

Investigation of Periodontal Disease Status in Small Cell Lung Cancer Greek Patients: A Case - Control Study

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Abstract

Introduction: Substantial epidemiological evidence links periodontal disease to various systemic malignancies, including upper respiratory, gastrointestinal, and urogenital tract cancers. This study evaluated the periodontal status of patients with small cell lung cancer relative to a healthy control cohort.

Methods: This case-control study utilized a sample of 48 patients diagnosed with small cell lung cancer and 144 matched healthy controls recruited across one dental and three medical private practices. Comprehensive clinical periodontal assessments were conducted to record probing pocket depth, clinical attachment loss, and bleeding on probing, alongside a standardized health questionnaire. Confounder-adjusted univariate and multivariate logistic regression models were applied for data analysis.

Results: After controlling for educational attainment, socioeconomic status, and smoking habits, multivariate logistic regression demonstrated that the small cell lung cancer cohort exhibited a significantly greater prevalence of tobacco exposure ($p = 0.022$, 95% CI = 0.773-3.135) and an elevated bleeding on probing index ($p = 0.027$, 95% CI = 0.734-3.020) compared to healthy controls.

Conclusion: These findings demonstrate distinctive periodontal and behavioral profiles between the groups, characterized by a significant clustering of extensive tobacco usage and adverse bleeding on probing scores among small cell lung cancer patients, after rigorous adjustment for socio-demographic variables and smoking status.

Keywords: Periodontal disease; Small cell lung cancer; Risk factors; Adults

Introduction

Lung cancer remains the leading determinant of oncology-related mortality globally. In the United States alone, it accounted for an estimated 130,180 deaths in 2022, representing approximately 21% of the total oncological mortality burden [1,2]. International epidemiological data from 2020 established an annual global incidence of 2.2 million cases, with 227,875 of these documented within the United States. Importantly, small cell lung cancer (SCLC) comprises roughly 14% of these diagnoses [1,3]. On a global level, SCLC affects approximately 250,000 individuals and accounts for nearly 200,000 deaths annually [4]. Etiologically,

tobacco use remains the predominant driver, precipitating over 95% of all SCLC presentations [5]. Lung cancer persists as the leading cause of cancer-related death in males and the second leading cause in females worldwide [1]. Epidemiological analysis further highlights prominent ethnic and socioeconomic status (SES) disparities. While the overall burden of lung malignancies in 2019 was substantially higher among males of African lineage compared to those of European descent regarding both incidence (67.1 vs. 60.9 per 100,000) and mortality (48.9 vs. 42.4 per 100,000), a paradoxical trend emerged specifically for SCLC [6]. In contrast to non-small cell lung cancer (NSCLC) patterns, individuals of African origin exhibited a lower susceptibility to

SCLC relative to their European counterparts (5.2 vs. 6.4 per 100,000 in 2019) [6]. Furthermore, SCLC incidence is associated inversely with SES, closely mirroring established tobacco exposure patterns [7]. A recent, extensive pooled analysis of case-control investigations confirmed that lower SES constitutes an independent risk factor for lung malignancies, including SCLC. Even after rigorous adjustment for smoking behavior, individuals in the lowest SES strata exhibited a significantly elevated risk compared to high-SES cohorts (OR = 2.13, 95% CI: 1.63-2.77 for males, and OR = 2.85, 95% CI: 1.57-5.18 for females; p -trend < 0.001 for both genders) [7]. Despite its high lethality, the genetic architecture predisposing individuals to SCLC has yet to be fully elucidated. Nonetheless, specific germline variants are increasingly recognized as potential actionable targets. At the cellular level, SCLC manifests profound intra-tumoral heterogeneity and molecular complexity, which fundamentally dictate its capacity to evade conventional therapeutic modalities [8]. Secondary prevention strategies via low-dose computed tomography (LDCT) screening have been shown to reduce lung cancer-specific mortality by up to 20%. However, this clinical benefit is largely confined to NSCLC patients [9]. Consequently, considerable research has shifted toward investigating novel blood-based biomarkers for early detection, which have demonstrated promising diagnostic potential. Nevertheless, the clinical utility of these systemic biomarkers, specifically their capacity to enhance population-level cancer control against an aggressive malignancy like SCLC, remains to be fully established. Despite recent therapeutic advancements, survival rates for SCLC remain suboptimal. Although the 2-year relative survival rate for limited-stage SCLC experienced a modest optimization, rising from 36% during the 2001-2002 period to 46% in the 2015-2016 cohort, the prognosis for extensive-stage disease persists as exceptionally poor. This advanced stage is characterized by a 2-year relative survival rate of merely 7% to 8% and a median survival duration of approximately 7 months [10]. Several risk factors have been implicated in the pathogenesis of SCLC. Tobacco combustion represents the foundational behavioral determinant of pulmonary oncogenesis, precipitating over 95% of all SCLC presentations [5]. Diverse cumulative exposure indices, including smoking duration, inhalation intensity, cumulative pack-years, chronological latency since cessation, and age at smoking onset, have been rigorously evaluated regarding their relative contribution to lung cancer risk [11]. Consistent with patterns observed in NSCLC, SCLC susceptibility is profoundly elevated in active smokers (OR=42.0, 95% CI: 21.7-81.2) compared to former smokers (OR = 17.1, 95% CI: 9.5-31.0) [12]. Although smoking cessation triggers an immediate attenuation of oncogenic risk, individuals fail to return to the baseline susceptibility of never-smokers, maintaining elevated risk profiles even 35 years post cessation [13].

