

Research Article

A Survey of Risk Factors Associated with Tooth Loss Among People in Suwannakili Village, Sanasomboun District, Champasak Province

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Abstract

Background: Oral health care is an integral component of overall physical well-being and quality of life. Despite its importance, disparities in geographic and socioeconomic access continue to limit the utilization of essential dental services in rural and peri-urban regions. Nowadays, health care is becoming more and more important for people, whether it is physical and mental health, or oral health care to maintain good health and personality. There are also oral health consultations and others. **Objective:** To Survey of risk factors associated with tooth loss among people in Suwannakili village, Sanasomboun district, Champasak province. **Method:** This research is a descriptive cross sectional study using a questionnaire to collect information on risk factors for tooth loss among people aged 15-65 years in Suwannakili Village, Sanasomboun District, Champasak Province. **Results:** In this study, a total of 450 people participated. Of these, 218 were female (47.7%) and 239 were male (52.3%). The age group of participants was 15-20 years (20.8%). The marital status was 268 (58.64%). The level of education was high school graduate for 145 (31.73%). The occupation was farming, with 105 and 93 (22.98% and 20.32%) of the participants. The per capita income was between 500,001-1,000,000 kip, with 163 (35.7%). **Conclusion:** A study evaluating the risk factors for tooth loss among residents of Suwannakili village revealed that individuals who smoked, consumed alcohol, and chewed betel nut exhibited the highest prevalence of periodontal pockets measuring 4–6 mm in depth. Within the sample population, N = 457 individuals presented with periodontitis. Overall, periodontitis was diagnosed in 26 participants (26.2%), comprising 17 females (17.1%) and 9 males (9.1%).

1. Introduction

Periodontal disease and dental caries represent the primary etiologies of tooth loss worldwide, posing a significant and rapidly escalating public health challenge across Asian populations. The oral cavity serves as the primary anatomical gateway to systemic health; maintaining periodontally sound and functional oral structures correlates directly with positive overall health outcomes. Conversely, the proliferation of oral pathogens and the subsequent onset of periodontitis and caries lead to irreversible structural loss. This decline in oral health substantially diminishes individual functional capacity, nutritional intake, and overall quality of life.

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In a study examining tooth mortality among 170 adults aged 30–69 years in Thailand, Shanin Tesaprasewaya [1] investigated the relationship between tooth loss, periodontal breakdown, and carious lesions: Age-Related Progression: Older age groups exhibited higher rates of tooth loss, largely driven by periodontitis and advanced dental caries. Periodontal Impact: Periodontitis was predominantly observed in older individuals, with maxillary teeth being the most frequently lost. Caries Burden: Tooth loss resulting from dental caries spanned across all age cohorts, with an average of 2.1 to 7.0 teeth lost per individual. Carious destruction particularly affected the mandibular anterior teeth, though periodontitis remained the overarching primary cause.

These findings align with research conducted by Zambon JJ [2] on the primary indications for tooth extraction among Nigerian patients. The study categorized the major causes of tooth loss as follows: Age-Dependent Patterns of Tooth Loss in Asia. Prior research consistently identifies periodontitis and dental caries as the predominant etiologies of tooth mortality. In a study on tooth loss prevalence within the Singaporean population, Nuun ME.(2003) [3] confirmed that dental caries and periodontal disease constituted the primary drivers of tooth extraction. Notably, the etiology of tooth loss was strongly age-dependent: Caries-Induced Extraction: Peak incidence occurred among individuals aged 21–30 years. Periodontitis-Induced Extraction: The highest rate was observed in the 41–50 age cohort. These observations align with findings from Genco R, Offenbacher S (2002) [4] in Japan. Upon evaluating 11,175 extracted permanent teeth, the authors reported that 55.4% of extractions were attributable to dental caries, while 38.0% resulted from periodontitis. Periodontal-related tooth loss was particularly prevalent among males aged 46–65 years, predominantly affecting the mandibular anterior teeth.

