

## Chapter 7

# Risk Factors for Periodontal Infection Among the Rural Population in Battambang Province, Cambodia

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### Introduction

Cambodia is a constitutional monarchy in Southeast Asia with a population of more than 13 million people. Most Cambodians are Theravada Buddhists of Khmer extraction, but the country also has a substantial number of Cham and small hill tribes.

The country shares borders with Thailand to the west, Laos to the north, Vietnam to the east, and the Gulf of Thailand to the south. There are three major political parties in Cambodia: the Cambodian People's Party, FUNCINPEC and the Sam Rainsy Party. Currently, the Cambodian People's Party, led by Prime Minister Hun Sen, is the ruling party. In 2004, after a year of negotiations, a coalition between the Cambodian People's Party and the royalists' FUNCINPEC came to power in the National Assembly. Administratively, Cambodia is divided into 20 provinces and 4 municipalities. It is also divided by District (srok), Communion (khum), Great Districts (khett), and also Islands (koh).

In the Battambang province there are 12 Districts, 89 Communes and 611 Villages. Within these there are 4 referral hospitals and 74 Health Centers. The demographics of this province are shown in Table 1. The general living conditions in both urban and rural regions of Battambang are shown in Table 2.

To date there have been very few studies concerning the periodontal health of Cambodians (Amarasena *et al* 2002). Therefore, this study was initiated in order to determine the periodontal health of residents in one province of Cambodia.

### The Battambang Periodontal Health Project

This project investigated the incidence of periodontal infection in a rural area of Cambodia. It was a collaborative effort between the Organization of International Support for Dental Education (OISDE) and Faculty of Odontostomatology, Health Science University (HSUFO) under the support of JICA. The purpose of this project was to investigate periodontal conditions of residents in Battambang province.

### Methods

#### *Patient history*

A detailed history was taken for each patient and this included obtaining relevant information concerning general demographic and living information, oral hygiene understanding and oral hygiene habits. A medical history also included information

<i>Population</i>	
•	Total 793,129
•	Males 388,599
•	Females 404,530
<i>Population density</i>	
•	68 per km <sup>2</sup>
<i>Urbanization Rate</i>	
•	17.6%
<i>Population distribution by broad age groups</i>	
•	0–14: 44.4%
•	15–64: 52.5%
•	65 and above: 3.2%
<i>Literacy rate</i>	
•	Both Sexes: 65.0%
•	Males: 72.4%
•	Females: 58.0%
<i>Employment activity</i>	
•	Both Sexes: 50.7%
•	Males: 54.7%
•	Females: 46.9%
<i>Unemployment rate</i>	
•	Both Sexes: 8.0%
•	Males: 6.8%
•	Females: 9.3%

**Table 1.** Demographic information of Battambang province

relating to general medical conditions, systemic conditions, and smoking history. Systemic conditions of particular interest included diabetes, respiratory disease, heart disease, hypertension, malaria and dengue fever (Table 3).

### **Oral/periodontal examination**

Detailed oral and periodontal examinations were carried out which included recording missing teeth, oral hygiene, plaque index, calculus index, and an occlusal assessment. Details of these measurements are shown in Table 4.

<b>Facility</b>	<b>Distribution</b>
Toilet facility	19.9%
Firewood	92.4%
Charcoal	4.4%
Kerosene	1.6%
Liquified Petroleum Gas	0.6%
Other	1.0%

**Table 2.** Distribution of household facilities

### **Risk factors**

Specific risk factors which were assessed included smoking, oral hygiene, systemic conditions and quality of living environment.

### **Results**

In this study a total of 164 individuals were assessed. Of these 66 were male and 98 were female. Most of the subjects studied (85%) lived in rural or remote regions with only 15% living in towns. The majority of subjects suffered from little tooth loss (none or one tooth missing – 77%) and only 9% of the subjects had more than 9 teeth missing (Table 5).

### **Oral hygiene**

Approximately 15% of the study population regularly carried out oral hygiene practices while up to 75% either very rarely or never practiced any form of oral hygiene (Table 5). These practices were reflected in the findings for general oral hygiene where 11% of the subjects had very good levels of oral hygiene and 47% had bad to very bad oral hygiene.