Epidemiological estimates indicate that approximately 2% to 3% of SCLC cases occur in never-smokers [14,15], underscoring the role of environmental, occupational, and hormonal etiologies. Across diverse global populations, residential exposure to radon gas constitutes the second most critical risk factor for lung malignancies, superseded only by active smoking [16]. Previous investigations confirm that domestic radon exposure is significantly associated with an elevated risk of SCLC [16]. At the molecular level, radon exposure is closely linked to somatic mutations in the TP53 tumor suppressor gene, a molecular hallmark identified in up to 90% of SCLC patients, in sharp contrast to the 23% to 65% mutation frequency observed in NSCLC cohorts [8,17,18]. Occupational carcinogens are estimated to account for up to 15% of lung cancer cases among males and 5% among females [19,20]. The primary occupational and industrial drivers include asbestos fibers [19,20], exposure to cigarette smoking [21], exposure to tar and soot containing benzopyrene [22], and heavy metals such as arsenic, chromium, and nickel [19,20,23]. While certain studies highlight crystalline silica and diesel exhaust emissions as notable occupational hazards [19,20], other literature suggests a weaker or less definitive association with lung malignancy risk [24]. Additionally, out- and indoor air pollution, predominantly in low- and middle-income countries, alongside passive smoke exposure, represent established risk factors. However, current literature remains limited, as most ambient exposure studies omit stratified analyses specifically for SCLC or suffer from restricted sample sizes. Eventually, hormonal profiles, reproductive histories, and dietary habits have been hypothesized to modulate SCLC risk [25,26]. Nonetheless, findings from epidemiological studies remain highly inconsistent, primarily due to statistical limitations and the comparatively smaller sample sizes of SCLC cohorts relative to other histological subtypes [27,28].

The genetic susceptibility to SCLC remains largely unclarified at the genomic level. Current genome-wide association studies (GWAS) frameworks, such as those evaluating the 15q25, 5p15, and 6p21 loci, demonstrate a predominant association with the NSCLC phenotype [29-33]. This distinct divergence highlights a unique molecular landscape for SCLC and underscores the critical necessity for larger sample cohorts to effectively map its genomic variations [31,33]. A notable exception to this pattern is the smoking-related 15q25 locus, which exhibits a robust association with SCLC susceptibility due to its direct causal link with tobacco inhalation behaviors [30,34,35]. Additionally, a recent meta-analysis identified five specific genetic variants, CHRNA5, CYP1A1, GSTM1, NQO1, and XPC, with significant associations to the disease, although the cumulative evidence supporting these specific targets remains moderate to weak [25]. Approximately 10% of patients diagnosed with SCLC harbor pathogenic germline

