Risk Factors Contributing to Oral Cancer in Men: A Focus on South Asia

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RISK FACTORS ASSOCIATED WITH ORAL CANCER PREVALENCE

Research Question: What risk factors contribute to oral cancer in men in South Asia ?

Abstract:

A wide range of factors may cause variations in how oral cancers develop. Socioeconomic and cultural factors can influence the prevalence and progression of oral cancer in South Asian men. With this, an environment can be examined to see if it's conducive to a positive health status. When socioeconomic conditions are poor, limited access to healthcare and delayed diagnosis could be detrimental to the oral health of these men. Because of this, the mortality rates of oral cancer in South Asian men continue to rise. The interaction between cultural habits and healthcare access impacts the progression of the disease. Studies suggest that individuals with higher socioeconomic status may be less likely to use cariogenic substances than those with lower socioeconomic status. By understanding these influences, disparities in survival rates can be better addressed. Throughout research, socioeconomic and cultural factors ultimately affect the progression and survival rates of oral cancer in South Asian men.

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Introduction

Oral Cancer, a subtype of head and neck cancers is shown to develop within the oral cavity on the lips, gums, tongue, throat or cheeks. Today, oral cancer reports about 2-3% of all cancers worldwide, with an estimated 377,000 new cases and 177,000 total deaths annually (Tranby et al., 2022). Oftentimes, oral cancer is misdiagnosed in its early stages due to its asymptomatic presence and can be mistaken for benign conditions such as canker sores or gum disease (Sujir et al., 2019). Over the past two decades, advancements in diagnostic technologies have enhanced the early detection of precancerous lesions (Herráthern et al., 2021). Despite these improvements, the 5-year survival rate for oral cancer has remained relatively stagnant, highlighting the need for continued research into early intervention strategies (NIDCR, 2023). While oral cancer predominantly affects individuals over the age of 40, cases have been observed across all age groups. Individuals over 40 years old worldwide experience higher mortality rates from oral cancer compared to those under 40. For example, per 100,000 individuals over 40, the mortality rate is 84.68% higher than all oral cancer cases. Additionally, the mortality rate in this older population is 96.97% higher than the coldest counterpart with the 15-39 age group (NIDCR, 2023).

In comparison to developed nations like the United States, South Asian countries such as India, Bangladesh, Pakistan, and Sri Lanka report substantially higher incidence rates of oral cancer, largely due to disparities in healthcare access, socioeconomic conditions, and cultural practices (Saraswat el al., 2020). Oral cancer accounts for a significant proportion of all cancer cases in the region, with incidence rates surpassing those of many neighboring and developed countries. For example, South Asia records approximately 143.20 new cases annually per 100,000 individuals, higher than the closest regional counterparts in Southeast Asia reporting

28.95 cases (Sun et al., 2023). Despite global advancements in early detection and treatment, the prevalence of oral cancer is still rising in Southeast Asian nations, highlighting the critical need for focused intervention in the region.

South Asian men carry a significantly higher rate for oral cancer, experiencing disproportionately high incidence and mortality rates compared to other demographic groups (BMC, 2020). The disease remains a significant health challenge among middle-aged and older men, who account for a large share of diagnosed cases (Jaul & Barron, 2017). (EXPAND) Additionally, younger men in the region have been increasingly affected contributing to a growing public health concern (NIH, 2017).

Recent research has focused on identifying and understanding how various factors contribute to the rising incidence of oral cancer. However, significant gaps remain in the literature regarding the region's diverse cultural, economic, and healthcare challenges. While South Asian countries share similar issues related to oral cancer, each nation faces distinct disparities in oral health. Countries such as India, Pakistan, Bangladesh and Sri Lanka exhibit differences in healthcare infrastructure, accessibility, and public health policies, underscoring the need for region-specific strategies to combat the growing burden of oral cancer (NIH,2024). The literature review aims to explore the risk factors contributing to oral cancer in men in South Asia, with a focus on the role of environmental, behavioral, and systemic factors.