Epidemiology and Public Health Context in Laos. Similarly, periodontitis and dental caries represent the major causes of tooth loss in the Lao population a public health concern anticipated to escalate. Risk behaviors such as tobacco use and alcohol consumption have long been widespread across various Asian nations, including Laos. While numerous experimental and clinical studies have established the link between smoking and oral pathologies, epidemiological evidence regarding these lifestyle risk factors remains limited in this setting. Consequently, rigorous epidemiological investigations assessing the combined impacts of tobacco smoking, alcohol consumption, and associated risk factors on tooth loss are critically needed. Periodontal disease is a disease that occurs in the periodontal tissues and tissues surrounding the teeth: the gums, the periodontal ligament, and the periodontal ligament. These tissues change with age, such as: the oral mucosa becomes thinner and has less keratin. The periodontal ligament, which is the connective tissue, has a decrease in both the size of the fibers and cells, resulting in a weak periodontal ligament. The cementum has an uneven surface due to the continuous dissolution and repair process. The alveolar bone has a decrease in the number of bone-forming cells that form the cribiform plate and the adhesion of collagen tissue to the periodontal ligament is reduced [5]. Bacterial plaque is an important cause of periodontal disease. Substantial evidence indicates that tooth loss is strongly linked to untreated periodontitis and dental caries. Multiple epidemiological investigations across Asian populations including studies by [6–9] substantiate this relationship. Specifically, Garcia ML, cutress TW (1986) [10] evaluated tooth extraction patterns in Singapore, identifying both periodontitis and dental caries as major causes of tooth loss. Conversely, research conducted in Japan, Hong Kong, and Malaysia demonstrated that carious lesions constituted the single most prevalent reason for tooth mortality in those regions. Synthesizing this collective evidence confirms that tooth mortality within the ASEAN population is fundamentally driven by two primary pathologies: dental caries and chronic periodontal inflammation.

Socio-Demographic Correlates and Prosthetic Status. In a study investigating molar loss and prosthetic rehabilitation among elderly Chinese individuals aged 65–70 years, Oliver RC, Brown LJ (2001) [11] observed that 3.4% of urban residents and 4.4% of rural residents had teeth indicated for extraction. While the overall incidence of tooth loss showed no statistically significant urban-rural disparity, individuals in rural areas presented with a higher volume of missing teeth. Furthermore, socio-demographic factors significantly influenced oral health outcomes: Socio-Educational Gradient: Females with lower educational attainment and socio-economic status exhibited a higher cumulative number of missing and indicated-for-extraction teeth across both evaluated age cohorts (35–44 years and 65–74 years). Impact of Tobacco Use: Among individuals aged 35–44 years, smoking status significantly correlated with both the total number of lost teeth and teeth requiring extraction. Prosthetic Rehabilitation: Regarding full edentulism, complete dentures were utilized by 51% of the urban population and 43% of the rural population. Removable partial dentures remained the most common prosthetic modality across both urban and rural demographics. Data were collected from a sample population of 457 residents in Souvannakhili Village, Sanasomboun District, Champasak Province, Southern Laos. These findings serve as preliminary baseline data and highlight the need for more comprehensive, in-depth research.

2. Research Methodology

This study is a descriptive cross sectional study. A questionnaire was used to collect information on risk factors for tooth loss in a sample group aged 15-65 years in Suwannakili Village, Sanasomboun District, Champasak Province. The sample size was calculated using the following formula: To calculate the prevalence rate of the disease. Sample size calculation formula

$$n = \frac{p(1-p) \times (Z\alpha/2)^2}{d^2}$$

Where,

n = Sample size

Z = Normal distribution

n = Number of people in the village

p = Proportion of tooth loss in the sample group

d = Acceptable value of difference =0.05 (2-sided test α 5)

p = Obtained from a study of factors that affect tooth loss in urban adults

Ethical Aspects

This study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of Health Sciences, Laos.

3. Results

3.1. Gender

The study cohort comprised a total of 457 participants (N = 457). Male participants accounted for 52.3% (n = 239) of the sample, while female participants represented 47.7% (n = 218). The detailed demographic breakdown by gender is presented in Table 1.

Table 1: Gender Distribution of the Study Population (N = 457)

Gender	Frequency(n)	Percentage(%)
Male	239	52.3
Female	218	47.7
Total	457	100

3.2. Age

A total of 457 participated in the oral health assessment. The study sample encompassed individuals aged 15 years and older. The largest proportion of participants belonged to the 36–40 age, accounting for 30.2% (n = 138) of the total sample. Individuals aged 40 years and older constituted the second largest group at 20.6% (n = 94), whereas the 15–20 age cohort represented the smallest proportion at 5.7% (n = 26). The complete age in Table 2.

Table 2: Age Distribution of Participants (N = 457)

Age Group (Years)	Frequency(n)	Percentage(%)
15-20	26	5.7
21-35	199	43.5
36-40	138	30.2
>40	94	20.6
Total	457	100

3.3. Marital Status

The majority were married (49.9%), followed by single individuals (41.1%). A smaller proportion of the sample comprised divorced (5.7%) and widowed (3.3%) participants. The complete breakdown is presented in Table 3.