variants within DNA damage repair (DDR) genes. Individuals inheriting mutations in critical genes, including BRCA1, BRCA2, RAD51D, CHEK1, and MUTYH, exhibit a significantly heightened genetic predisposition to SCLC oncogenesis. This elevated risk is particularly pronounced upon concurrent exposure to environmental carcinogens, most notably tobacco smoke [36]. Periodontal Disease (PD), systematically categorized into gingivitis and periodontitis, constitutes a highly prevalent, destructive, and progressive chronic inflammatory disorder affecting approximately 15% of the global adult population. Initiated by bacterial infections infiltrating the gingiva and the supporting periodontal architecture, its prevalence and severity correlate positively with advanced age, tobacco use, and suboptimal oral hygiene. Pathogenic intraoral bacteria [37] and associated viral agents [38] elicit a robust host immuno-inflammatory response. This biological cascade induces periodontal pocket formation, clinical attachment loss, hemorrhage, and alveolar bone resorption, with aggressive phenotypes ultimately culminating in tooth loss. Furthermore, complex associations involving immuno-deficiencies, osteoporosis, and specific infectious variables of the oral microflora remain under active investigation [39,40]. Beyond localized tissue destruction, periodontal infection exerts severe systemic effects across multiple vital organs, including the cardiovascular and pulmonary systems [41]. The underlying pathophysiological mechanism is characterized by elevated generation of reactive oxygen species (ROS) and subsequent oxidative stress, mediated by interactions with acute-phase cytokines and chemokines, such as Interleukin (IL)-1, IL-6, and C-reactive protein (CRP), which modulate PD severity [42]. The involvement of these inflammatory biomarkers in diverse systemic pathologies is attributed to a generalized inflammatory state, a systemic immune response against periodontal pathogens, or the translocation of oral microflora into the systemic circulation [43,44]. Consequently, extensive epidemiological investigations have evaluated periodontitis as a potential risk factor for systemic comorbidities, establishing significant associations with cardiovascular and atherosclerotic diseases, cerebrovascular diseases, respiratory disorders such as COPD, type 2 diabetes mellitus, rheumatoid arthritis, and various malignancies [40,45-52]. An elevated overall risk of malignancy [53,54], as well as site-specific cancers [55-57], has been robustly associated with poor oral hygiene, PD progression, and tooth loss, independent of confounding variables such as age, gender, smoking habits, and SES. Although the potential causative and oncogenic impact of PD has been evaluated across distinct anatomical sites, including the oral cavity, esophagus, stomach, pancreas, and lungs [54,58-61], available data remain conflicting, even after adjusting for potential confounders. Furthermore, while shared immuno-inflammatory

pathways are hypothesized to underlie both PD and oncogenesis, the precise pathophysiological mechanisms linking PD to cancer risk remain to be fully elucidated. Conversely, a paucity of literature currently exists regarding the assessment of baseline periodontal health or oral symptoms in patient cohorts already diagnosed with malignancies, such as gastric or lung cancer [62-70]. Of note, the periodontal health of patients with highly aggressive tumors, such as lung malignancies, remains substantially underreported in current research. To address this gap, this study was undertaken to compare the periodontal status of individuals with histologically confirmed SCLC cases against healthy controls.

Materials and Methods

Research design and study sample

This retrospective, case-control study was conducted across various clinical environments from May 2024 to June 2026. Calculations for sample size estimation and study power assessment were rigorously based on baseline SCLC prevalence [71] and the EPITOOLS guidelines [72] (<https://epitools.ausvet.com.au>), utilizing a 95% Confidence Interval (CI) and a target statistical power of 0.8. Age group stratification was aligned with the epidemiological recommendations of the World Health Organization (WHO) [73] for assessing the incidence of lung malignant tumors [74]. The overall cumulative study population consisted of 192 individuals, comprising a pooled cohort of both male and female participants aged between 45 and 73 years, who were enrolled from private dental, and general medical practices. The active patient cohort included 48 validated SCLC cases, whereas 144 healthy individuals were enrolled to comprise the control group. To establish a robust baseline and adjust for potential confounding variables, including tobacco use, SES, and educational background, controls were carefully selected from the social, professional, or local environment of the cases. Both cohorts were precisely matched for age and gender, and all participants originated from the same urban area to achieve a representative study sample and minimize selection bias. Controls were selected from individuals attending the designated clinical practices for routine health check-ups between 2024 and 2026. Within the patient cohort, the primary diagnosis of SCLC was initially indicated by Magnetic Resonance Imaging (MRI) findings. Nevertheless, definitive confirmation was achieved via thoracic endosonography (EBUS/EUS-b), employing conventional cytologic, histological, and histochemical techniques [75].

