lengua, Prevén el Cáncer Oral</i> (annual national campaign)
Cuba	Organized oral health programs and stomatology network integrated into the primary care system	Active search for lesions in at-risk adults, governmental campaigns
El Salvador	No specific policy for early diagnosis	Opportunistic detection in hospitals
Ecuador	No specific policy for early diagnosis	Educational initiatives and university actions/community events; <i>Saca la Lengua, Prevén el Cáncer Oral</i> (national annual campaign)
Haiti	No specific policy for early diagnosis	Actions promoted by Non-Governmental Organizations
Honduras	Recent acknowledgment of the theme in national plans, limited structure	Isolated campaigns
Mexico	No specific policy for early diagnosis	SEDESA (<i>Secretaría de Salud de la Ciudad de México</i>) campaign: <i>Saca la Lengua</i> (2022): education, self-examination, free oral examinations; permanent programs at UNAM (National Autonomous University of Mexico): free exams; partnership with INCAN (<i>Instituto Nacional del Cáncer</i>) for expanding actions
Nicaragua	No specific policy for early diagnosis	Actions conducted by Non-Governmental Organizations and universities, in addition to local community efforts
Panama	Proactive approach with support from <i>Caja de Seguro Social</i> and <i>Ministerio de Salud</i>	<i>Campanha Nacional de Prevención</i> by the <i>Gorgas Memorial Institute for Health Studies</i> , widespread media advertising
Paraguay	<i>Instituto Nacional del Cáncer</i> , although not a stable national policy	Oral Cancer Week
Peru	Oral Health National Strategy (MINSAs), but with no specific program for the early diagnosis of oral cancer	Educational actions and opportunistic clinical exams in community and university programs
Uruguay	<i>Comisión Honoraria de Lucha contra el Cáncer</i>	Opportunistic approach through primary care
Dominican Republic	Recent creation of specialized units	Growing campaigns from the <i>Servicio Nacional de Salud</i> and professional entities; <i>Saca la Lengua, Prevén el Cáncer Oral</i> (annual national campaign)



structured programs. One study from the *Universidad Nacional Autónoma de León* highlighted the need for investments in preventive and early detection actions, indicating that the country still relies on isolated initiatives conducted by Non-Governmental Organizations (NGOs) and academic institutions, with no consistent public policies⁶⁸.

DISCUSSION

These experiences together demonstrate that tackling oral cancer in Latin America depends not only on national policies but also on a coordinated effort encompassing awareness, prevention, and institutional strengthening. Both the region and Brazil present challenging scenarios, with data that highlights the need for structured and effective early detection strategies.

Although some countries have developed important initiatives, the general scenario remains unequal. In several contexts, the existing actions are isolated, one-off, or documented only by NGOs and universities. The scarcity of data makes it difficult to understand the actual impact of campaigns, especially among smokers, who constitute the greater at-risk group. Thus, more than highlighting differences between countries, the landscape highlights an essential limitation: the inability to analyze Latin America as a cohesive unit, given the absence of consistent information in many national contexts.

The heterogeneity observed between Latin American countries is not restricted to the availability of campaigns or isolated initiatives but reflects structural differences in the organization of healthcare systems, in the priority of oncological policies, and in the capacity of integrating care pathways. In contexts with greater articulation between primary care, specialized services, and information systems, early detection strategies have greater potential for impact. On the other hand, in contexts marked by fragmented care, underfunding, and lack of structured protocols, actions tend to be episodic and less effective. These findings reinforce that broadening access to early diagnosis does not rely exclusively on the implementation of campaigns but on its insertion within organized healthcare networks, with well-defined workflows, continuous professional training, and systematic monitoring of indicators. In this sense, strengthening oncological care pathways and reducing structural inequalities emerge as central elements for advancing oral cancer control in the region.

The outcomes from early detection campaigns refer to tangible and measurable results from their implementation, directed at the final objective of improving the population's health indicators. In the context of oral cancer, the main outcome is the increase

in survival and reduction of mortality from the disease. To reach this objective, continuous campaigns targeted at high-risk individuals tend to be more effective, mainly when these patients are assessed on multiple occasions⁶⁹.

Several other intermediate results can be achieved with the implementation of early detection strategies. Among those, we highlight the increase in the proportion of diagnoses in initial stages, an indicator associated with better prognoses, less invasive treatments, and lower costs to the healthcare system^{1,69}. In Brazil, the high rate of cancer cases diagnosed in advanced stages^{3,4} represent a negative outcome that campaigns seek to reverse. Another benefit is reduced therapeutic intensity, since early diagnosis enables less radical surgical interventions, often dismissing adjuvant therapies and resulting in lower morbidity^{1,4}. Quality of life also constitutes a key outcome, influenced by the lower aggressiveness of the treatment and by the reduction of physical and functional sequelae. Accuracy and adherence, despite being process indicators, are equally essential: high sensitivity and specificity of visual assessment, associated with treatment adherence after diagnostic confirmation, directly impact clinical results⁶⁹. It is important to highlight that attributing improvements in survival solely to early detection strategies, without considering general advances in medicine, constitutes a significant limitation in outcome assessment⁶⁹. Still, the persistence of late diagnoses and inequalities in access to treatment — as observed in Brazil within the public and private sectors³ — demonstrates that substantial gaps remain and require specific actions.