- Diabetes
- Heart disease
- Respiratory disease
- Liver disease
- Kidney disease
- Brain disease
- Hypertension
- Gynaecological disease
- Skin disease

**Table 3.** Systemic conditions assessed

Calculus levels were found to be moderate to heavy in 66% of the population with only 4% of the study group having no calculus deposits.

### **Periodontal pockets**

The average pocket depth for each patient in the study ranged from 3.0 to 6.5 mm (Figure 1). Only around 8% of the populations had pocket depths averaging 5 mm or more.

### **Occlusal analyses**

Of the subjects studied 57% did not have any occlusal problems while 7% had some prosthetic occlusal problems, 32% had a malocclusion of some form and 8% had an orthodontic problem.

### **Systemic disease**

Participants in this study were assessed for the incidence of one or more systemic conditions as listed in Table 3. Approximately 70% of the study population did not suffer from any systemic conditions whereas 18% had a single condition and 12% had multiple conditions (Figure 2).

### **Smoking**

Only 4% of the study population did not

smoke. The majority of smokers smoked more than 21 cigarettes per day and this represented 80% of the study population (Figure 3).

## **Discussion**

This study investigated the periodontal health of residents within the Battambang province in Cambodia. This has been an important study because there is a paucity of information pertaining to oral disease patterns including periodontal disease in Cambodia. In 2002 a house-to-house survey was conducted to assess the periodontal status of 1948 subjects aged 15-74 years in a rural commune in Cambodia using Community Periodontal Index (CPI) and measuring attachment loss (Amarasena *et al* 2002). The periodontal status of Cambodians increased with age as indicated by both CPI and loss of attachment. Calculus was the most common finding among Cambodians pointing to overall poor oral hygiene levels. Notwithstanding the poor oral hygiene, however, severe periodontitis as denoted by 6 mm or greater periodontal pockets was rare even in the elderly, while edentulousness was not frequently observed until 65 years.

The present study confirmed many of the findings from the Amarasena study. For example although around 90% of the population had poor oral hygiene the incidence of severe and advanced disease was low, with only 8% of the populations demonstrating average pocket depths of 5 mm or more. These findings are in line with most other epidemiologic studies which indicate that advanced periodontal destruction is rare in nearly all societies whether they be industrialized or third world (Albander and Rams 2002).

Indeed, the prevalence of periodontal disease in adults in a variety of communities has been determined. The data from all racial populations shows that the prevalence of periodontal disease around the world ranges

	<b>Grade</b>			
	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
Missing teeth	None	2-4	5-8	>9
Oral hygiene freq	Regular	Sometimes	Occasional	Never
Oral hygiene control	Good	Fair	Bad	Very bad
Plaque index	No plaque	Thin film	Moderate plaque along gingival margin	Heavy accumulation along gingival margin and interdentally
Calculus	None	Mild deposits	Moderate deposits	Heavy deposits
Occlusal problems	None	Prosthetic	Malocclusion	Orthodontic
Living conditions	Town	River district	Village	Outside village or mountain
Smoking	Never	<10/day	<20/day	>21/day
Systemic conditions	None	One	Two	Three

**Table 4.** Qualitative assessments of study

	Grade			
	0	1	2	3
Missing teeth	46	31	14	9
Oral hygiene freq	18	5	75	5
Oral hygiene control	11	42	34	13
Plaque index	5	30	39	26
Calculus	4	30	38	28
Occlusal problems	53	7	32	8
Living conditions	15	8	26	51
Smoking	4	6	10	80
Systemic conditions	70	18	10	2

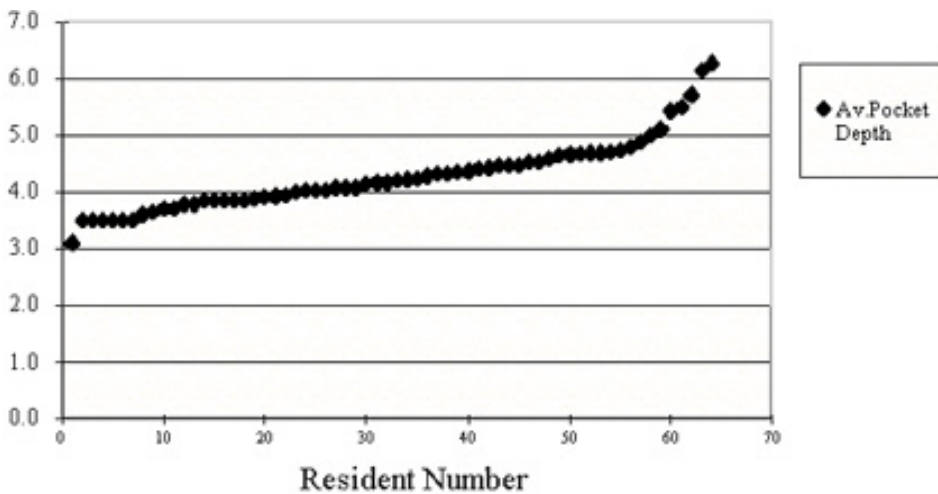
**Table 5.** Percentage distribution of qualitative assessments

