



JOURNAL OF LAO DENTISTRY

ວາລະສານ ທັນຕະແພດສາດ

Official Journal of the University of Health Sciences
Faculty of Dentistry LAO PDR

Volume 1. Number 1. July 2015
ຕະນະທັນຕະແພດສາດ ມະຫາວິທະຍາໄລ ວິທະຍາສາດ
ສຸຂະພາບ

EDITOR-IN-CHIEF

Dr. Alounnhadeth Sitthiphanh Dr. Phouthone Vankonevilay

DEPUTY EDITOR-IN-CHIEF

Assoc. Prof. Dr. Sengphouvanh Ngonephady

Editorial Advisory Board

Assoc. Prof. Dr. Som-Ock Kingsada

Assoc. Prof. Dr. Somchith Boupha

Assoc. Prof. Dr. Khamhoung Phommavongsa

International Editorial Advisory Board

Prof. Dr. Takashi Miyata (Japan)

Dr. Ikki Watanabe (Japan),

Prof. Kazuo Komine (Japan)

Dr. Sok Chea (Cambodia)

Dr. Gen Yano (Japan)

Prof. Takao Sato (Japan)

Mr. Toshimitsu Mochida (Japan)

Associate Editorial Board

Assoc. Prof. Dr. Akao Lyvongsa

Assoc. Prof. Dr. Bounta Choumchanh

Dr. Boun-nhong Sidaphone

Dr. Jonhy Sisounthone

Dr. Vimone Thongteume

Dr. Khambay Thammavongsa

Dr. Phonesavanh Soundara

Dr. Douangsavanh Pengmanivong

Dr. Somephone Phanthavong

Dr. Sackpraseuth Senesombath

Dr. Amphaivanh Homesavath

Managing and Administrators

Dr. Vorasack Phounsiri

Dr. Chanhthavisao Phanthanalay

Dr. Nithideth Somsanith

Dr. Xaysana Vixaylath

Dr. Phonepaseuth Sitthiphanh

Dr. Hue Vang,

Dr. Vatsana Chanthalin and

Dr. Phonesavanh Soundara

Dr. Phonelavanh Manivong

Technical and Financial Support by Japan Ministry of Foreign Affairs and Organization of International Support for Dental Education (Japan)

University of Health Sciences Lao PDR Faculty of Dentistry, Mahosot Rd. Vientiane Capital, Lao PDR

TABLE CONTENTS

Dr. Alounnhadeth Sitthiphanh
Dr. Sengphouvanh Ngonephady
Assoc. Prof. Dr. Som Ock Kingsada
Professor Takashi Miyata

Consideration of Influence on the Risk of the
Dental or Oral Disease in the Northern and
Mountain Side of Rural Area, Lao PDR...9

Chanthanome MINGBOUBPHA, Saiyasouk
TANTHAPHENSAIY, Xayyaphon LATSOMPHOU

A study to Evaluate General Nurse's Oral
Health Knowledge and Oral Conditions for the
Substitute of Dental Nurse in Phone Hong,
Vientiane Province, Lao PDR.....16

Khouaxiong XIAZE, Duangchai MAHAVONGSANANH,
Samlan KEOVISIT, Phouthasone THIPHAJDY

WELCOM MESSAGE
FROM THE JOURNAL
EDITORIAL BOARD

CONGRATULATION
MESSAGE

ORIGINAL ARTICLES

CONTENS (continued)

ORIGINAL ARTICLES

**Relationship between Oxidative Stress and Oral
Disease in Rural Area, Lao PDR-Comparison with
Kingdom of Cambodia-25**

Toulaphin Phetsaphone, Khamphouvy Chanbounmy, Somlouay
Pheuaphom, Aloungnadeth Sitthiphanh, Sengphouvan
Ngonphady, Bounnhong Sidaphone, Vorasack Phounsiri, Gen
Yano and Takashi Miyata

SPECIAL ARRICLE

**Application of Doc's Best Cement in Developing
Countries.....31**
Kazuo KOMINE

This journal was admitted by the sub-committee of Faculty of
Dentistry regarding ethical aspects on 15th July 2015.



Dr. Aloungnadheth Sitthiphanh, DDS.
Vice President for Planning and Student Affairs,
University of Health Sciences

In July 2015, the first volume of Lao International Journal that named “the Journal of Lao Dentistry” have been publishing as the official journal of the Faculty of Dentistry, University of Health Sciences, Vientiane Capital Lao PDR. It is great interest and participation from many Lao dentists and foreign expert from different country in the field of dentistry.

Scientific paper describes and publishes information including creative clinical and research findings based on logic, clarity, and precision conforming to norms and standard. The writer avoids gaps in logic, restrain unnecessary expressions, write concisely, and describe precisely based on evidence.

Now, many Lao dentist and people are able to easily share paper that published in Lao and foreign language. So the people that carried out the study are due to be held responsible for their study and research. Through the Journal of Lao Dentistry. I do hope we can share the dental information and experience related news. Also, our institution will try to make general and public oral health promotion, approaching broadly and combined.

We promise and attempt to try to do hard work to become better journal with faith, dedication, and satisfaction. Finally, this journal is able to publish supported by Japan Ministry of Foreign Affairs and Organization of International Support for Dental Education. I express a sincere address of gratitude here.

Vientiane Capital, 30th July 2015



Assoc. Prof. Dr. Sengphouvanh Ngonephady
Dean of Faculty of Dentistry, University of Health Sciences

Welcome to the first Lao Journal of Dentistry. This journal is focused on providing an update on the field of dentistry in Lao PDR.

Dentistry is one of the most progressive fields in health sciences in the world as same as in Lao PDR. The dental science, as the dental research activity seems to be more largely and well known in day life in General. So the need of new information in dentistry is necessary. In this journal, experienced clinicians (dentists) and researchers have prepared up-to-date reviews on a broad range of dental and periodontal topics. I would like to record my deep thanks to the Japanese Ministry of Foreign Affaires and president of the Organization of International Support for Dental Education (OISDE) of Japan, who initially created and totally assisted us to publish this international journal of the faculty of dentistry, University of Health Sciences in Lao PDR.

After a long duration prepared and a fruitful assistance from OISDE of Japan, the Journal of Lao Dentistry was able to publish and the result is here for all to enjoy. The papers in this journal cover the full coverage of dentistry. Here you will find excellent and up-to-date overviews of most of the important clinical aspects of modern dentistry. I wish to record my thanks to all of the authors for taking the time to prepare such useful and informative papers. I encourage all of our readers to take the time to read these papers.

I do hope this journal containing such an array of excellent paper will be kept as a handy reference in your dental practices. I encourage you to take the information contained herein and apply it in your everyday clinical practices and research activity.

CONGRATULATION MESSAGE



Assoc. Prof. Dr. Som Ock KINGSADA MD. PhD
Vice Minister of Ministry of Health, Lao PDR

On behalf of Ministry of Health, Lao PDR, I would like to say a sincere congratulatory address to publish international journal that named “The Journal of Lao Dentistry”.

The medical care situations of our country is still developing and in particular, our country has been lagging behind in the field of medical and dental sciences. Fortunately, on publish this journal, we received strongly support from Japanese Ministry of Foreign Affairs and the Organization of International Support for Dental Education. It is really important opportunity to come forward to the big one step for the development of medical and dental sciences in our country. This journal is positioned as the official journal of the University of Health Sciences, Faculty of Dentistry, and this concern owes its published the journal to the efforts and cooperation of teachers and all of staff in the University of Health Sciences. Especially, I would like to pay my respect sincerely to the efforts of the master course students of periodontology belonging to the faculty of dentistry because they have had a lot of times to contact and contribute with a community in the rural area and to make clear the actual oral and dental conditions academically and epidemiologically valid. I believe that this international journal will contribute to our bright future.

CONGRATULATION MESSAGE



Professor Takashi Miyata, DDS, PhD
President of Organization of
International Support for Dental Education

In this time, I am heartily pleased that “The Journal of Lao Dentistry” having been published as the first case in Lao PDR. The history of my contributed life for supporting dental education in the developing countries, in 1991, this was my first experience as a volunteer activity to visit the Kingdom of Cambodia just over the civil war and while over 20 years I contributed continually for the revival of the University of Health Sciences, Faculty of Odonto-Stomatology, Cambodia, Phnom Penh. From that time on 2002 when I retired university in early resignation, I had started in really earnest to educate for students and teachers as a volunteer the educational contribution mainly at Cambodia, Lao PDR, East Timor, Indonesia, Mexico, Guatemala, and Cuba. In particular, just one example, I brought up a lot of specialist of periodontology whom the authorized in Cambodia government, but unfortunately, I could not reach to publish the international journal in the case of Cambodia. However, in Lao PDR, the University of Health Sciences, Lao PDR have been established promptly the master course of periodontology and it is really glad to manage to reach published this journal that takes only one year. It is really wonderful achievements in Lao dentistry with what my long-time dream is coming realize and thanks to excellent master course students with strong effort and study.

At Tokyo, Japan July, 2015

Consideration of Influence on the Risk of the Dental or Oral Disease in the Northern and Mountain Side of Rural Area, Lao PDR

Chanthanome MINGBOUBPHA*, SaiyasoukTANTHAPHENSAIY*, Xayyaphon LATSOMPHOU*

* University of Health Sciences, Faculty of Dentistry, Lao PDR

BACKGROUND

It is possible to indicate two specific characteristics of Lao PDR. One is that Lao PDR is located at the borderline of five different countries such as Thailand, Myanmar, China, Vietnam and Cambodia. The other one is that it is composed of many minority ethnics, and they are widely distributed throughout the nation. These characteristics sometimes influence various aspects of culture, languages and sense of values towards health. The purpose of this report is to determine the dental/oral disease risks influenced by multiple unique characteristics especially in the northern and Mountain side of Rural Area, Lao PDR.