Participant selection and exclusion criteria

To qualify for enrollment in this study, participants in both the active patient and healthy controls were required to satisfy strict baseline eligibility parameters. Patients in the case group had to present with a newly diagnosed, histopathologically verified SCLC, in accordance with current WHO diagnostic criteria [74]. For the patient cohort, clinical information, staging, and diagnostic data were obtained directly from official medical registries. To prevent confounding systemic impacts on the biological markers under investigation, all participants, cases and controls, were required to have no history of receiving systemic antibiotics, immunosuppressive agents, or systemic glucocorticoids within the preceding six months. Additionally, individuals were excluded if they had undergone any conservative or surgical periodontal interventions during the previous six months. Individuals with a documented history of severe cardiovascular diseases, diabetes mellitus, rheumatoid arthritis, acute pulmonary conditions, or any other primary malignancy were excluded from the study protocol. These specified conditions could modify oral microbial profiles and periodontal tissue indices, thereby introducing significant secondary analytical biases [76]. For the patient cohort, specific exclusion parameters were strictly applied. Patients presenting with advanced metastatic disease originating from a primary site outside the lungs as well as those with secondary tumors, in other locations, linked to multi-field carcinogenesis theories [77], were excluded. Furthermore, to guarantee unbiased baseline evaluations, SCLC patients were excluded if they had already commenced first line oncological treatments, such as surgical resection, adjuvant chemotherapy, targeted molecular therapy, or radiotherapy, prior to baseline data collection.

Selection of controls and confounding adjustment

Cases and controls were precision-matched in a 1:3 ratio based on gender, age (± 4 years), SES, and smoking status (categorized as current, former, or never-smokers), as these covariates represent principal risk factors for systemic inflammation and epidemiological variances [78-80].

Data collection and standardized questionnaire

All eligible cases and healthy controls completed a modified version of the Minnesota Dental School Medical Questionnaire [81]. This standardized questionnaire was utilized to gather comprehensive data regarding patients' past medical and dental histories, current systemic disorders, and a wide array of epidemiological and socioeconomic variables. To conserve statistical power and eliminate the risk of multi-collinearity within the multivariable regression models, age, biological gender, educational level, and SES were the primary covariates utilized for statistical adjustment. Broader socio-demographic parameters, such as race, alcohol consumption, etc., were intentionally omitted

from multivariate weighting due to the relatively small sample size of the SCLC cohort.

Definition and measurement of covariates

Sociodemographic characteristics were incorporated as covariates in the statistical analysis. Chronological age of cases and controls was stratified into four distinct cohorts, 45-50, 51-60, 61-70, and > 71 years. SES was defined based on monthly income and dichotomized as $\leq 1,000$ € and $> 1,000$ €. Educational attainment was categorized into primary (elementary education) and higher education (University/College) levels. Tobacco consumption was classified into two operational categories, never-smokers (individuals who had consumed fewer than 100 cigarettes during their lifetime) and active/former smokers (individuals who had smoked at least 100 cigarettes in their lifetime, subdivided into those reporting current daily or occasional smoking, and those reporting complete cessation).