between 5 to 20 % (Hugoson and Jordan 1982, Albandar *et al* 1999, Diamanti-Kipiotti *et al* 1995, Miyazaki *et al* 1991). This distribution of periodontal disease appears to have remained unchanged for the last twenty years (Hugoson *et al* 1998).

While plaque is considered a necessary component for the development of periodontal disease, its absolute role must be questioned. For example good evidence exists that in developed countries the frequency of tooth brushing is high, and oral hygiene levels are improving (Bartold *et al* 1998). However, the incidence of periodontal disease has remained static over the past 20 years. Interesting, in the present study despite an apparent lack of oral hygiene the incidence of advanced periodontal disease is no different than many other regions.

It is now recognized that plaque may account for only 20% of the risk for developing periodontitis (Page 1998, Grossi *et al* 1999). Indeed it is well accepted now that periodontitis is a multifactorial problem with three factors interplaying before disease becomes manifest: a susceptible host, environmental factors conducive to disease development and altered host responses leading to tissue destruction. In this context the findings of this study show that interestingly 30% of the population had one or more systemic condition.

In conclusion, this study on a small Cambodian provincial population has revealed that periodontal infection is very strongly involved with all age groups in the targeted area. Because oral health services have not been provided in the area almost 60% of the people do not have any knowledge of appropriate



**Figure 1.** Average pocket depths in study population

plaque control procedure and only 11% of the people had good oral hygiene. Smoking and systemic disease were high in this population and indicates the possibility that these modifying conditions may influence the manifestation of advanced periodontal disease.

Future efforts to deal with periodontal disease in these areas must consider not only oral hygiene but also major modifying factors such as smoking and systemic health.

## References

- Albandar JM, Rams TE. Global epidemiology of periodontal diseases: an overview. *Periodontol* 2000;29:7-10.
- Albandar JM, Brunelle JA, Kingman A. Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. *J Periodontol* 1999;70:13-29.
- Amarasena N, Ikeda N, Win KK, Yamaguchi Y, Takehara T, Miyazaki H. Periodontal status of rural inhabitants in Prek Russey, Cambodia. *Asia Pac J Public Health* 2002;14:105-109.
- Bartold PM, Seymour GJ, Cullinan MP, Westerman B. Effect of increased community and professional awareness of plaque control on the management of inflammatory periodontal diseases. *Int Dent J* 1998;48:282-289.
- Diamanti-Kipiotti A, Afendoulidis N, Moraitaki-Tsami A, Lindhe J, Mitsis F, Papapanou PN. A radiographic survey of periodontal conditions in Greece. *J Clin Periodontol* 1995;22:385-390.
- Grossi SG, Zambon JJ, Ho AW, Koch G, Dunford RG, Machtei EE, Norderyd OM, Genco RJ. Assessment of risk for periodontal disease. I. Risk indicators for attachment loss. *J Periodontol* 1994;65:260-267.
- Hugoson A, Jordan T. Frequency distribution of individuals aged 20-70 years according to severity of periodontal disease. *Comm Dent Oral Epidemiol* 1982;10:187-192.
- Hugoson A, Norderyd O, Slotte C, Thorstensson H. Distribution of periodontal disease in a Swedish adult population 1973, 1983, and 1993. *J Clin Periodontol* 1998;25:542-548.
- Miyazaki H, Pilot T, Leclercq M-H, Barnes DE. Profiles of periodontal conditions in adults measured by CPITN. *Int Dent J* 1991;41:74-80.
- Page RC. The pathobiology of periodontal diseases may affect systemic diseases: inversion of a paradigm. *Ann Periodontol* 1998;3:108-120.