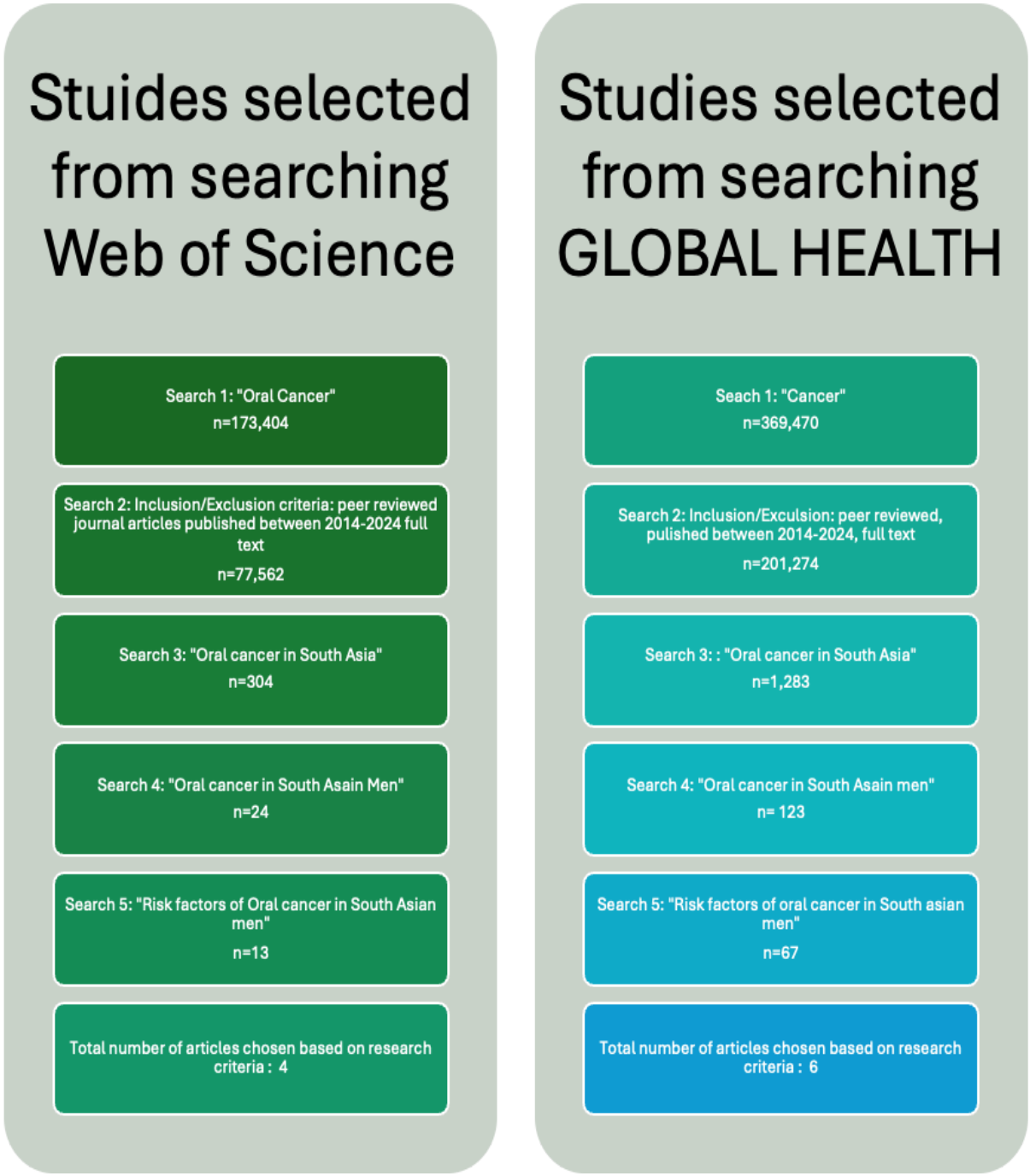
Methods

The two databases chosen for this literature review, Web of Science and GLOBAL HEALTH, were selected because they focus on biomedical and population health research. These databases provide extensive coverage of medicine and health-related issues, offering a substantial number of articles relevant to the research question. Many studies were found on oral cancer and its contributing factors. Both databases include peer-reviewed journal articles from 2014-2024, ensuring high research quality and reliability. Web of Science contains over 22,000 peer-reviewed scholarly articles covering various scientific disciplines. Global Health advanced search specializes in public health. Specific search terms and inclusion/exclusion criteria, which will be discussed later, were applied to both databases. While Global Health provided more articles, both databases contributed to the final 10 peer-reviewed journal articles.