Assessment of clinical and periodontal parameters

Assessment of oral and periodontal status was carried out by a single calibrated Dental Surgeon. To maintain consistency, all evaluations took place in a uniform clinical setting using a standardized dental light, a mouth mirror, and a pressure-controlled periodontal probe calibrated to a constant force of 0.2 N (UNC 15/Williams type, model DB764R, Aesculap AG & Co. KG, Tuttlingen, Germany) to minimize examiner subjectivity. To eliminate the risk of skewing chronic periodontal metrics with acute findings, both third molars and remaining retained roots were systematically omitted from the scoring process in all quadrants. The baseline periodontal profile was documented by concurrently evaluating three standard indices, bleeding on Probing (BOP), Probing Pocket Depth (PPD), and Clinical Attachment Loss (CAL). For maximum diagnostic sensitivity, indexing was performed across all dental quadrants. Measurements were recorded at six distinct sites per tooth (mesiobuccal, mid-buccal, disto-buccal, mesio-lingual, mid-lingual, and disto-lingual). The highest severity value obtained for each index was rounded to the nearest 1.0 mm and subsequently transformed into dichotomous categorical variables for statistical evaluation. Periodontal parameter evaluation followed the standardized staging criteria for PPD, dividing patients into Stage I/II (maximum PPD ≤ 4.0 mm or ≤ 5.0 mm, respectively, presenting mostly with horizontal bone loss) and Stage III/IV (Stage III: PPD ≥ 6.0 mm alongside vertical bone loss ≥ 3.0 mm, Class II/III furcation defects, or moderate ridge resorption; Stage IV: fulfilling all Stage III requirements but requiring advanced multidisciplinary rehabilitation due to masticatory dysfunction, secondary occlusal trauma, tooth mobility $\geq$ degree 2, advanced ridge defects, bite collapse, tooth migration, or < 20 remaining teeth/10 opposing pairs) [82]. For

Clinical Attachment Loss (CAL), stratification separated Stage I/II (interproximal CAL at the highest site measuring 1-2.0 mm or 3-4.0 mm, respectively) from Stage III/IV (Stage III: interproximal CAL at the highest site ≥ 5.0 mm with ≤ 4 teeth lost to periodontitis; Stage IV: interproximal CAL ≥ 5.0 mm with ≥ 5 teeth lost to periodontitis) [82]. Bleeding on Probing (BOP) was checked circumferentially and treated as a binary variable: Score 0 for no hemorrhage and Score 1 for presence of bleeding. A positive BOP score was confirmed if visual display of marginal or sulcular bleeding occurred within 15 seconds after controlled probe application.

Clinical standardization and intra-examiner reliability

To confirm the reproducibility of the clinical findings and strictly evaluate examiner consistency, a random sub-sample of 38 individuals (constituting 20% of the total study population) was chosen for a secondary reliability analysis. These participants were subjected to a blinded clinical re-evaluation by the initial examining dental surgeon following a strict three-week washout period. Statistical concordance between the initial and secondary clinical records indicated an outstanding level of reproducibility, evidenced by a calculated Cohen's Kappa coefficient of 0.97. To maintain baseline examiner consistency and prevent temporary behavioral modifications from altering the oral microenvironment, participants received no oral hygiene instructions during this three-week observational timeframe.

Ethical considerations

Given the non-experimental, retrospective observational nature of this study, the research protocol complied fully with institutional exemption frameworks designated for retrospective registry evaluations. Prior to enrollment in the study protocol, all participants (or their legally authorized representatives) received comprehensive details regarding the specific objectives, methodologies, and clinical relevance of the study, and subsequently provided written informed consent.

Results

The mean age of the study sample was 58 ± 4.5 years. Table 1 presents the outcomes after application of Univariate analysis, and showed that none of the evaluated indices differed to a statistically significant degree between patients and controls. Table 1 also presents Unadjusted OR's and 95% CI for each variable analyzed. After application of the first step (step 1a - Enter method) of the logistic regression model it was found that all examined parameters showed no statistically significant variation between cases and controls. Table 2 also demonstrates Adjusted OR's and 95% CI for

each index examined. The final step (step 9a - Wald method) of the model showed that former/current smokers ($p=0.022$), and the manifestation of hemorrhage upon probing of the gingival crevice or pocket (BOP) ($p=0.027$), were statistically significant different between cases and controls, after adjusting for gender, and age (Table 2).

Discussion

Socio-demographic profiles, specifically age, gender, educational attainment, and SES, demonstrated no statistically significant variance between the case and control groups. Conversely, smoking status profiles diverged substantially, with the SCLC cohort exhibiting a markedly elevated prevalence of tobacco exposure relative to healthy controls.

Tobacco consumption is well-established as a critical risk factor accelerating both the pathogenesis of PD and various malignancies [83]. However, it frequently introduces confounding bias in epidemiological frameworks exploring the potential association between PD and cancer types where smoking etiologically contributes to oncogenesis. To rigorously evaluate periodontal status, the most widely adopted clinical parameters comprise a comprehensive suite of indices, including probing pocket depth (PPD), clinical attachment loss (CAL), gingival index (GI), plaque index (PII), bleeding on probing (BOP), bleeding point index (BPI), alveolar bone loss (ABL), and indices of missing or remaining teeth [84].