Table 3: Marital status of participants

Marital Status	Frequency(n)	Percentage (%)
Married	228	49.90%
Single	188	41.10%
Divorced	26	5.70%
Widowed	15	3.30%
Total	457	100.00 %

3.4. Educational

The educational background of the study participants in Suwannakiri Village was primarily concentrated across secondary and primary levels. High school graduates constituted the largest demographic cohort at 27.6%, followed by junior high school graduates at 21.2% and primary school graduates at 20.6%. Participants without formal education accounted for 16.4% of the sample, Associate's degree 10.5% while those holding a university degree or other higher qualifications represented the smallest proportion at 5.5% details are in the Table 4 below.

Table 4: General information on educational level

Educational Level	Frequency(n)	Percentage (%)
High School	126	27.6
Junior High School	97	21.2
Primary School	94	20.6
No Formal Education	75	16.4
Associate's degree	48	10.5
Degree & Others	17	5.5
Total	457	100

3.5. Occupational

The occupational of service recipients in Suwannakiri Village was predominantly comprised of agricultural workers, students, homemakers, and salaried employees. Farmers constituted the largest single demographic group at 22.98%, followed closely by students (21.23%),

housewives (20.35%), and general employees (16.41%). Manual laborers represented 9.19% of the surveyed population. As presented in Table 5.

Table 5: Occupational Profile of Service Recipients

Occupation	Frequency(n)	Percentage (%)
Agriculture / Farming	105	22.98
Student	97	21.23
Housewife	93	20.35
General Employee	75	16.41
Manual Laborer	42	9.19
Other / Unspecified	45	9.84
Total	457	100

3.6. Income Level

A majority of the participants earned between 500,001 and 1,000,000 Kip (n = 163, 35.67%), followed closely by those with a monthly income of 1,000,001 to 2,000,000 Kip (n = 160, 35.01%). Participants earning less than 500,000 Kip per month accounted for 26.26% (n = 120) of the sample, while those in the highest income tier (greater than 2,000,000 Kip) represented the smallest cohort at 3.06% (n = 14). A detailed summary of the monthly income levels is presented in Table 6.

Table 6: Monthly Income

Monthly Income Range (LAK)	Frequency(n)	Percentage(%)
Less than 500,000 Kip	120	26.26
500,001 - 1,000,000 Kip	163	35.67
1,000,001 - 2,000,000 Kip	160	35.01
More than 2,000,000 Kip	14	3.06
Total	457	100

3.7. Oral Cleaning Methods

The most prevalent method for cleaning teeth was the toothbrush, utilized by 285 participants (62.36%). A notable subset of the sample utilized traditional or alternative methods: 56 participants (12.25%) used a combination of a toothbrush and fruit peel, while 51 participants (11.16%) relied solely on fruit peel. The least utilized material was charcoal, reported by 28 participants (6.13%). Brushing Frequency. Regarding daily brushing habits, the majority of respondents (215 participants, 74.44%) reported brushing their teeth twice daily. Conversely, the smallest proportion (21 participants, 7.37%) reported brushing more than twice daily. Post-Meal Oral Hygiene. When cleaning the oral cavity after meals, the predominant method was the use of toothpicks, reported by 167 participants (36.11%), closely followed by rinsing with plain water (147 participants, 32.17%). Dental floss was the least utilized method, only 4 participants (0.87%) presented in Table 7.

Table 7: Oral Hygiene Behaviors Among Participants

Behavioral	Indicator / Method	Frequency(n)	Percentage(%)
Oral Cleaning	Toothbrush	285	62.36
	Toothbrush & Fruit Peel	56	12.25
	Fruit Peel	51	11.16
	Charcoal	28	6.13
	No Cleaning	59	12.91
Daily Brushing Frequency	2 times / day	215	74.44
	>2 times / day	21	7.37
Post-Meal	Toothpick	167	36.11
	Water Rinse	147	32.17
	Dental Floss	4	0.87

3.8. Smoking Status

The study population (257 participants, 56.24%) were classified as non-smokers. Active smokers comprised 144 participants (24.95%), while 86 participants (18.82%) were identified as former smokers. Duration of Tobacco. Among active smokers reporting their duration of tobacco use, the largest subgroup had smoked for more than 10 years (45 participants, 39.47%). This was followed by participants who had smoked for 6 years (23 participants, 20.18%) and those who had smoked for 10 years (21 participants, 18.42%). Type of Tobacco. Regarding the form of tobacco used, standard commercial was the most prevalent, accounting for 64 respondents (58.91%). Pipe tobacco was the second most common form, reported by 41 respondents (35.96%) presented in Table 8.