For both Web of Science and Global Health, the search process stayed consistent to guarantee clarity. The first search term, “Oral cancer,” was used to gain a general understanding of the topic, providing 173,404 articles in Web of Science and 369,470 in Global Health. To refine the results, exclusion and inclusion criteria were applied, eliminating outdated, non-human, and non-peer-reviewed articles. Next, the search was narrowed to “Oral cancer in South Asia,” which resulted in 304 articles in Web of Science and 1,283 in Global Health. To focus on a specific population, the term “Oral cancer in South Asian men” was searched, reducing the results to 24 articles in Web of Science and 67 in Global Health. Finally, to fully address the research question, “Risk factors of oral cancer in South Asian men” was used as the final search term, yielding 13 articles in Web of Science and 67 in Global Health. From these, four articles were selected from Web of Science, and six were chosen from Global Health.

The inclusion and exclusion criteria remained consistent across Web of Science and Global Health, Inclusion criteria required peer-reviewed articles published within the past 10 years between (2014- 2024), focusing solely on the South Asian male population. To maintain reliability and relevance, exclusion criteria left out studies that did not address the research question, as well as any studies including females, men from other regions and review articles and meta-analyses. *Figure 1* outlines the selection process of the 10 final peer-reviewed articles.

Figure 1: Literature Review Article Selection Process



Oral cancer remains a significant public health concern in South Asia, particularly among men, due to the influence of various sociocultural and economic factors that contribute to its prevalence. This literature review highlights three primary risk factors for oral cancer in South Asia: social pressure and cultural norms, inequality in healthcare access, and the impact of socioeconomic factors. For a more detailed summary of the articles reviews see, *Table 1. Detailed Summary of Articles reviewed.*

Influence of Social Pressure and Cultural Norms-

Social pressure and cultural norms heavily influence the use of carcinogenic substances like betel quid and smokeless tobacco. In many South Asian communities, chewing betel quid is more than a habit and is often shared among friends and family (Tami-Maury et al., 2019). Many individuals are introduced to betel quid at a young age, making it a familiar and normalized part of their culture (Tami-Maury et al., 2019). More than 53% of first time users start using these products with the family, often influenced by their grandfather or father (Niaz et al.). Similarly, peer and family influence play a major role in adolescent tobacco use. When young people see their parents or older relatives regularly using smokeless tobacco, it becomes an accepted behavior, making them more likely to adopt the habit themselves (Hussain et al., 2017). This influence is evident in Mumbai, where 40% of school students and 70% of college students are reported to regularly consume gutkha (Niaz et al. 2017). Social acceptance within households further reinforces this cycle, turning occasional use into long-term dependence (Hussain et al., 2017). Despite the well-documented health risks, the cultural acceptance of betel quid and smokeless tobacco makes quitting incredibly difficult. These traditions are deeply ingrained, often carrying more weight than public health warnings (Khan et al., 2016). This is especially

concerning given that oral cancer accounts for 30–40% of all cancer cases reported in India, and over 90% of oral cancer cases have been linked to the use of tobacco products (Niaz et al 2017.). As a result, efforts to curb their use must go beyond education and address the cultural significance that keeps these practices alive. For a more detailed summary of the articles reviews see, *Table 1*.

Inequality in Access to Healthcare-

For many people in underserved regions, access to healthcare can mean the difference between life and death. Limited access to medical services often leads to delayed diagnoses, making treatment less effective and survival rates lower. Socioeconomic factors play a significant role in whether someone can get the screenings and early care they need. In Southeast Asia, healthcare disparities make preventive care challenging to access, which results in more late-stage diagnoses and higher mortality rates. In Southeast Asia, nearly 75% of oral cancer cases are diagnosed at advanced stages, contributing to five-year survival rates as low as 30% (Amanat et al., 2024). Only one in 100 current male tobacco users in India undergo Oral Cancer Early Screening , significantly increasing their risk of undetected and untreated premalignant and malignant oral cancer lesions (Diwan et al. 2023)In Myanmar, rural communities face an alarming number of oral cancer cases due to a lack of medical resources and infrastructure (Mizukawa et al., 2017). Likewise, in India, lower-income populations struggle with financial and logistical barriers that keep them from getting screened (Roy et al., 2023). When people can’t reach a doctor in time, their chances of survival drop drastically. That’s why investing in better healthcare infrastructure, making services more affordable, and increasing awareness are crucial steps in closing this gap. Everyone deserves a fair chance at early detection and better health outcomes.