INTRODUCTION

In the long history of Lao PDR, people have been cooperating and acting harmoniously between different races. However, traditionally, each minority ethnic has different languages, religion, culture, ceremonies and sense of values towards health. Table 1 shows the list of minority ethnics in Lao PDR. (World Population Prospects: The 2012 Revision)

Historically, a large number of minority ethnics have been living at the rural area. The targeted area in this report is Vientiane province known as a typical minority ethnics' environment. Vientiane province is one of the biggest provinces, and the total area is 22,554 km². Table 2 shows the name of the 10 Districts and its population. In this report, residents of Ban Vangheua village were selected as the samples. Ban Vangheua village is located at 77 km from the center of Phonhong city, and the population is 100,547. A large number of residents are farmers (85% of total occupation). Vangheua village has the typical rural area's environment of Lao. This village is located in the deep mountain side of Phonhong district, Vientiane province. The water supply in this area is in a good condition. The water is supplied from the river, and some residents still use water pump. Water from river and pump is very clean for drinking^{1, 2}). The school education system in this village follows Lao governmental policy. There are only one primary school and secondary school in the village. Therefore, the knowledge of oral and dental health behaviors are still poor and many dental and oral problems can be seen. Based on our investigation in this village, many oral and dental diseases were found including periodontal disease, severe dental decayed, missing tooth and inflammatory disease causing bacterial infection and by products are the principle etiologic agents.

KEY WORD: Lao PDR, Dental risk factors, Rural Area in Lao PDR, Interview Method.

Table 1.

Kinds of Minorities in LAO PDR

Name of minority	Name of minority
Lao	Oy
Phuthai	Grieng
Thai	Cheng
Leu	Sdang
Hor	Shuay
Nguan	Ngahearn
Yung	Lavy
Sairk	Pako
Thaineau	Kamer
.Keumneue	Toum
Prai	Guan
Singnoon	Moy
Phong	Kree
Thein	Alda
Adoo	Singsiri
Bid	Lahoo
Lamed	Sila
Samtao	Hayee
Katang	Lolo
Makong	Mlong
Tri	Yuroo
Treang	Taoy
Yerb	Katu
Brao	Katu
Hahak	

Table2.

Name of districts and population in Vientiane province

Name of Districts	Population
Phonhong	100,547
Thoulakhom	86,997
Keooudom	30,230
Kasy	56,896
Vangvieng	86,731
Feuang	67,264
Xanakham	57,879
Mad	31,963
Hineherb	46,396
Viengkham	28,318
Total	593,221

MATERIALS AND METHODS

Characteristics of the samples

The samples were selected from the residents in Ban Vangheua village. Sex ratio was 4 males to 36 females (Table 3), and 82.5% were married (Table 4). 27.5% of the samples have finished compulsory education, and 37.5% of samples were graduated from higher level education including high school (Figure 1). 85% of samples were farmers, and 12.5% were students (Figure 2).

An interview method was used to the samples to define the knowledge of dental and oral health, and the behavior for oral health and the reaction towards the symptoms of oral or dental disease. The interview questions are as follows;

1. How often do you clean your teeth?
2. What would you do when you experience tooth/teeth pain?
3. If you were to get dental service, what kind of institution do you choose?
4. What is your image towards a dental treatment?
5. This report asked to samples about as the Medical Status the following questions that were Infectious disease, Heart disease, Hypertension, Diabetes disease and as the life style including Smoking behavior, drinking with alcohol were recorded.

Table3.

Sex distribution

Sex	Distribution (%)
Male	4(10%)
female	36(90%)

Table4.

Married Status

single	Married
7(17, 5%)	33(82, 5%)

RESOULTS

According to the result of the question 1, which was intended to ask how often samples clean their teeth, 47.5% showed 2 to 3 time per day, 50% showed once a day and 2.5% showed zero (Figure 3).

In the question 2, the samples were asked about the behavior when they experience tooth/teeth pain. The result showed that 2.5% of the muse salt which is the traditional care among the sample group. 20% of them take medicine such as western drugs, and other 20% do nothing. The last 57.5% answered as taking some traditional drugs (Figure 4).

The rural area of Lao PDR is well known for residents having little choices of dental care institutions. The question 3 was intended to ask if the samples want to visit dental service institutions, what kind of institution resident would choose. 47% of the samples answered as visiting traditional dentists, 20% of the samples answered as using services at a health center, 10% of the samples answered as using services at a provincial hospital, and the last 5% answered as using services at private dental clinics (Figure 5).

The result of question 4, which was intended to ask the image of dental treatment showed that almost half of the samples have an image of extracting teeth. 40% of the samples answered as filling teeth, and the last 2.5% of the samples answered as consultation and denture (Figure 6).

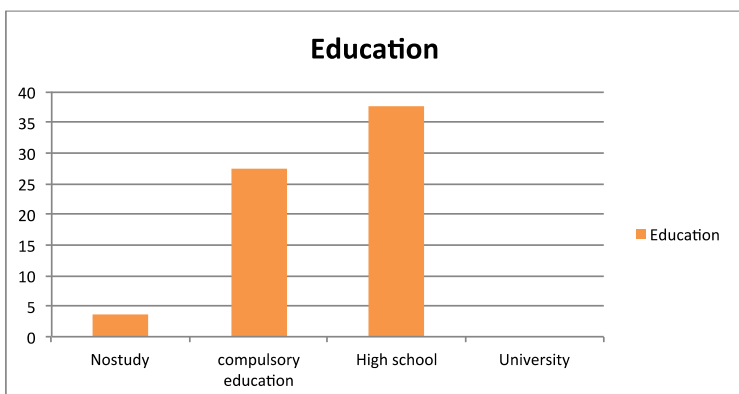


Figure 1.

Educational status in the targeted area

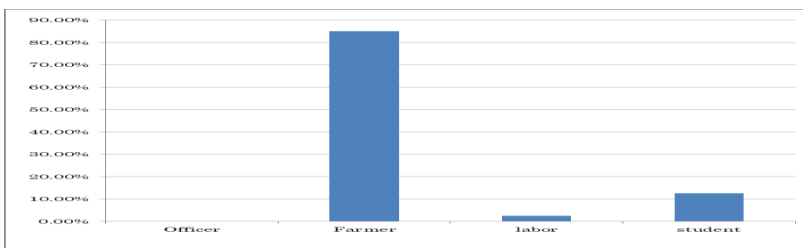


Figure 2.

Occupation of Samples in the targeted area

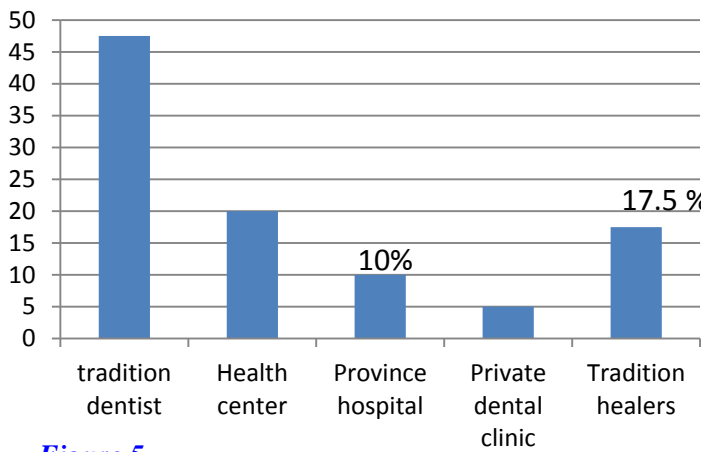


Figure 5.

Question 3: If you were to get dental service, what kind of institution do you choose?

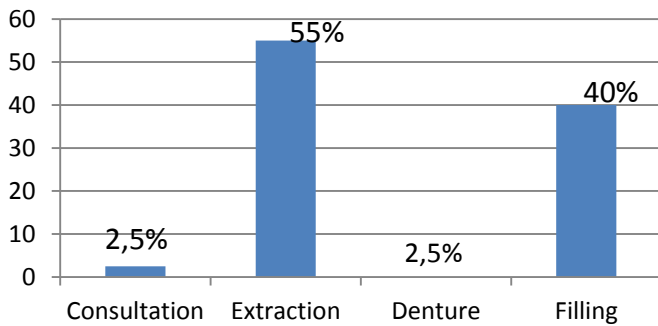


Figure 6.

Question 4: What is your image towards a dental treatment?

The actual activities in Phone Hong District shows pictures on the figures from 7 to 9.



Figure 7 to 9

Indicated the views of our projects in the rural places in Phone Hong districts. Set up dental equipment and materials in front of the health center. Sometimes, when the condition of hard rain, to prepare tent for raining or to move inside.

DISCUSSION

As for the northern and mountain side of the rural area in Lao PDR, the result clearly indicated that the knowledge of dental/oral health is still very poor³⁾. However, regarding teeth cleaning behavior, more than 90% of the residents in the targeted area clean their teeth more than once a day. This result tells us that it is necessary to determine if the residents recognize the meaning of cleaning teeth as preventive method or simply a custom. If the residents recognize cleaning teeth as a custom, it is necessary to establish enlightenment program to increase the awareness of cleaning teeth as a preventive method.