Existing literature highlights that oral lesions frequently serve as the initial clinical presentation for diverse malignancies, such as multiple myeloma (MM) [85-87], lung cancer [62], and gastric cancer [63].

In the present study, intergroup analysis revealed no statistically significant elevation in PPD among cases compared to controls. This observation remained robust even after rigorously controlling for potential confounding factors, including smoking status, SES, and educational attainment. Although PPD reflects the tissue-destructive pathology driven by chronic inflammatory cascades and remains a gold standard for staging PD severity [88], conflicting evidence exists. For instance, a prospective cross-sectional cohort reported that 76.0% of patients diagnosed with oral or oropharyngeal malignancies presented with a severe PPD of ≥ 6.0 mm, in marked contrast to a mere 10.0% of healthy controls [61]. Correspondingly high PPD profiles have been documented in prior investigations regarding acute leukemia patients [66]. Conversely, a recent case-control study focusing on lung cancer patients established that PPD variance between cases and controls lacked statistical significance [62]. Comparable clinical parameters and consistent statistical profiles have likewise been documented in research concerning MM [51], gastric cancer [63], colorectal

cancer (CRC) [65], and glioblastoma (GBM) populations [68] CAL constitutes another critical index for assessing periodontitis severity [88], reflecting the longitudinal stages of chronic inflammation and the cumulative manifestations of tissue-destructive inflammatory processes. The current study demonstrated no statistically significant variance in CAL values between the case and control groups. Furthermore, equivalent findings regarding the CAL index within SCLC cohorts have not been previously examined in the literature.

In contrast, similar investigations focusing on distinct anatomical regions demonstrated that patients diagnosed with malignancies of the lung [62], stomach [63], breast [64], acute leukemia [66], and GBM [68] exhibited significantly worse mean values regarding the aforementioned index. BOP represents the most pathologically validated indicator of active PD [89]. This clinical marker directly indicates the localized vascular alterations, which are fundamentally mediated by hyperemia, capillary engorgement, and microcirculatory acceleration at the inflammatory focus. Conversely, while PPD and CAL reflect the longitudinal progression of chronic, cumulative tissue-destructive inflammatory complications [90], BOP primarily detects immediate inflammatory exacerbations. Furthermore, despite its wide spread implementation as a diagnostic index for marginal gingivitis, the clinical presentation of deep periodontal pockets (≥ 5.0 mm) is associated with a markedly increased prevalence of BOP [89]. In the present study, a statistically significant variance was observed concerning BOP between the case and control groups following statistical adjustment for potential confounding variables. Similarly, significant discrepancies between cases and controls have been reported in equivalent investigations concerning lung cancer [62] and acute leukemia patients [66]. On the other hand similar studies did not confirm such outcomes regarding gastric [63], breast [64], CR cancer [65], and multiple myeloma (MM) patients [67]. The elevated susceptibility to PD among oncological patients has been hypothesized to arise predominantly from psychological burden, rather than from nutritional deficiencies, alterations in salivary quality and quantity,

or treatment-induced disruptions in oral microbial and immunological homeostasis [91,92]. Furthermore, SCLC cohorts may exhibit a heightened vulnerability to the progression and destruction of periodontal tissues relative to healthy controls. This suggestion could potentially be attributed to the extremely poor prognosis associated with metastatic, invasive histological SCLC subtypes, such as SCLC-A (characterized by the predominance of the ASCL1 transcription factor), SCLC-N (characterized by the predominance of the NEUROD1 transcription factor), SCLCP (characterized by the predominance of the POU2F3 transcription factor), and SCLC-I (Inflamed-a subtype exhibiting high inflammatory and immunological activity, associated with superior response to immunotherapy) [93]. The primary objective of the present study was to cross examine periodontal indices between SCLC cohorts and epidemiologically matched healthy controls, rather than to establish an etiological or risk-based causal association between PD parameters and SCLC pathogenesis. Consequently, certain methodological limitations must be acknowledged. Retrospective case-control frameworks inherently lack the robust causal inference characteristic of prospective designs, while selection, recall, and confounding biases may introduce biased secondary associations among the examined variables. Moreover, such study designs rely mainly on self-reported questionnaires, which are susceptible to non-response bias, recall inaccuracy, or systematic over- and underestimation of clinical and medical status. The principal strengths of the present study concern the comprehensive completion of the follow-up period and the utilization of a well-characterized cohort, which facilitated rigorous statistical adjustment for confounding variables and the systematic assessment of interactions among established risk factors. Additionally, the methodological integrity of this investigation is enhanced by the recruitment of an adequate and highly representative sample within a matched case-control design. The utilization of a randomly selected, population based cohort underscores the robustness of this methodology, thereby warranting high internal validity.