Table 8: Smoking Behaviors and Attributes Among the Population

Behavioral Category	Indicator	Frequency (n)	Percentage (%)
Smoking	Non-smoker	257	56.24
	Active Smoker	144	24.95
	Former Smoker	86	18.82
Duration of Smoking	>10 years	45	39.47
	6 years	23	20.18
	10 years	21	18.42
Type of Tobacco	Standard Tobacco	64	58.91
	Pipe Tobacco	41	35.96

3.9. Alcohol Status

Among the surveyed population, 193 participants (42.23%) reported active alcohol consumption, while 89 participants (19.45%) were non-drinkers. Duration of Drinking Habits. Regarding the duration of alcohol consumption, the highest proportion of drinking for more than 10 years (31.61%). This was followed by participants reporting a duration of 3 years (24.87%) and 10 years (21.76%). Types of Alcoholic Beverages Consumed. Among participants who drank alcohol, whiskey was the most frequently consumed beverage (77 participants, 39.90%), followed by beer (39 participants, 20.21%), and spirits or distilled liquor (23 participants, 11.92%) presented in Table 9.

Table 9: Distribution of Alcohol Consumption Behaviors Among Participants

Behavioral Category	Indicator / Category	Frequency (n)	Percentage (%)
Drinking Status	Active Alcohol Consumer	193	42.23
	Non-Drinkers	89	19.45
Duration of Drinking	> 10 years	47	31.61
	3 years	35	24.87
	10 years	51	21.76
Type of Beverage	Whiskey	77	39.90
	Beer	39	20.21
	Spirits / Distilled Liquor	23	11.92

3.10. Betel Nut Chewing

A study evaluating health risk behaviors among residents of Suwannakiri Village revealed that 298 participants (65.5%) did not chew betel nut, 135 participants (29.7%) were active chewers, and 22 participants (4.8%) had stopped chewing. Among active chewers, the duration of the habit varied significantly: 10 years: 40 individuals (34.3%) More than 10 years: 38 individuals (27.7%) 6 years: 33 individuals (21.9%) Regarding post-chewing oral hygiene practices among active chewers (n = 137), 62 participants (45.3%) utilized dental floss, 40 participants (29.2%) used mouthwash, and 35 participants (25.5%) performed no oral cleaning after chewing presented in Table 10.

Table 10: Betel Nut Chewing Status, Duration, and Post-Chewing Oral Hygiene Practices

Variable	Frequency (n)	Percentage (%)
Chewing Status		
Never Chewed	298	65.5
Current Chewer	135	29.7
Former Chewer	22	4.8
Duration of Chewing Habit		
10 Years	40	34.3
>10 Years	38	27.7
6 Years	33	21.9
Post-Chewing Oral Hygiene		
Dental Floss	62	45.3
Mouthwash	40	29.2
No Oral Cleaning	35	25.5

3.11. Dental Caries

Within the total study cohort (N = 457), dental caries was identified in 166 participants (36.3%). Among those affected, 135 individuals (29.5%) presented with active lesions, whereas 31 individuals (6.8%) presented with arrested or restored caries. Regarding oral hygiene methods, the majority of participants (285 individuals, 62.4%) utilized conventional toothbrushes. Alternative oral cleaning methods included manual finger scrubbing (56 individuals, 12.3%) and the use of twigs or fruit barks (51 individuals, 11.2%). The predominant daily cleaning frequency was twice daily (265 participants, 58.0%), followed by once daily (157 participants, 34.4%). For postprandial oral hygiene (cleaning after meals), 164 participants (35.9%) practiced tooth brushing, 147 participants (32.2%) used mouthwash, and 134 participants (29.3%) relied on toothpicks presented in Table 11.

Table 11: Oral Hygiene Habits and Dental Caries Status (N = 457)

Variable	Frequency (n)	Percentage (%)
Dental Caries Status		
Active Caries	135	29.5
Inactive / Non-caries	31	6.8
No History of Caries	291	63.7
Oral Hygiene Method		
Toothbrush	285	62.4
Finger scrubbing	56	12.3
Natural twigs / Fruit bark	51	11.2
Other / Unspecified	65	14.2
Daily Cleaning Frequency		
Twice daily	265	58
Once daily	157	34.4
Other / Irregular	35	7.6
Postprandial Cleaning Habits		
Toothbrushing	164	35.9
Mouthwash	147	32.2
Toothpicks	134	29.3

3.12. Periodontal Health Status

The periodontal examination using a periodontal probe, 138 participants (30.20%) exhibited gingival bleeding (Bleeding on Probing), indicating active inflammation or periodontitis. Conversely, 319 participants (69.80%) demonstrated no signs of bleeding upon probing. Periodontal Examination Outcomes (N = 457)

Periodontal Pocket Depth

In an evaluated sample (N = 457), periodontitis was defined clinically by the presence of a periodontal probing depth (PPD 4–6 mm) in at least one site across all six anatomical sextants.