It is well known that the medical or dental service institutions in the rural area of Lao PDR are still in poor conditions⁴⁾. For that reasons, residents do not have various choices for medical and dental services. The result of question 2 was very interesting and unique. Half of samples answered that they relied on the traditional medicine when they experience the symptoms of teeth or gum pain. This tells us that residents tend to prefer lower price and stay with their traditional life style. However, the traditional medicine is clearly skeptical about the effect to teeth pain and is similar to homeopathic magic. Also, the result indicated that visiting dental service institution is not their first choice when experiencing symptoms of tooth or gum pain. This shows the long history of poor conditions in medical and dental services has been preventing residents to have an idea of using these services. The question 3 is a transient question asking what kind of dental services the residents would choose when they experience symptoms of teeth or gum problems. Half of the samples selected traditional dentists. It is known that in South-East Asian countries, traditional dentists who do not have dental license and are illegal under the governmental law still remain as one of the occupations. Tough, it is an undeniable fact that traditional dentists have contributed as a substitute of licensed dentist in the areas where licensed dentist do not exist. However, since traditional dentists have never learnt the procedure of preventing infections⁵⁾⁶⁾, they do not have infection control. This report strongly suggests the government to establish the re-training programs to traditional dentists including infection prevention and control. Once they complete the re-training course, government should grant the license as an “assistant dentist”.

The images (Figures 7-11) of dental treatments are almost the same as other developed foreign countries. Extraction is the most common treatment for dental decayed or periodontal disease. In other words, this result suggests that residents who have teeth problems would not select the appropriate procedure of treatments. In the case of missing teeth/tooth caused by extraction, it severely declines the mastication function, and it also has bad influences to systemic condition including digestion.



Figure 10, 11

Traditional views of dental care by no license dentist at small town in the country side. This system of dental cares are having been still remains in Lao. It is undeniable insanitary problems.

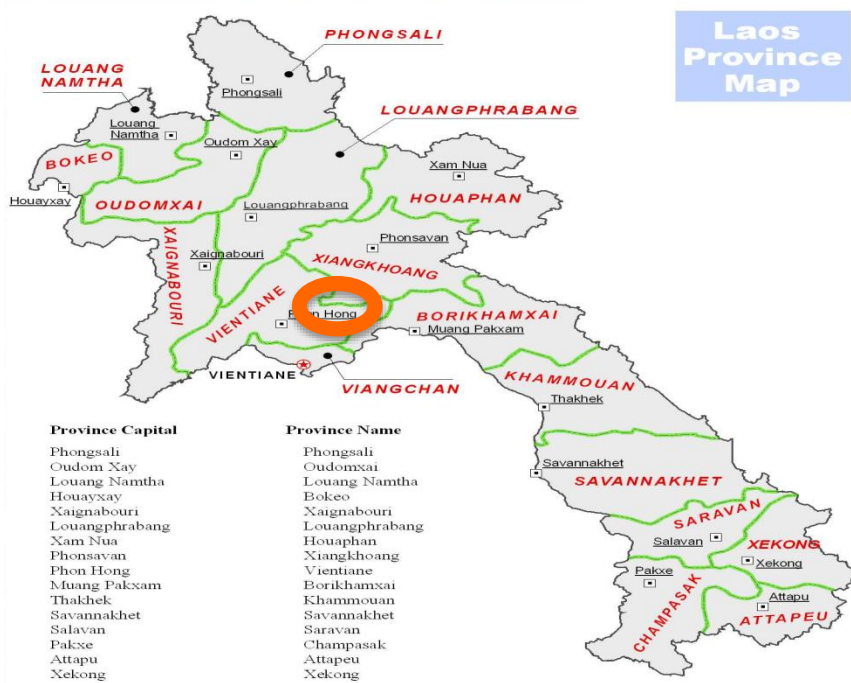


Figure 12

Phone Hong district, Vientiane Province located northern direction and 80 km from the Vientiane capital.

To conclude, the results in this report tell us that the northern and mountain side of the rural area in Lao PDR still has poor dental/oral health condition. The “poor” means that residents in targeted village have no opportunities to learn about dental/oral health promotion. The most effective method to solve this issue is to establish new dental nurse schools in each province. However, the establishing cost is very high. As a substitute policy,

Japanese Foreign Affairs and OISDE have been supporting it through providing dental/oral training programs for nurses who belong to health centers and technical nursing school in Phonehong district since 2009. Obviously, the center of health promotion is in each health center. Once these nurses understand dental/oral preventive procedures, cares and treatments, it would very effective way to implement the enlightenment programs to residents of each village.

References

1. S. Nampanya, J. Richards, S. Khounsy, P. Inthavong, M. Yang, L. Rast, P. A. Windsor, Investigation of Food and Mouth Disease hotspots in northern Lao PDR, *Transboundary and Emerging Diseases*, Volume 60, Issue 4, 315–329, 2013
2. SomphouSayasonea, YouthanavaneVonghajackc, MonelyVanmanyb, OrothRasphoned, SmarnTesanae, JürgUtzingera, KongsapAkkhavongb, Peter Odermatt; Somphou Sayasone^a, Youthanavane Vonghajack, Monely Vanmany, Oroth Rasphone, Smarn Tesana^e, Jürg Utzinger, Kongsap Akkhavong, Peter Odermatt Diversity of human intestinal helminthiasis in Lao PDR, *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vl.103, Issue 3., 247–254 March 2009
3. MasafumiMotohashi, Ichiro Nakajima, Hirofumi Aboshi, Kazuya Hond, Munemitsu Yanagisawa, Takashi Miyata, Masao Maeno, FumiyukiKuwata, BounnhongSidaphone, SengphouvanhNgonephada, AloungnadethSitthiphanh^l, SomOckKingsada, Kichibee Otsuka; The oral health of children in a rural area of the Lao People’s Democratic Republic, *Journal of Oral Science*, Vol. 51 -1, 131-135, 2009
4. SjobbeBesseling, SengphouvanhNgonephady, Arjen J. van Wijk; Pilot survey on dental health in 5–12-year-old school children in Laos, *Journal of Investigative and Clinical Dentistry*, Vl. 4-1, 44–48, 2013
5. Takashi MIYATA; Report of Actual Condition in Lao PDR (printed in Japanese), Tokyo Metropolitan International Cooperative Project Assistants, 2007
6. Jürgensen N, Petersen PE; Oral health behavior of urban and semi-urban schoolchildren in the Lao PDR *Community Dent Health*. 28(4),280-5. 2011

ACKNOWLEDGMENTS

The authors thank all of the staff in the health department of Phone Hong district, Vientiane province and provincial technical nursing school. The authors also thank, Dr. Aloungnadeth SITTHIPHANH, Dr. Sengphouvanh NGONEPHADY, Dr. Bounyong SIDAPHONE, Dr. Vorasack PHOUNSIRI, The authors also thank Organization of International Support for Dental Education (president: Professor Takashi MIYATA) and Mr. Toshimitsu MOCHIDA for the cooperation and lead.

Ethical Approval

This study was approved by ethical committee in University Health Sciences, Lao PDR

Correspondence: Dr. Chanthanome MINGBOUBPHA, University of Health Sciences Lao PDR Faculty of Dentistry, Mahosot Rd. Vientiane Capital, Lao PDR

A study to Evaluate General Nurse's Oral Health Knowledge and Oral Conditions for the Substitute of Dental Nurse in Phone Hong, Vientiane Province, Lao PDR

Khouaxiong XIAZE*, Duangchai MAHAVONGSANANH*, Samlan KEOVISIT*, Phouthasone THIPHAKDY *

* University of Health Sciences, LaoPDR

ABSTRACT

BACKGROUND

Lao People's Democratic Republic (Lao PDR) is the only country that does not have a dental nurse system in Southeast Asian region. In Lao PDR, dental nurses belong to governmental institutions such as primary school or health centers, and they simply provide dental treatments for school children and residents through enlightenment programs. It has been a useful program in the point of preventing oral and dental problem as a primary oral/dental care¹⁾. Consequently, Lao PDR have no dental nursing system, and health centers have never implemented programs for preventing oral and dental problem for school children and residents. Since 2012, Organization of International Support for Dental Education (OISDE) has been introducing and implementing an educational and practical training program for general nurses who are working in health centers and students belonging to the Technical Nursing School in Phone Hong, Vientiane Province as a substitute of dental nurse²⁾.

AIM

A purpose of this study is to evaluate the knowledge and understanding towards the oral/dental health care of nurses to introduce an appropriate curriculum for Technical Nursing School, Phone Hong, Vientiane province Lao PDR Furthermore, adaptability of the oral health promotion is examined in the actual oral conditions of nurses.

MATERIALS AND METHODS

79 nursing students at the Provincial Technical Nursing School, Phone Hong District, Vientiane Province were selected as samples of this study. A questionnaire method was used to describe the samples with a self-administered structured questionnaire consisting of 24 questions on demographic data. Oral hygiene knowledge and practices were distributed. All of 79 nurses were examined for their actual oral conditions such as oral hygiene status, DMF status and periodontal status by dentists from University of Health Sciences, Faculty of Dentistry. **Results and conclusion:**

The result showed that samples understand the basic level of the oral/dental health care, but they seem to be confused in advanced knowledge level. The knowledge for actual oral conditions including oral hygiene, dental and periodontal status was very poor. In a curriculum of the nursing school, it appears that developing basic dentistry, clinical knowledge and the training systems is important.