Table 1: Univariate analysis of cases and controls regarding each independent variable examined.

Variables	Cases	Controls	p-value	Odds Ratio and 95% Confidence Interval
Gender				
Males	26 (54.2)	80 (55.6)	0.867	0.945 (0.491-1.822)
Females	22 (45.8)	64 (44.4)		
Age (years)				
45-50	10 (20.8)	32 (22.2)	0.964	_____
51-60	14 (29.2)	45 (31.2)		
61-70	12 (25.0)	36 (25.0)		
70+	12 (25.0)	31 (21.5)		

Educational level				
Low	29 (60.4)	89 (61.8)	0.864	0.943 (0.483-1.842)
High	19 (39.6)	55 (38.2)		
Socio-economic status				
Low	33 (68.8)	95 (66.0)	0.724	1.135 (0.563-2.287)
High	15 (31.2)	49 (34.0)		
Smoking status				
Never	20 (41.7)	71 (49.3)	0.359	0.734 (0.379-1.421)
Current/Previous	28 (58.3)	73 (50.7)		
Probing pocket depth				
Stage I/II	18 (37.5)	65 (45.1)	0.355	0.729 (0.373-1.425)
Stage III/IV	30 (62.5)	79 (54.9)		
Clinical Attachment Loss				
Stage I/II	21 (43.8)	68 (47.2)	0.676	0.869 (0.450-1.678)
Stage III/IV	27 (56.2)	76 (52.8)		
Bleeding on probing				
Absence	15 (31.2)	56 (38.9)	0.342	0.714 (0.356-1.433)
Presence	33 (68.8)	88 (61.1)		
p-value : no statistically significant difference was recorded				

Table 2: Presentation of association between PD indices examined and SCLC and healthy individuals according to Enter (first step-1a) and Wald (last step 9a method of multivariate logistic regression analysis model).

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	gender	,584	,364	2,575	1	,109	1,594	,879	2,662
	age.group	,137	,164	,698	1	,403	1,146	,832	1,580
	educ.level	,086	,391	,049	1	,825	1,090	,507	2,345
	socioec.stat	-,156	,393	,157	1	,692	,856	,396	1,349
	smok.stat	,326	,362	,812	1	,168	1,386	,681	2,820
	prob.pock.dep	,301	,391	,591	1	,442	1,151	,628	1,907
	clin.attach.loss	,030	,378	,006	1	,937	,670	,463	1,135
	bleed.prob	,399	,382	1,091	1	,196	1,490	,705	3,148
	Constant	2,174	,575	14,311	1	,000	,114		
Step 9 ^a	smok.stat	,426	,349	1,490	1	,022*	1,531	,773	3,135
	bleed.prob	,398	,361	1,216	1	,027*	1,489	,734	3,020
	Constant	2,343	,616	17,857	1	,000	,158		
a. Variable(s) entered on step 1: gender, age.group, educ.level, socioec.stat, smok.stat, prob.pock.dep, clin.attach.loss, bleed.prob.									
p-value : statistically significant									

Conclusions

The present investigation identified significant variations between the evaluation groups, characterized by a higher smoking

prevalence and deteriorated clinical parameters upon probing of the gingival sulcus or periodontal pocket (BOP) within the SCLC cohort. These profiling distinctions remained robust after adjusting for known confounders.

Declaration of Interest

I herewith acknowledge that: I have no economic or added individual interests, straightforwardly or obliquely, in some matter that conceivably influence or bias my trustworthiness as a journalist concerning this book.

Conflicts of Interest

The authors profess that they have no conflicts of interest to reveal.

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