Socioeconomic Factors

Economic conditions play a big role in behaviors that increase the risk of oral cancer. Research by (Gupta et al. 2014) found that low-income communities in Ahmedabad had a higher rate of oral cancer, with tobacco and betel quid use being key risk factors. Similarly, (Ullah et al. 2023) showed that in Northern Pakistan, risk factors like tobacco use, poor oral hygiene, and lack of healthcare were closely tied to socioeconomic status. Adolescents from lower-income backgrounds are especially at risk. A study by (Hussain et al. 2017) found that these young people were more likely to use smokeless tobacco, which increases their chances of developing oral cancer at a younger age. These studies highlight how economic hardship is linked to higher rates of oral cancer and suggest that addressing these disparities could help reduce the risk factors and improve health outcomes for entire communities

RISK FACTORS ASSOCIATED WITH ORAL CANCER PREVALENCE- *Table 1. Detailed Summary of Articles Reviewed*

	Author(s)	Years	Article Title and journal	Purpose of article	Sample info	Type of research	Research Findings	Limitation of articles
1	Tami-Maury, Irene, Ma, Wei-Fe, Lin, Mi-Ting, Lin, Cheng-Chieh,Tsai, Ming-Hsiu, Li, Chia-Ing, Li, Tsai-Chung, Krukrubo, Rosetta, Gritz, Ellen R.	2019	A qualitative study of attitudes to and perceptions of betel quid consumption and its oral health implications in Taiwan Oral diseases	Discusses the cultural aspects of betel quid chewing which is one of the leading factors of oral cancer	The majority of participants chewed BQ every day (53.7%) and started chewing at age 18 or younger (56.1%). Over half of the participants were current cigarette smokers (68.3%) and alcohol drinkers (51.2%).	Review article	Highlights major clinical features, risk factors, and challenges in early detection and treatment	It discusses data from outside of the preferred region.
2	Roy,S; Girotra,S;(...);Basu, S	2023	Prevalence and determinants of tobacco consumption and oral cancer screening among men in India: evidence from a nationally representative cross-sectional Survey Journal of public health-heidelberg	To analyze tobacco use and oral cancer screening behaviors among men in India	The total sample included 101839 men of whom 43.43% (n = 44227) consumed tobacco (any form) with higher consumption in the socially disadvantaged groups. Only 1.06% (n = 429) men reported that they had undergone oral cavity examination screening (OCES) for oral cancer. Moreover, 1.11% (n = 344) and 0.92% (n = 178) of smoking and smokeless tobacco users, respectively, had undergone screening for oral cancer.	Cross-sectiona l survey	Highlights the impact socially living in a disadvantaged neighborhoods consumption of tobacco	Self-reported data may introduce bias, cross-sectional design limits causal conclusions
3	Gupta, PC (Gupta, P. C.) ; Ray, CS (Ray, C. S.) ; Murti, PR (Murti, P. R.) ; Sinha, DN (Sinha, D. N.)	2014	Rising incidence of oral cancer in Ahmedabad city Indian journal of cancer	To evaluate the increase in oral cancer cases in Ahmedabad, India		Epidemiologic al study	Age-specific incidence rates have grown over the past 25 years due to the increased consumption of areca nut, mawa and gutka	Small sample size only focuses on one city on india
4	khan, Z (Khan, Zohaib) ; Khan, S (Khan, Sheraz) ; Christianson, L (Christianson, Lara) ; Rehman, S (Rehman, Sara) ; Ekwunife, O (Ekwunife, Obinna) ; Samkange-Zeeb, F	2016	Smokeless tobacco and oral potentially malignant disorders in South Asia: a protocol for a systematic review Systematic Review	To outline the methodology for a systematic review on smokeless tobacco use and oral malignancies	90 % of the SLT burden of the whole world lies in the South Asian countries of Pakistan, India, Sri Lanka, Bangladesh, Bhutan, Nepal, Afghanistan, and Maldives.	Systematic Review	The burden placed on south asian countries due to smokeless tobacco	only a protocol