CONCLUSIONS

Students of the nursing school had potentials to understand oral/dental health care, and they can possibility utilize to become substitute for dental nurses. However, in the results of samples' actual condition on oral hygiene status, DMF index and gum condition showed very poor. Therefore, it strongly suggests that instruction of the nurse regarding the method of oral hygiene, preventing oral and dental disease and treatment procedure is necessary, and dental specialist must teach for nurses.

KEY WORDS: Nursing Students, Oral Health Knowledge, Actual Oral Conditions of Nurses

INTRODUCTION

The dental nurse systems were adopted in many countries, and they have been contributed to oral/dental health care for infants and inhabitants¹). Many developing countries have been using dental nursing systems to provide oral/dental health care in the local schoolchild or manage oral health for inhabitants in health center. Unfortunately, due to the fact that Lao PDR does not have dental nurse system, there has not been an appropriate oral health promotion for local schoolchild and inhabitants²). Therefore, the new project started in 2012 by OISDE (Organization of International Support for Dental Education) and University of Health Sciences which was financially supported by Japanese Ministry of Foreign Affairs, as substitute of dental nurses. The project was to educate oral/dental health care to general nurses for the purpose of providing oral health care for local schoolchild and inhabitants³). At first, when establishing educational system on dentistry, it is necessary to grasp the exact level of knowledge and understanding for dentistry of general nurses. Based on the result, it must build a new curriculum and introduce it to nurses and students in the nursing school. Therefore, the project made a questionnaire to evaluate and analyze the knowledge and understanding level regarding dentistry. The result showed that the nursing students understand and have the common knowledge of dentistry, but there were some confusing answers on the slightly complicated questions (Figure 1, 2). Furthermore, for the purposes to evaluate whether the nurses are able to take oral health promotions and the evaluation of ability to adapt towards the oral health promotion, we examined from actual oral conditions of nurses.

MATERIAL AND METHODS

A cross sectional questionnaire-based study was conducted to investigate the oral and dental health care among students of Technical Nursing School at Vientiane province, Lao PDR 150 nursing students from four studying years were invited as the participants in this workshop. 79% returned the completed questionnaire. The sample of this study included 74 female students and 5 male students representing different categories of Lao PDR population. Approval from the dean and the ethical committee of the University of Health Sciences Lao PDR was obtained for this study with a formal letter explaining the purpose of the study, the procedure to be followed and a copy of the questionnaire to be used. The questionnaire was explained to the students before delivering to them. Some questionnaire used were Arabic modified version. The questionnaire included 24 questions to evaluate the general knowledge of oral and dental health care in the various categories, human specific growth factors, self-care practices, dental services, previously received treatments and their habits. The teachers of UHS marked the answers of the questions after the consultation. The results of answers were evaluated and classified as general knowledge of dentistry in the specialized field. Furthermore, for the purpose of evaluating whether the nurses are able to take oral health promotions, it is necessary to evaluate actual oral condition. The oral examinations were used for 79 nurses about plaque and calculus accumulation, DMF and periodontal status by the instructors of UHS.



Figure1.
Interview for Nursing Students



Figure2.
Explain how to answer the questionnaire

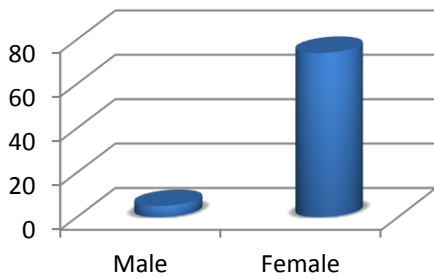


Figure 3.
Sex distribution in Nursing Students

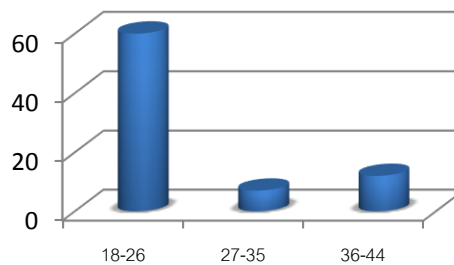


Figure 5.
Age distribution in Nursing Students

RESULTS

This study was to evaluate oral health knowledge status of nursing student at Technical Nursing School, Vientiane province.

General information

93.7 % were females and 6.3% were males indication on Figure 3. Demography: 75.9% for age of 18-26 years old, 8.9% for age of 27-35 years old, 15.2% for age of 36-44 years old indication on Figure 4. Since living cost is low, 51.9% of participants live at dormitory, which belongs to nursing school indication on Figure 5.

60.8% of student's father and 44.3% student's mother were farmers, 29.1% of student's father and 13.9 of student's mother were government officers, indicated in table 1. 7.6% of student's father and 16.5% of student's mother had no chance for education, indicated on table 2.

Oral health knowledge

The original questionnaire was made by the authors, indicated in table 3. Table 4 shows the numbers and its ratio of participants' answers. 97.5% of the samples answered in Q1. Q2 showed 75.9% understand the sign of dental decay. Q3 showed 68.4% know how to treat dental decay. Q4 showed 96.2% understands the condition of dental decay. Q5 showed 92% understand how to clean teeth. Q6 showed that 89.9% understand how to check cleanness by oneself. Q7 showed 97.5% knows how to use dental floss.

Q8 showed 87.3% understand that calcium was good for teeth to become stronger. Q9 showed 91.5% understands type of behavior that increases the risk dental decay, indicated on table 4. From the analysis above, nurses understand the basic oral health promotion in some extent, which enables them to acquire further knowledge. Since they have basic knowledge of the subject, they could become substitute of dental nurses in the future if they are given further knowledge regarding oral health promotion.

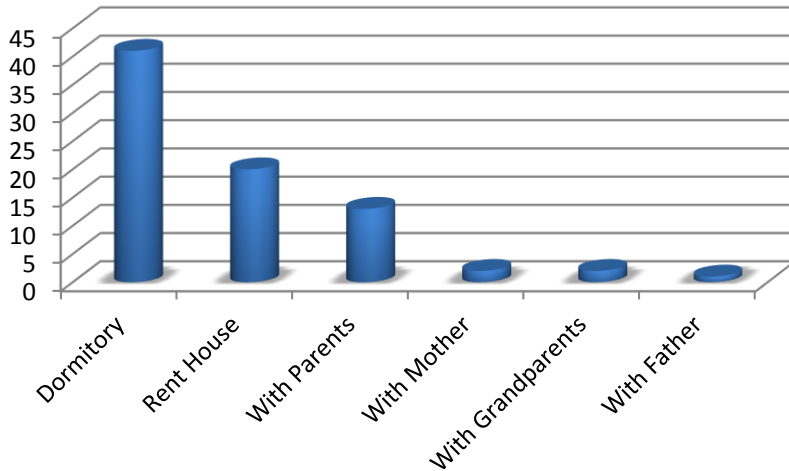


Figure 5
living situation of Nursing Students

Table 1.

Occupation of student's parents

Occupation	Father		Mother	
	Number	Percentage (%)	Number	Percentage (%)
Farmer / Gardener	48	60.8%	35	44.3%
Government officer	23	29.1%	11	13.9%
House wife	0	0%	22	27.8%
Business owner	6	7.6%	11	13.9%
Factory/worker	2	2.5%	0	0%

Table 2.

Education of student's parents

Education	Father		Mother	
	Number	Percentage (%)	Number	Percentage (%)
No education	6	7.6%	13	16.5%
Primary school	26	32.9%	30	38.0%
Secondary school/high school	32	40.5%	31	39.2%
College/university	15	19.0%	5	6.3%

Table 3.

Oral health knowledge questionnaire

1. Which of the followings are the methods for cleaning teeth?
2. Select three answers the signs of dental decay?
3. Dental decay is treated by?
4. If the dental decay neglects long time?
5. Which of the followings are the bad influences by misusing of teeth brushing?
6. How do you check cleanness by yourself?
7. What are the benefits of dental floss?
8. What kind of nutrition in foods makes teeth stronger?
9. Which the behavior reduces the risk dental decay?

Table 4.