The future of early detection of oral cancer in Latin America requires profound restructuring, which includes the continuous training of primary care professionals and the guarantee of adequate supplies, ensuring conditions for assistance in communities without regular access to dental clinics⁶. In this scenario, incorporating telemedicine and digital health technologies, including the capture of suspicious lesion images for remote assessment by specialists, represents a promising strategy by increasing diagnostic precision and reducing time until specialized assessment¹⁰. Additionally, the use of artificial intelligence has the potential to transform subjective clinical image interpretation into a quantifiable and reproducible process, overcoming limitations inherent of human visual assessment¹⁰. When combined with low-cost imaging devices, this technology can significantly amplify diagnostic accuracy, working as an essential decision support to healthcare professionals¹⁰.

Another emerging area is the development of non-invasive methods for early detection of HPV-positive oropharynx cancer. Given the anatomical location, visual inspection presents limitations, and preliminary studies

suggest the use of mouthwashes and detection of serum antibodies as promising screening alternatives¹⁰.

It is important to reinforce that universal population screening for oral cancer is not currently recommended by the main international organizations, such as the *US Preventive Services Task Force*, *American Cancer Society* (ACS), and the *Canadian Task Force on Preventive Health Care*, due to the absence of robust evidence of mortality reduction solely attributable to screening⁶. In this context, opportunistic approaches and strategies directed at high-risk individuals are considered more adequate, especially in healthcare systems with limited resources⁶. Thus, isolated campaigns, although relevant for raising population awareness, present a limited impact when not integrated into structured, continuous programs articulated to different healthcare levels. In this sense, the development of risk prediction models also becomes fundamental to increase the efficiency of opportunistic approach strategies for this population. These models seek to integrate demographic variables (such as age and sex), lifestyle factors (smoking and abusive alcohol intake), and ultimately, biological markers, enabling the identification of individuals with a higher probability of developing the disease.

In summary, the transition to integrated models that articulate primary care, telemedicine, and artificial intelligence represents a strategy with high impact potential for Brazil and Latin America, by directly facing human, geographic, and structural challenges that historically contribute to late diagnoses^{10,15,16}.

CONCLUSION

Oral cancer constitutes a major global public health problem, stricken by high morbidity and mortality, especially in Latin America and Brazil, where its incidence remains high. Early detection is a fundamental pillar to improving prognosis and survival rates, particularly among smokers, considered a high-risk group. However, the epidemiological analysis and the early detection strategies in Brazil and other Latin American countries show that most diagnoses still happen in advanced stages, significantly compromising the clinical outcomes.

The persistence of late diagnoses results from a complex interaction of multiple-level barriers. At the individual level, the low awareness of signs and symptoms, stigma, and socioeconomic difficulties stand out. At the professional level, some gaps can be observed in the education and training of dentists and generalist doctors in performing VOE, recognizing PMOL, and properly recommending biopsies. In healthcare services and systems, the lack of structured strategies for early detection, opportunistic approaches aimed at high-risk

individuals, fragility in the integration of primary care and specialized services, and underfunding contribute decisively to delays in diagnosis and treatment start.

Considering international recommendations, the focus of public policies must be on strengthening secondary prevention strategies, including early diagnosis of symptomatic cases, clinical vigilance of individuals in higher at-risk groups, and increasing the resolution capacity of primary care. In parallel, structured policies for controlling the main risk factors — especially smoking and abusive alcohol drinking — remain essential to reducing incidence and mortality by oral cancer. In this context, the effectiveness of the actions depends less on the expansion of isolated initiatives and more on the integration of these strategies into organized healthcare networks.

To reverse this scenario and improve disease outcomes, a multifaceted and coordinated effort becomes necessary. Recommendations include continuous and encompassing awareness campaigns; investment in training and calibration of healthcare professionals; strengthening integration between care levels, with clear referral protocols; and robust policies for controlling main risk factors, especially tobacco and alcohol. The adoption of auxiliary technologies — such as telemedicine, diagnostic support tools, and artificial intelligence-based solutions — along with rigorous outcome monitoring is essential to improve diagnostic accuracy and ensure equitable access to early diagnosis and treatment.

This study presents limitations inherent to its integrative literature review design. The lack of a formal systematic strategy for the search and selection of studies may have resulted in the non-inclusion of all evidence available on the theme, especially that published in non-indexed databases or in regional contexts with less scientific visibility. Although the selection of sources has been guided by thematic relevance, currentness, and contribution to understanding early detection strategies in Latin America, the possibility of selection bias cannot be excluded. Therefore, the findings must be interpreted as a critical analysis of the scenario based on representative evidence, and not as an exhaustive literature synthesis.

CONTRIBUTIONS

All the authors contributed substantially to every stage of the manuscript and approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

Leandro Luongo Matos declares a potential conflict of interests as he is a speaker in the *Merck Sharp & Dohme* (HPV/ immunotherapy vaccines). The other authors have no conflict.



DATA AVAILABILITY STATEMENT

All the contents associated with the article are included in the manuscript.

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