	(Samkange-Zeeb, Florence)							
5	Mizukawa, N;Win,SS;(...);Sein ,T	2017	The incidence of oral and oropharyngeal cancers in betel quid-chewing populations in south myanmar rural areas	To investigate the incidence of oral and oropharyngeal cancers in betel quid-chewing populations	Thirty-nine lesions were detected by this oral cancer screening in the high-risk oral habits group (Table 2). We found not only 2 oral carcinomas but also 1 oropharyngeal carcinoma (Fig. 2). Other lesions included 7 cases of leukoplakia, 4 lichen planus lesions, and 1 submucous fibrosis	Observational study	Different oral habits leading to oral cancer	Myanmar, lacks generalizability
6	Amanat,MU;Sriplung, H and Kerdpon,D	2024	Addressing health inequities in Southeast Asia: challenges and opportunities	To explore disparities in oral cancer care and prevention in Southeast Asia	SA people and males typically experience higher OC incidence and mortality rate overall loss% 31.1(Pakistan) and 24.8 (Laos)	Policy analysis	Highlights the negative correlation between mortality and incidence rate	Lacks quantitative data, focuses on policy recommendations
7	Niaz, K ; Maqbool, F Faheem) Khan, F Bahadar, H (Bahadar, Haji) Hassan, FI Abdollahi, M	2017	Smokeless tobacco consumption, prevalence, and contribution to oral cancer	To explore how different aspects of smoking impacts different groups in south asia	Taiwan- In more than 53% of cases, use of these products started among family members influenced by the grandfather and father Indian-In India, mostly children and teenagers chew gutkha occasionally or regularly. In Mumbai, 40% of school students and 70% of college students have been reported to regularly consume gutkha and Wardha, gutkha was found to be used by approximately 46.4% of men and 20% of women Pakistan-More than 90% of oral cancer cases have been reported to be associated with the use of tobacco products, indicating that they are vital factors triggering oral cancer. In Karachi, Pakistan, 40% of the populations have used chewable betel, areca, and	Different research was administered for different south asian countries. Taiwan and pakistan-questionnaire India-Case-control Ski lanka-Cross-sectional study	Different aspects that lead to high tobacco use in these countries	Discusses information outside of the preferred region

					tobacco products in their daily life			
8	Azmina Hussain; Sidra Zaheer,; Kashif Shafique	2017	Individual, social and environmental determinants of smokeless tobacco and betel quid use amongst adolescents of Karachi: a school-based cross-sectional survey	To examine the factors influencing smokeless tobacco and betel quid use among adolescents in Karachi	An overall 30 days prevalence of SLT and/or BQ use was Estimated to be 42.6% (n= 912) of the Total sample whereas 57.4% (n = 1228)	Cross-sectiona l survey	Highlights the gender differences and how the consumer group is higher in men than female in south asia	Self-reported data, may not represent all adolescents in Karachi
9	Ullah, Ahsan; Pervez, Namal; Javaid, Muhammad Mohsin; Din, Shahab Ud; Liaqat, Sehrish; Junaid, Muhammad	2023	Assessment of the Influence of Risk Factors on the Incidence of Oral Squamous Cell Carcinoma (OSCC) in the Northern Pakistani Population	To evaluate how risk factors contribute to OSCC in Northern Pakistan	110 (73.3%) male and 40 (26.7%) female patients. Mean ±SD of age of OSCC patients was 47.00± 9.170 years. Among the participants 9 (6.0%) smokers, 39 (26.0%) consumed alcohol, use betel and 24 (16.0%) areca nut pan.	Cohort study	Association with smoking and age as well as betel quid showing statically significant collection with gender.	Limited to one region, may not generalize to all of Pakistan
10	Diwan, Prerna, Nirwan, Mohit, Bahuguna, Mayank, Kumari, Shashi Prabha, Wahlang, James Gupta, Rakesh Kumar	2023	Evaluating alterations of the oral microbiome and its link to oral cancer among betel quid chewers: prospecting reversal through probiotic intervention.	observing changes in the oral microbiome among betel quid chewers and identifying potential links to oral cancer	tobacco and alcohol as the two most important associated factors accounting for 75–90% of OC in people with the habit of chewing BQ and AN,	Cohort study	Highlights the impact of betel quid and the change it has on the oral microbiome on the development of oral cancer	Generalized information not specific to just men or the south asian region.

Discussion

To effectively address the impact of oral cancer in South Asia, it is crucial to understand the underlying risk factors contributing to its prevalence. Social and economic influences play a significant role in oral cancer risk, highlighting the need for targeted interventions and policy reforms to reduce its burden among South Asian men. This literature review examines the main risk factors that contribute to worse oral cancer outcomes in men across the region, emphasizing the most prominent drivers of increased mortality. This paper brings attention to the health behaviors and social norms that sustain these risks, as well as the limitations in healthcare advancements that further contribute to high oral cancer mortality rates in South Asia.