Oral health knowledge

Q1	Which of the followings are the methods for cleaning teeth? (Multiple answer)	Number	Percentage
	Brush teeth	77	97.5
	Mouth wash	58	73.4
	Clean tongue	49	62
	Wash the mouth by water	47	59.5
	Salt	26	32.9
	Dental floss	16	20.3
	Toothpick	10	12.7
Q2	Select the signs of dental decay? (Multiple answer)	Number	Percentage
	Teeth groove gray	60	75.9
	Teeth cavity	55	69.6
	Odor	55	69.6
	Hypersensitive teeth	21	26.6
Q3	Dental decay is treated by? (Multiple answer)	Number	Percentage
	Extraction	54	68.4
	Filling	41	51.9
	Scaling	13	16.5
Q4	What would be the consequences if the dental decay is neglected for a long time? (Multiple answer)	Number	Percentage
	Severe pain	76	96.2
	Odor	70	88.6
	Difficult to chew	69	87.3
	Missing tooth	52	65.8
	Weakness	29	36.7
	No activities	27	34.2
	No society	23	29.1

Q5	Which of the followings are the bad influences by misusing of teeth brushing? (Multiple answer)	Number	Percentage
	Not Clean	73	92.4
	Calculus	70	88.6
	Dental decay	64	81
	Deep neck tooth	26	32.9

Q6	How do you check cleanness by yourself? (Multiple answer)	Number	Percentage
	Mirror	71	89.9
	Tongue touch	57	72.2
	Tooth pick	17	21.5
	Finger	16	20.3

Q7	What are the benefits of dental floss? (Multiple answer)	Number	Percentage
	Take foods out from proximal tooth	77	97.5
	Prevention of gum disease	71	89.9
	No odor	51	64.6
	Prevention dental decay	32	40.5

Q8	What kind of nutrition in foods makes teeth stronger? (Multiple answer)	Number	Percentage
	Calcium	69	87.3
	Fluoride	59	74.7
	Mineral	38	48.1
	Vitamin	26	32.9
	Protein	10	12.7

Q9	Which the behavior reduces the risk dental decay? (Multiple answer)	Number	Percentage
	Not brushing teeth	77	91.5
	Sweet foods	60	75.9
	Cola	30	38
	Eat snack food	18	22.8

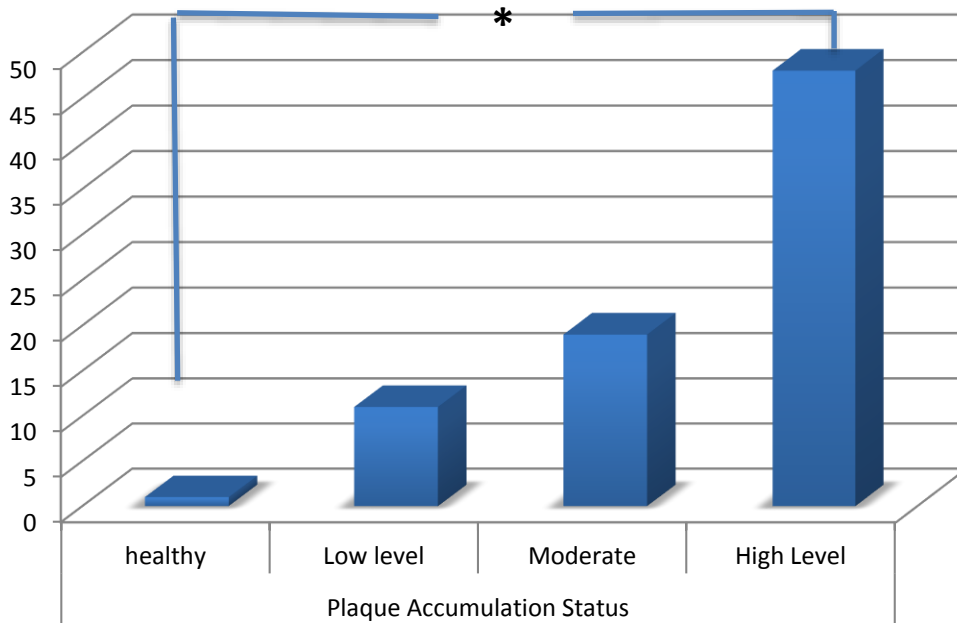
Oral health Status of the targeted nurses

We assumed that it is necessary to evaluate the actual oral condition of targeted nurses. The results of oral hygiene status for 79 nurses evaluated by plaque and calculus accumulation show in figure 6 and 7. In the evaluation of the plaque accumulation status of 79 nurses, it indicates that the high level plaque accumulation group was the largest group, and it showed statistical significant difference between healthy and high level group. In the evaluation of the calculus accumulation status of 79 nurses, it indicated that the high level plaque accumulation group was the largest group, and it showed statistical significant difference between healthy and high level group.

In general, DMF index is used to indicate the dental decayed situation. The result of DMF was shown on figure 8.

Dental decayed covers 67.1% of 79 nurses. Missing tooth also indicated 44.3%. Regarding to gingival conditions are distributed no inflammation surrounding tooth as normal and inflammation limited on gingiva so call gingivitis and spread into alveolar bone as periodontitis.

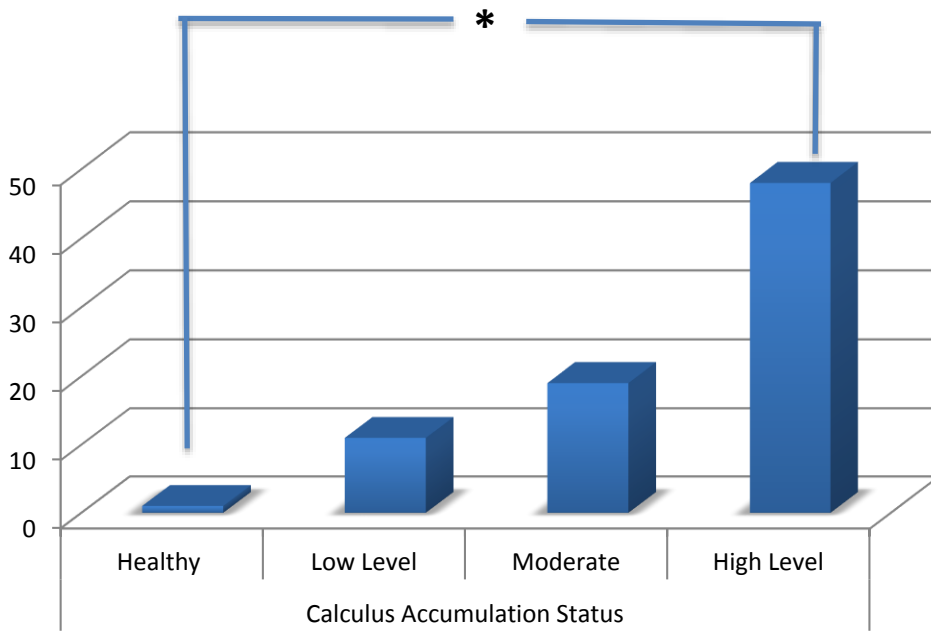
For the periodontal status, almost 90% of samples were normal or being standing slight gingivitis (Figure 9).



P>0.05

Figure 6.

the plaque accumulation status of 79 nurses, it indicates that the high level plaque accumulation group was the largest group, and it showed statistical significant difference between healthy and high level group.



P>0.05

Figure 7.

In the evaluation of the calculus accumulation status of 79 nurses, it indicated that the high level plaque accumulation group was the largest group, and it showed statistical significant difference between healthy and high level group.

DISCUSSIONS

The nine questions were classified into three categories such as self-care, food/ nutrition and basic knowledge of dental decayed.

Question 1 asked about method for cleaning teeth. As for the general knowledge, for instance burnishing teeth or mouth wash, the targeted nurses understand at the same level of general persons, however, slightly complicated questions including method of dental floss or tooth pick were answered only by 12% to 20% of the samples. In the question 2 which was intended to evaluate the understanding of the signs of dental decayed, the targeted nurses do not understand hypersensitive symptoms. In question 3, 68.4% of nurses answered as extraction for the treatment for dental decayed. Fortunately, the question 4 which asked about the consequence for neglecting dental decayed for a long time, over 60% of nurses answered correct, and it means that nurses understand the pathological change of dental decayed. The question 5 asked about the influences of misusing teeth brush, only 32.9 % understand about deep neck tooth. In question 6 which asked about their own method for checking teeth, only 21.5% of nurses picked using tooth pick. Question 7 asked about the benefit of dental floss, and 89.9 % of nurses answered as preventing gum disease, but only 40.5 % of them answered as preventing dental decayed. Regarding the nutritional question (question8), nurses appeared to understand the nutritional supply for dental and oral health. The last question asked about the behavior for reducing dental decayed risk, nurses did not appear to understand the risks caused by cola and sank food⁵⁾.

According to the result from our original questionnaire, we found that the targeted nurses understand the basic knowledge of oral health as a general parson's level, but when it comes to slightly complicated questions, they could not answer.

Furthermore, in the purpose to evaluate whether the nurses are able to take oral health promotions of the evaluation of ability adaptability of the oral health promotion that it examined from actual oral conditions of nurses. The results of actual conditions in oral hygiene status, DMF index and gum condition indicated that in all categories very poor comparison between nurses and general residents⁶.

Our study strongly suggests that instruction of the nurse regarding the method of oral hygiene, preventing oral and dental disease and treatment procedure is necessary, and dental specialist must teach for nurses.

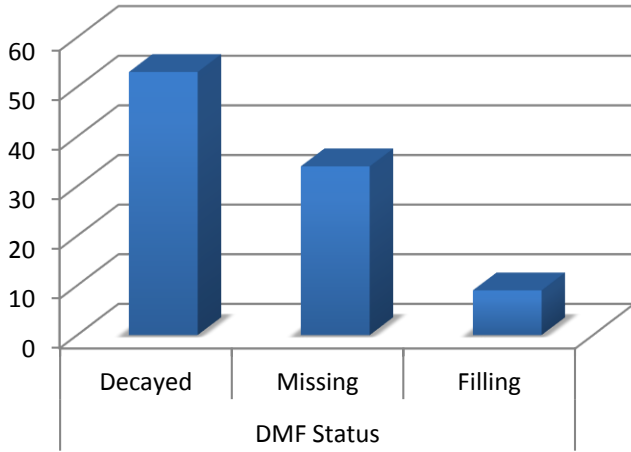


Figure 8.

In general, DMF index is used to indicate the dental decayed situation. The result of DMF was shown on Dental decayed covers 67.1% of 79 nurses. Missing tooth also indicated 44.3%.