1. **Smoking Cohort:** Exhibited the highest severity of disease, with 55.58% of individuals presenting with moderate to deep periodontal pockets (PPD 4–6 mm and <6 mm).
2. **Alcohol Consumption Cohort:** Moderate-to-severe periodontal pocketing was recorded at an average prevalence of 47.05%.
3. **Betel Nut / Areca Nut Chewing Cohort:** Demonstrated a 36.54% prevalence rate of moderate periodontal pocketing (PPD 4–6 mm) presented in Table 12.

Table 12: Periodontal Pocket Depth (PPD) Levels Stratified by Behavioral Risk Factors (N = 457)

Behavioral Risk Factor	Pocket Depth	Sample Size (n)	Prevalence (%)
Smoking	Moderate (4–6 mm)	115	25.16%
	Severe (>6 mm)	81	17.72%
Alcohol Consumption	Mild (0–3 mm)	69	15.10%
	Moderate (4–6 mm)	97	21.23%
Betel / Areca Nut Mild	(0–3 mm)	51	11.16%
Chewing Moderate	(4–6 mm)	77.11	16.85%

4. Discussion

Oral Hygiene Behaviors and Tobacco Consumption ProfileA study conducted in Suwannakili Village, Sanasomboun District, Champasak Province examined the risk factors associated with tooth loss among local residents (N = 457). Oral Hygiene Practices: Oral Cleaning Implements: 87.09% of participants (n = 398) reported utilizing a toothbrush for general oral hygiene, whereas 62.36% (n = 285) specifically used a toothbrush for tooth cleaning. Brushing Frequency: 57.99% of respondents (n = 256) adhered to a twice-daily tooth-brushing regimen. Tobacco Consumption Profile:Prevalence: 24.95% of participants (n = 144) were active smokers, while 18.82% (n = 86) were classified as former smokers (cessation group). Duration: Among current smokers, 39.40% (n = 45) reported a smoking history exceeding 10 years, and 20.18% (n = 23) had smoked for over 6 years. Tobacco Type: Native rolled tobacco was the predominant modality of consumption (58.91%, n = 64), followed by manufactured cigarettes (35.96%, n = 41). These empirical findings closely corroborate the longitudinal investigation by Holm (1994), which followed a cohort of 273 subjects over a 10-year period to assess tobacco use as a primary risk factor for partial tooth loss. Holm demonstrated that heavy tobacco use (>15 cigarettes per day) among males under 50 years of age exhibited a strong correlation with partial tooth loss, yielding a proportional hazard ratio of 0.78 (78%). Multi-variable regression analysis further validated that tobacco consumption, advanced age, and inadequate oral hygiene represent the most critical determinants driving partial tooth loss. Prevalence of Periodontitis and Comparative Survey Analysis In this cohort, periodontitis was operationalized as presenting a periodontal probing depth of ≥ 4 mm in at least one site across all six anatomical sextants. Study Cohort Epidemiology: Out of the 457 total evaluated subjects, 155 presented with periodontitis, establishing an overall prevalence rate of 32.92%. The remaining 302 subjects (67.08%) were

clinically non-periodontitis cases. Comparative Evaluation (Thai National Dental Health Surveys, 35–44 Age): Comparisons with Higher Benchmarks: The observed prevalence in Suwannakili (32.92%) is lower than figures reported in the 1989 Thai national survey (45.3%), rural and urban (Bangkok) survey cycles from 2006–2007 (45.1% and 44.7%, respectively), and the national benchmarks established in 2000 (58.2%) and 2003 (57.6%). Comparisons with Lower Benchmarks: Conversely, the rate observed in this study remains lower than the prevalence reported in the Thai National Dental Health Surveys during the 2000–2001 (37.3%) and 2006–2007 (37.6%) monitoring periods.

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Ethical Approval: This study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of Health Sciences, Laos.

Informed Consent: Written informed consent was obtained from all participants.

Conflict of Interest: The authors declare no conflict of interest.

Data Availability Statement: Data available on reasonable request.

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Disclaimer (Artificial Intelligence): The author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.), and text-to-image generators have been used during writing or editing of manuscripts.

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