The findings underscore the significant role that social norms, healthcare disparities, and economic conditions play in the prevalence of oral cancer among South Asian men. These factors are deeply interwoven with cultural practices and socioeconomic challenges, creating an environment where individuals may have limited access to resources or information to protect their health. Addressing the widespread use of betel quid and smokeless tobacco through culturally appropriate awareness campaigns is essential in this context. Such efforts can help break down long-standing habits and provide individuals with the knowledge they need to make informed health decisions (Tami-Maury et al., 2019; Khan et al., 2016). Furthermore, the need for improved early detection and cancer screening programs in underserved areas cannot be overstated. Many communities face significant barriers to healthcare access, leading to late-stage diagnoses when treatment options are less effective and outcomes are poorer. Enhanced screening efforts tailored to high-risk populations are crucial in improving survival rates and reducing the burden of oral cancer (Amanat et al., 2024; Roy et al., 2023).

Socioeconomic interventions are equally important in combating the rise of oral cancer. Reducing economic barriers to healthcare, including prevention and treatment services, is essential for ensuring that all individuals have the opportunity to receive timely care. By implementing policies that address these economic disparities, we can create a more equitable healthcare system for those who are most at risk (Gupta et al., 2014; Ullah et al., 2023). Ultimately, combating oral cancer requires a multifaceted approach. This includes not only cultural sensitivity in public health campaigns but also substantial healthcare reforms and economic policies that address the root causes of the issue. By taking a comprehensive approach, we can better equip communities to fight this preventable disease and improve health outcomes across South Asia.

Limitations of the Review

While this review provides valuable insights, several limitations must be acknowledged. The studies analyzed have constraints that impact the generalizability of their findings. One key limitation is the geographical scope many studies focus on specific regions, such as India or Pakistan, making it challenging to apply their conclusions to all of South Asia (Mizukawa et al., 2017; Gupta et al., 2014). Additionally, issues related to study design must be considered. Some studies rely on self-reported data, which introduces the possibility of bias and inaccuracies (Hussain et al., 2017; Roy et al., 2023). Another limitation is the lack of longitudinal data, as many of the studies reviewed are cross-sectional or observational, making it difficult to establish causal relationships between risk factors and oral cancer prevalence (Khan et al., 2016; Ullah et al., 2023). Furthermore, the review is based on only ten articles, which, while informative, may not capture the full complexity of the issue. These limitations highlight the need for broader,

more rigorous research to strengthen the understanding of oral cancer risk factors in South Asian populations.

Further Research

To effectively combat oral cancer in South Asia, a comprehensive research approach is necessary to address the cultural, social, and structural factors contributing to its prevalence. Future studies should evaluate the impact of culturally tailored awareness campaigns in reducing the use of tobacco, betel quid, and areca nut, as these substances are widely recognized risk factors in the region. Additionally, research should explore the role of community leaders, educators, and faith-based organizations in disseminating cancer prevention messages, as these figures often hold significant influence over public attitudes and behaviors. Studies should investigate strategies for integrating routine oral cancer screening into existing healthcare infrastructures, particularly in rural and underserved areas where access to dental and medical care remains limited. Examining policy measures, such as stricter tobacco regulations, targeted health warnings, and economic disincentives for carcinogenic substances, could provide valuable insights into long-term prevention efforts. By addressing these multifaceted issues, future research can inform public health interventions that promote early detection, enhance community engagement, and ultimately reduce the burden of oral cancer in South Asian populations.

Conclusion

Oral cancer among South Asian men is not driven by a single factor but rather a complex interplay of sociocultural, healthcare, and economic influences. Addressing this pressing public health issue requires a comprehensive and targeted response that considers the unique challenges faced by this population. One of the key findings of this review is the significant role of social pressure, healthcare inequality, and economic constraints in shaping oral cancer risk. Cultural practices such as betel quid and smokeless tobacco use, often deeply ingrained in social norms, continue to fuel the prevalence of this disease. At the same time, disparities in healthcare access prevent early detection and timely treatment, while financial barriers further limit individuals' ability to seek preventative care. To combat this issue effectively, governments and health organizations must implement interventions that are culturally sensitive and economically feasible. Public health campaigns should be tailored to address harmful practices within communities, while healthcare systems must expand access to affordable cancer screenings and treatment. Economic policies that reduce financial barriers to healthcare can also play a crucial role in prevention and early intervention. Ultimately, reducing oral cancer rates in South Asia requires a multidisciplinary approach that brings together public health initiatives, policy reforms, and education efforts.

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