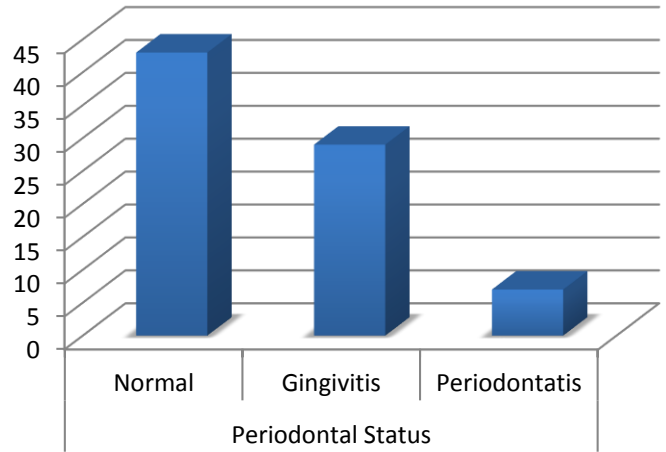


Figure 9.

For the periodontal status, almost 90% of samples were normal or being standing slight gingivitis .

CONCLUSIONS

According to the result, the targeted nurses appear to understand the basic knowledge of oral health as general persons' level, but they could not answer slightly complicated questions. In the purpose to evaluate whether the nurses are able to take oral health promotions that it examined from actual oral conditions of nurses. The results of actual condition regarding oral hygiene status, DMF index and gum condition showed very poor in all categories. Therefore, our study strongly suggests that instruction of the nurse regarding the method of oral hygiene, preventing oral and dental disease and treatment procedure is necessary, and dental specialist must teach for nurses

ACKNOWLEDGMENT

The authors in this study would like to acknowledge all the nursing students and staff of technical nursing school in Phone Hong district, teachers of University of Health Sciences (Dr. Aloungnadheth Sittiphanh, Dr. Sengphouvanh Ngonephady Dr. Bounnyong Sidaphone and Dr. Vorasack Phounsiri) Vientiane province Lao PDR. And the authors also respectfully thanks for Organization of International Support for Dental Education (President: Professor Takashi MIYATA) and Mr. Toshimitsu Mochida.

REFERENCES

1. J H John, D Thomas, D Richards, C Evans, Regulating dental nursing in the UK, *British Dental Journal* **193**: 207 – 209: 2002.
2. Masafumi Motohashi, Ichiro Nakajima, Hirofumi Aboshi, Kazuya Hond, Munemitsu Yanagisawa, Takashi Miyata, Masao Maeno, Fumiyuki Kuwata, Bounnhong Sidaphone, Sengphouvanh Ngonephada, Aloungnadheth Sitthiphanh, Som Ock Kingsada, Kichibee Otsuka; 3.
3. The oral health of children in a rural area of the Lao People’s Democratic Republic, *Journal of Oral Science*, Vol. 51 -1, 131-135, 2009.
4. Takashi MIYATA , A Completion Report of Phase1 Project of Capacity Building for Nurses in Phone Hong District through Dental and Oral Health Training: 2012
5. Hiroko Miura, Yoshima Araki, Katsuhiko Haraguchi, Yumiko Arai, Takusei Umenai, Socioeconomic factors and dental caries in developing countries: A cross-national study, *Social Science & Medicine*, Volume 44, Issue 2,: 269–272: 1997.
6. E Newbrun, Sugar and dental caries: a review of human studies *Science*, Vol. 217 no. 4558 : 418-423: 1982.
7. Poul Erik Petersen, Niels Hoerup, Nattaporn Poomviset, Janpim Prommajan, Achara Watanapa, Oral health status and oral health behaviour of urban and rural schoolchildren in Southern Thailand, *international Dental Journal* Volume 51, Issue 2, : 95–102: 200.

Ethical Approval

This study was approved by ethical committee in University Health Sciences, Lao PDR

Correspondence: Dr. Khouaxiong XIAZE, University of Health Sciences Lao PDR Faculty of Dentistry, Mahosot Rd. Vientiane Capital, Lao PDR

Relationship Between Oxidative Stress and Oral Disease in Rural Area, Lao PDR-Comparison with Kingdom of Cambodia.

Toulaphin Phetsaphone¹, Khamphouvy Chanbounmy¹, Somlouay Pheuaphom¹, Aloungnadeth Sithiphanh¹, Sengphouvanh Ngonephady¹, Bounnhong Sidaphone¹, Vorasack Phounsiri¹, Gen Yano^{2,3}, Takashi Miyata^{1,2}

1. University of Health Sciences faculty of Dentistry, Lao PDR
2. Organization of International Support for Dental Education (OISDE)
3. Nihon University School of Dentistry at Matsudo

KEY WORDS: Oxidative Stress, Oral Disease, Lao PDR, Cambodia

INTRODUCTION

The Oxidative Stress (OS) is an important index to evaluate aging. Particularly, it is important to clarify how the OS affects the progressive aging syndrome in the developing country. OS was measured by the project of the Organization of International Support for Dental Education (OISDE) from 2009 to 2013 at Mondulkiri province, in Kingdom of Cambodia (Cambodia). The results demonstrated that various oral diseases may induce the outbreak of the OS in the severe environment of the Mondulkiri province.

In this study, OS was measured in Lao PDR (Laos) by the similar method to the previous study in Cambodia. The big differences in data were found in the comparison with Mondulkiri province. There were various interesting findings after analyzing the oral and dental conditions in two different areas.

MATERIAL AND METHODS

This study was conducted for one year from December 2014 in Phone Hong district, Laos. 39 adults were selected as the subjects. Sex ratio was 4 males to 35 females, average age was 32.7 years old, average weight was 50.3 kg and average height was 155.0 cm which were the averages of ordinary adults in Laos's people. Average blood pressure was 113.8>78.4, and in multipara of the subjects, the mortality rate showed 2.6. All of subjects had no infectious disease including malaria, dengue fever, diarrhea and etc. The subjects were examined regarding to the oral condition including decayed tooth, probing depth (PD), and bleeding on probing (BOP). At the same time, the subjects were taken blood to measure the oxidative stress. Oxidative stress was measured by the diacron reactive oxygen metabolites (d-ROMs) test using a FRAS4 system (Diacron, Grosseto, Italy). 20µL of peripheral blood was collected from each sample's the fingertip. This test is based on the ability of transition metals to catalyze, in the presence of peroxides, the formation of free radicals that are trapped by an alchylamine. The alkylamine reacts and forms colored radicals which are detectable at 505nm by a kinetic reaction. The free radicals can be determined with a normal spectrophotometer. The measurement unit used was the Carrabelle unit (U.CARR). The normal range was set at 250-300 U.CARR. 1 U. CARR is set at 0.08 mg/dL.

Results

Table 1 indicates the averages of oral conditions of all the 39 inhabitants in Phone Hong districts were determined in number. The result of OS test was 260 which is lower than the average of the Japanese physically normal person. The scatter diagram of OS test is shown in figure 1.

Figure 1 indicates In d-Roms test, three subjects scored beyond 300, three subjects on the border line and the others scored lower than the border line.

When comparing OS test result between Laos and Cambodia, the inhabitants of rural area in Cambodia showed a stronger tendency to have higher score. The tendency is shown on table 2.

Table 2. indicates Comparing the data that affected the outbreak of OS in Laos and Cambodia, Cambodia showed relatively higher numerical value in BOP that induces a strong inflammation for body, and it showed significant statistical difference.

Figure 2. indicates Comparing the data that affected the outbreak of OS with Laos and Cambodia, Cambodia showed relatively high numerical value in BOP that induces a strong inflammation for body, and it showed significant statistical difference.

Table 1.

The averages of oral conditions of all the 39 inhabitants in Phone Hong districts were determined in numbers. Oral and dental conditions' data of 39 subjects

Average of dental decayed teeth	3.8
Average of missing teeth	5.51
Average of filling teeth	0.1
Debris index	2.6
Calculus index	2.1
Rate of 4mm> PD	20
BOP	5

d-Roms

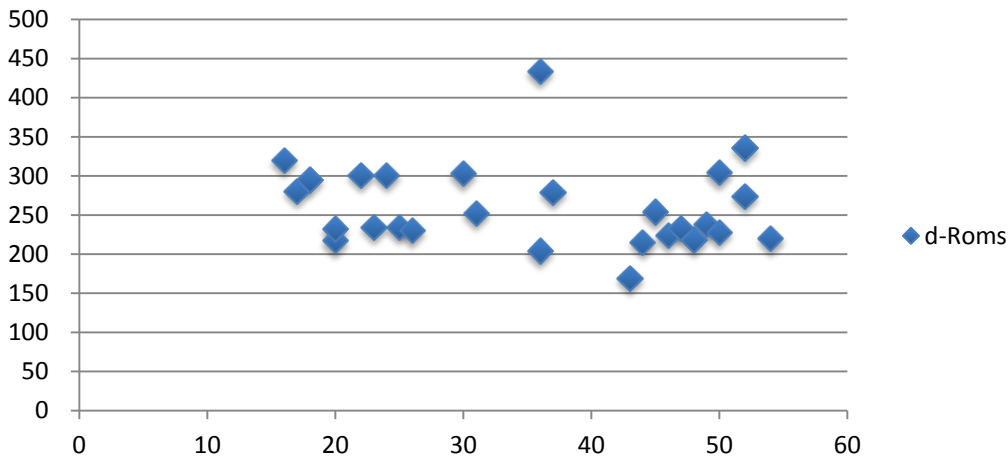


Figure 1.

In d-Roms test, three subjects scored beyond 300, three subjects on the border line and the others scored lower than the border line.

Table 2.

Comparison of related data for OS test between Laos and Cambodia

	Lao P.D.R	Kingdom of Cambodia
Average of subject's age	32.7	37.6
Average of dental decayed tooth	3.8	6.0
Average of missing tooth	6.23	3.18
Average of filling tooth	0.1	0.29
Rate of >4mm PD	20	17.4
BOP	5	52.23
R-ROMs	260.0	336.8

Comparison between PD and BOP

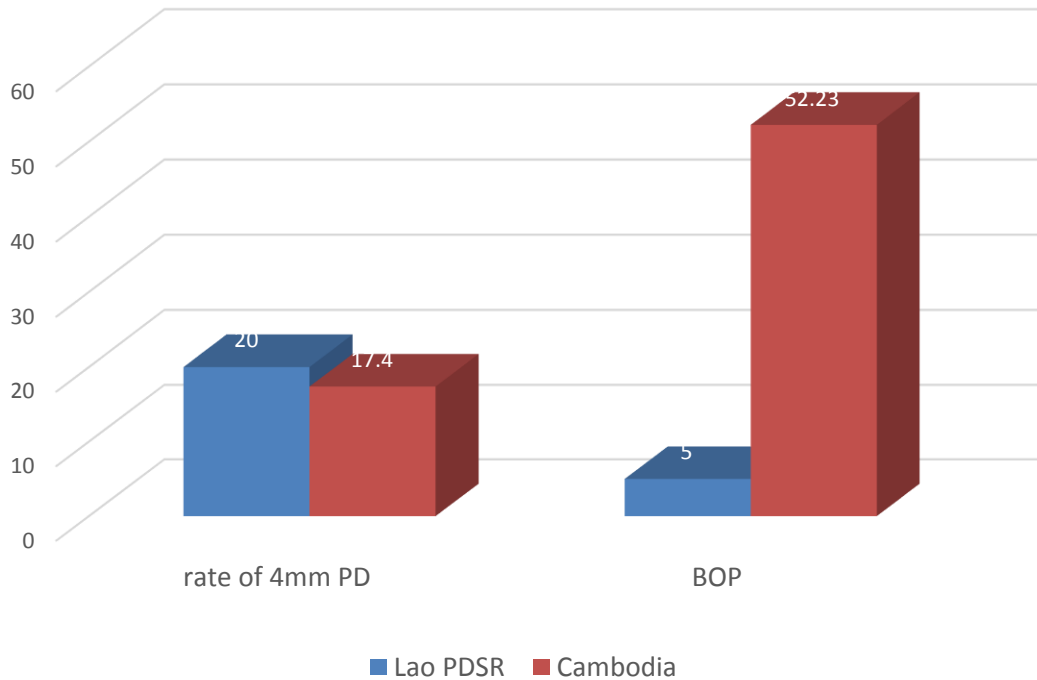


Figure 2.

Comparison between PD and BOP Lao PDR and Cambodia. Comparing the data that affected the outbreak of OS with Laos and Cambodia, Cambodia showed relatively high numerical value in BOP that induces a strong inflammation for body, and it showed significant statistical difference.

DISCUSSIONS

Lao PDR is the superior country in producing the electricity which is supported by Japan, and Lao PDR supplies electricity to the whole land in Lao PDR “Lao is the 21st country in terms of exporting electricity around in the world, and No. 1 in East Asia (428 mil. USD)” *

* TRADE AND DEVELOPMENT BOARD (UNCTAD) Commission Investment, Technology and Related Financial Issue: Intergovernmental Group of Experts on Competition Law and Policy Eighth Session Geneva 17-19 July 2007 Item 3(i) of the provisional agenda

Therefore, the living environment is relatively in place in the rural area. Lao PDR has relatively better nutritional condition. Lao PDR has safe water supply, and other hygiene conditions is much better than Cambodia including periodontal status. Furthermore, one of the factors that oxidation stress is held at low level is the continuous implementations of the national policy in every rural area. On the other hand, the dental service is not yet very poor in Lao PDR**.

** Final Statistical Report Year Book 2012

The result on OS which measures aging degree shows that it is not in a serious state at this point. However, in the future, oral and dental disease may increase due to the changes of eating and poor oral hygiene habits. This result strongly suggests that the further measurement of aging degree is necessary.

As notable characteristics of residents in the rural areas of developing countries, we can observe rapid aging and short life expectancy. One of the hypothesis of causing the rapid aging and short life expectancy in rural areas of developing countries is an excess of oxidative stress. One of the factors that may contribute to the oral disease is the production of OS. Yano¹ published an academic paper regarding the tendency of OS outbreak in the rural area of Cambodia. The paper indicated that periodontal disease may increase the production of OS outbreak. The free radical theory is currently the most influential theory among the various aging theories. The free radical theory points that aging is accelerated by oxidative stress. Oxidative stress is produced by reactive oxygen species which are generated through the processes of inflammation, diabetes, ultraviolet rays, radiation, bacterial infection, drugs, smoking, and energy metabolism². The level of oxidative stress is higher in patients with cancer, disease-infarct, hypertension, obesity, atherosclerosis, diabetes, and periodontal disease⁴⁻⁸. The d-ROMs test is assumed to be a reliable and highly reproducible method ⁹. The results of the present studies show the potential correlation between d-ROMs data and oral diseases. When comparing the data from Laos and Cambodia, it suggests that the periodontal disease is a factor for OS outbreak. Miyata et al.¹⁰ and Amarasena et al.¹¹ reported that residents living in a rural area in Cambodia had severe oral disease, and the periodontitis was significantly worse than that of the studies' subjects in Phnom Penh City. According to those studies, poor living conditions such as an inadequate supply of safe water, improper toilet facilities, poor nutrition, and the risk of living in proximity to livestock were closely associated with severe periodontal inflammation compared to the advanced living conditions found in Phnom Penh City. This study showed that the infectious disease rate was extremely low at the target area while the living environment was not severe. On the other hand, the data from oral conditions indicated the poor level of dental decayed and high level of missing teeth which were the average of 3.8 and 5.5 respectively. Average of filing tooth was 0.1, and this clearly tells us a lack of dental services. Periodontal condition is not severe according to the data. The data also showed that OS was 260 on average which is lower than the average of the physically healthy person. The relation between oral and dental disease and OS was not found. At last, the comparison of the oral condition between Cambodia and Lao PDR shows the prevalence and severity of periodontal diseases in particular made a great difference, and it may suggests that the outbreak of the OS may be contributing to it.

REFERENCES

1. Yano G. Relationship between Oxidative Stress and Oral Disease in a Rural Cambodian Population: Evaluation of Oxidative Stress in a Developing Country, *Int J Oral-Med Sci* 11(4):229-235, 2013
2. Watanabe R, Yodoi J: Reactive oxygen species (ROS). *Nippon Rinsho*, 67: 577-580, 2009.
3. Katherine LT, Supawan B: Nutrition and Aging in Developing Countries. *J Nutr*, 131: 2417S-2423S, 2001.
4. Yoshikawa T, Naito Y: Molecular mechanism of accelerating ageing by oxidative stress. *Nippon Rinsho*, 67: 1307-1313, 2009.
5. Richter T, Von ZT: A continuous correlation between oxidative stress and telomere shortening in fibroblasts. *Exp Gerontol*, 42: 1039-1042, 2007.
6. Miyake S, Sasaguri K, Hori N, Shoji H, Yoshino F, Miyazaki H, Anzai K, Ikota N, Ozawa T, Toyoda M, Sato S, Lee MC: Biting reduces acute stress-induced oxidative stress in the rat hypothalamus. *Redox Rep*, 10: 19-24, 2005.
7. Lee CI: Biomedical Application of Dental Treatment Using Free Radical Technology. *J Kanagawa Odont Soc*, 40: 135- 138, 2005.
8. Komatsu T, Lee MC, Miyagi A: Reactive oxygen species generation in gingival fibroblasts of Down syndrome patients detected by electron spin resonance spectroscopy. *Redox Rep*, 11: 71-77, 2004.
9. Cesarone MR, Belcaro G, Carratelli M, Cornelli U, De Sanctis MT, Incandela L, Barsotti A, Terranova RN: A simple test to monitor oxidative stress. *Int Angiol*, 18: 127 - 130, 1999.
10. Miyata T, Uy S, Chan B, Sok C, Lim S: A Study of Risk Factors Concerned the Onset of Periodontal Infection in the Least Developed Countries: The First Report - The Influences of the Living Environments Risk Factors at Rural Area in Kingdom of Cambodia-. *J Jpn Soc Periodontol*, 47: 258 - 268, 2005.
11. 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*, 14: 105 - 109, 2002.

ACKNOWLEDGMENT

The authors would like to acknowledge the cooperation of participants in Phone Hong district, Vientiane province Lao PDR Also, thanks for helping our study to all of the staff of University of Health Sciences Lao PDR (Dr Aloungnadheth Sitthiphanh, Dr Sengphouvanh Ngonphady, Dr Bounyong Sidaphone, Dr Bounsong) specially Dr Vorasack Phounsiri, Mr Toshimitsu MOCHIDA from Japan and OISDE project (President: Professor Takashi MIYATA).

Ethical Approval

This study was approved by ethical committee in University Health Sciences, Lao PDR

Correspondence: Dr. Toulaphin Phetsaphone, University of Health Sciences Lao PDR Faculty of Dentistry, Mahosot Rd. Vientiane Capital, Lao PDR

Applications of Doc's Best Cement in Developing Countries

Kazuo KOMINE

Visiting professor of the University of Health Sciences, Faculty of Dentistry, LAO PDR
Private Practitioner, Satama, Japan

1. Bland Cleaning Method

1) Cleaning of Dental Caries

Cleaning plaque and food debris with Ultrasonic Scaler often causes irritation of tooth pulp from the mechanical vibrations and the heat of a Scaler. Based on the Dentinal Fluid Transport theory, such irritation results in infecting dental pulp of bio-film. And so, bland cleaning method, which does not involve any irritation, is recommended.

(1) Bland Cleaning Method

Use Protein Resolute Sterilizing Water (PRSW), which was developed for the purpose of sterilization. In order to get the ideal sterilization of biofilm alkalize PRSW and act pH control to around pH9.5, unless PRSW reveals its disinfecting capacity that is not effective enough to kill bacterial of bio-film.

PRSW not only cleans the surface of bio-film, but also removes plaque and food debris without causing any irritation from a mechanical vibration of an Ultrasonic Scaler. In addition, as the temperature of PRSW is turned up, the usage of PRSW achieves better cleaning effect and less irritation on dental pulp from the heat of a scaler. The use of PRSW decreased the incidence of pulp inflammation dramatically.

PRSW is made by the Dr. Plus (Epios, Figure 1) and was named POIC Water (Figure 2).



Figure 1 (left): Dr. Plus (Epios)

Figure 2 (right) POIC Water

(2) Removing remaining Decay

Textbook theory suggests leaving 2mm of decay in vital tooth in order to remove it without causing irritation. It is technically impossible to perfectly measure 2mm inside of a mouth and avoid irritation that might result in pulp inflammation at the same time.

Use POIC Water to clean the surface of softened dentin without removing remaining decay. It is one of the major dedications to the increase of success rate of DBC treatment.

Avoid removing any decay, which might lead to susceptibility to defluxion of carious cavity, is recommended for the beginners of DBC. However, for experienced DBC users, or if there is no pain caused on the infected dentine on the side walls of carious cavity, decay (infected dentine) should be removed, because the pain caused on the infected dentine, which is on the side walls of carious cavity, is highly likely gone by the time of defluxion.

2. Cavity Prevention Method

1) Prevention Method (Compound of DBC Powder and Copa-lite liquid)

On the smooth-surface decay, pint the compound liquid of DBC powder and Copa-lite time and time again until dentin becomes re-mineralized. In the prevention of decay, repeated treatment of such should be enough. However, when there is a caries observed, criterion to observe its progression is necessarily.

Use Diagno-dento (KaVo. Dental company, Figure 2) and Laser diagnostic device (Figure 3) to examine the progression of caries. This Diagno-dento shows a numerical measurement on caries. Before a treatment, examine caries with Diagno-dento, record the information (the numerical measurement), and paint the compound liquid of DBC powder and Copa-lite on caries. On a next visit of a patient, examine caries with the Diagno-dento again. Every patient on a second visit shows numerical result that is lower than one's first time examination. On a second visit, if the Diagno-dento shows the numerical result, which is less than 30, it means that caries are healed. Such examination with Diagno-dento before and after the painting of DBC powder and Copa-lite on caries gives the numerically-based consequence of treatment.



Figure 3 (left) Diagno-dento

Figure 4 (right) Laser diagnostic device

2) Filling Method

It is a characteristic of DBC filling to have softened dentin becomes re-calcified with passage of time. Time needed for re-calcified differs on every case. And so, examination on caries with Diagno-dento preliminarily to a treatment gives a projection on tooth-recalcified time of DBC. The caries with normal depth shows the numerical result of more than 99. If it shows around 30, it indicates that tooth re-calcified has already started, and will have a shorter time to complete tooth re-calcification. Based on Dr. Komine's examinations, it takes about 1-2 years on average to complete tooth re-calcification. When the numerical result of Diagno-dento shows less than 50, it completes tooth re-calcification in around 6 months. When the numerical result shows less than 50, and when it shows sign of symptom, it is amenable to treatment on the same day of DBC filling-the treatment of direct bonding. However, it is often the case that it is associated with no symptoms when the numerical result shows less than 50.

3) Acute Symptoms

Usage of DBC to treat acute symptoms holds promises in its result. It is recommend to redefine preconceived notions on dental treatment and to use DBC, in order to find new method of treatment. It is desirable to use POIC Water and Red DBC together. Due to total dental pulp inflammation, it may not get expected result when tooth is too sensitive to percussion When other acute symptoms, such as cold-water/hot-water pain, is observed, it requires alimentary therapy (diet therapy) like perfect Sugar-cut¹ for more than 2 weeks treat dental pulp inflammation. Alimentary therapy and Sugar-cut are stated herein below.

3. Establishing formation method that conforms with philosophy of Minimum

Intervention

1) Last Prosthesis

There is need to conduct dental prosthesis after 1-2 years of DBC filling. Tooth preparation caused by dental pulpitis has tendency to develop dental pulp inflammation. Without preventing pulp inflammation, it is right back to the starting point. Suggested is the last conservative therapy that does not involve grinding, the DirectBonding method, which was developed in Japan. The Direct Bonding method indicates photo polymerization hybrid resin. It is important to remember to use a sophisticated hybrid resin, such as Gradia-Direct (GC company, Figure 4), and MY-fill (GC company). Both of them are high quality in operability, durability, and aesthetically

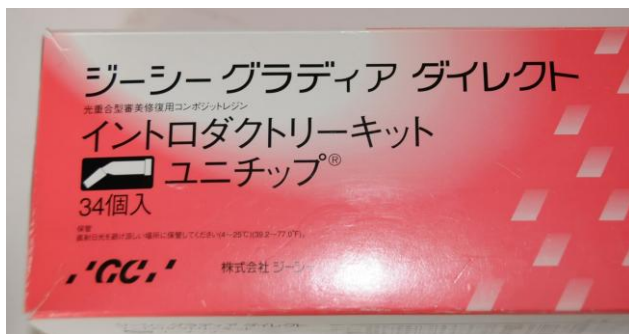


Figure 5: Gradia-Direct

Case Presentation

Patient: Female, 22 years old

Diagnosis and Symptom : Dental Caries, Little pain

Treatment Method : Remove free enamel

Clean carious cavities with POIC Water and remove plaque



Figure 6 Clean carious with POIC Water and remove plaque



Figure 7 Paint the compound of DBC powder and Copa-lite



Figure 8 Fill caries with DBC cement



Figure 9 Prosthesis

4. DBC + alimentary therapy (diet therapy)

When DBC is used in combination with alimentary therapy, it results in more effective tooth re-mineralization. Japanese have tendency to develop caries more often compared to other nationalities, due to its little acceptable amount of sugar. With the Sugar-control method mentioned in the next paragraph, high probability of anti-inflammatory on acute dental inflammation is achieved.

1) Sugar-Control Method

Dental Inflammation

Paint the compound of DBC and Copa-lite on to the dental inflammation and carry out the Sugar-control method for 2 weeks. Do not eat any sweets and any dishes that contain sugar. Performing this method for more than 2 weeks achieves high probability of antiinflammatory action.

Tooth Re-mineralization

This emphasizes on Sugar-control, instead of Sugar-cut. Sugar-control indicates the limitation of sugar in diet, while Sugar-cut indicates the diet without any sugar. Sugarcontrol often brings the effective results in one's health. It is important for a patient to experience the difference in one's health by going through the Sugar-Control diet. Les than 20g of sugar consumption a day.

Agenda

Mechanism of DBC's re-mineralization

It is necessarily to demonstrate the mechanism of how DBC cement re-mineralizes the infected softened dentin and to collect the data to demonstrate the mechanism. Confirmation Method on sterilization after Re-mineralization How to confirm re-mineralization is the challenging of DMC treatment. Establishing the recalcification confirmation criteria and sterilization state after recalcification is required.

Antimicrobial system in dental tubule

I have been researching Focal Infection that, I believe, will become the best system that saves patients through the collaboration of dentistry and medicine. In fact, I have gained positive result on my patients with the knowledge I learned through my research on Focal Infection. Finding out the mechanism and understanding the importance of Focal Infection will be beneficial for the further development of dentistry.

References

1. Aoshima, Tetuji. et.al; Composit Resin. The Quintessence 2012.1, 2012.
2. Cooley & Cooley Ltd. Copalite Intermediary Varnish & Dentinal Tubuli : Seal. Huston TX: Cooley & Cooley Ltd.

ACKNOWLEDGEMENT

Special thanks to;

Prof. Takashi Miyata, the president of the Organization of International Support for Dental Education (OISDE)

Assoc. Prof. Dr. Som Ock Kingsada MD. PhD, Deputy Minister, Ministry of Health. Dr. Aloungnadeth Sitthiphanh, DDS., Vice President for Planning and Student Affairs, University of Health Sciences . Assoc. Prof. Sengphouvanh Ngonephady, Dean for Faculty of Dentistry, University of Health Sciences. Bounnhong Sidaphone, DDS., MPH, Assoc. Dean for Faculty of Dentistry, University of Health Sciences. Vorasack Phounsiri, DDS., MSc, Director of Dental Hospital, University of Health Sciences. And all of the staff of the university of Health Sciences, Lao PDR

Correspondence: Dr. Kazuo KOMINE, 2469 Tamagawa, Tokigawa-cyou Hiki-gun Saitama, Japan, tel: 81-493-66-1118

