研 究 者：Zar Chi Kyaw Myint

（所属：Department of Oral Health Promotion, Tokyo Medical and Dental University, Japan Department of Preventive and Community Dentistry, University of Dental Medicine, Yangon, Myanmar）

研究題目：Risk Indicators of Dental Caries and Gingivitis among 10-11-year-old Students in Myanmar

Introduction：

Oral health is indispensable to general health, and it is an essential element of quality of life. One of the most common oral diseases is dental caries, which affects 60%-90% of children globally. In some Asian countries, dental caries is widespread, and it becomes a major public health problem. The high prevalence of dental caries may be attributable to frequent consumption of sweet food, lack of oral hygiene care, dental plaque, past dental caries experience in primary dentition, female sex, low socio-economic status and inadequate dental service utilization. Oral health promotion and oral health education are national oral health strategies in Myanmar. However, efforts about dental public health-related activities remain insufficient. Moreover, lack of annual school oral health data is a problem in Myanmar. Early identification of the risk indicators of oral diseases allows dental professionals for the preventive approach to the students. In particular, very limited data are available on the oral health status of school students during the mixed dentition stage. Therefore, the objectives of the present study were to collect basic data on the clinical oral health status of school students in Myanmar and to investigate associated risk indicators, including the gender-based difference, socioeconomic condition of the parents, oral health behaviors, and dietary pattern of students.

Methods：

In total, 537 fifth-grade students (251 boys and 286 girls), aged 10-11 years, participated in this study, in which they completed a questionnaire survey and underwent a clinical oral examination from December 2017 to January 2018. This study was implemented as a part of school health promotion activities.

This research was approved by the ethical committee of the Department of Medical Research in Myanmar, University of Yangon Dental Medicine, and Tokyo Medical and Dental University.

A self-administered questionnaire inquired the participants about the occupational status of the parents and assessed the students' oral health behaviors, such as toothbrushing frequency, mouthrinsing habits, dental visits over the last 12 months, consumption of sweet snacks, and

consumption of sweet beverages. A trained dentist examined all students who were present at the date of study for oral health status. An artificial light, a mirror and a community periodontal index probe (WHO) were used in the oral examination. Oral examination assessed dental caries (DMFT, dft), oral hygiene status with the simplified oral hygiene index (OHI-S). Gingival status of 12 anterior teeth was evaluated with the PMA index.

Number of bacteria in dental plaque was assessed with the bacteria counter® (Panasonic, Tokyo, Japan). Plaque sample was obtained from the cervical portion of the buccal surface of the upper left permanent first molar with a cotton swab. Results were expressed as face icons representing the seven-level ranking system, and the numerical value is seen at LCD screen. This procedure was done after clinical examination by the same investigator, and the result was coming out in approximately one minute. All statistical analyses were conducted using SPSS software, version 21.0 (IBM, Tokyo, Japan). The level of significance was $p<0.05$.

Results:

Prevalence of dental caries in permanent teeth was 36.5% and the major component was the untreated dental caries. There were no significant differences concerning the caries status in permanent and primary teeth by gender. Regarding the oral hygiene status, boys had significantly higher OHI-S and bacteria count than girls. Boys had the significantly higher number of gingiva inflammation sites than girls ($p<0.001$) (Table 1). It was revealed that students who brushed their teeth once daily, no mouthrinsing habit after meals, the experience of a dental visit last 12 months, daily consumption of sweet snacks and OHI-S (high score) were significantly higher risk predictors for decayed teeth (i.e., DT + dt) after controlling for another factor. Gingivitis (based on the PMA index) was significantly associated with those students whose mothers were government workers or professionals, less frequent toothbrushing, students who drank sweet drinks daily, higher OHI-S score and high bacteria level (Table 2).

Discussion:

The dentition status of Myanmar students was overall poor in that nearly 70% of students had dental caries in the permanent or deciduous teeth compared with the findings of studies conducted in other developing countries. Decayed teeth were the major components of DMFT. Only a few students had filled teeth. These results implied that necessary dental treatments were not provided in Myanmar or the students, and their parents did not acknowledge the necessity of treatment. Students who had experience of the dental visit are significant associated with dental caries. In the present study among the students who had experience of a dental visit, 82.7% give the reasons of the dental visit were pain or trouble in their teeth and gum. This may be because of the fear of the dentist and lack of oral health awareness in both children and parents. Children and parents need to be educated regarding the importance of

dental visits for the treatment and prevention of oral disease.

In Myanmar, people who work as government workers and professionals are regarded as having a high socioeconomic status, compared with individuals who have other occupations. Therefore, it seems plausible that students in such families have more money and are free to buy sugary snacks or drinks. In Myanmar, every school has a school canteen, and these types of foods or beverages are readily available to students. This study showed that the consumption of unhealthy foods, especially sweet snacks, contributed to dental caries.

In this study toothbrushing ≤once daily is a significant risk indicator for dental caries (B = 0.735, $p<0.001$) and gingivitis (B = 1.604, $p<0.001$) compared to the frequency two times or more. Moreover, no mouthrinsing habit after the meal is correlated with dental caries. At home, students should be taught to choose healthy foods and should be guided to practice an adequate oral hygiene regimen to prevent dental caries and gingivitis. Clinical indexes such as the OHI-S was a key predictor for influential factors in dental caries and gingivitis. According to the results, bacterial counter machine is effective for evaluating the oral hygiene condition and showing the result may motivate students to clean their teeth. However, the study revealed that bacteria count in dental plaque was not associated with dental caries. This might be dure to the bacteria counter machine can quantitatively detect the biological cells according to their variability, no specific detection of cariogenic bacteria. Moreover, because of the cross-sectional study, additional longitudinal study needs to check the relationship. OHI-S score, gingivitis (PMA index) and the number of bacteria in dental plaque were both significantly lower in girls by bivariate analysis, but sex was not associated with dental caries and gingivitis in multiple linear regression analysis after adjusting for other independent variables.

Children who have dental caries in the primary dentition are more likely to develop dental caries in the permanent dentition. Thus, during the mixed dentition period, appropriate measures should be taken to promote oral health of Myanmar students. This study revealed the risk indicators of dental caries and gingivitis that make possible identification of the students who are at a higher risk and could make a further preventive measure for them.

A limitation in the present study was the representativeness of the sample. A random sampling method was employed, although the sample was chosen from only one area in Myanmar. Therefore, the results of this study may not necessarily be generalized. Because the information was gathered by the self-report survey, there is a possibility of information and response bias. Another limitation in this study came from using some questions with categorical responses to record the sugar consumption practice. Another limitation is related to study design. This was a cross-sectional study ; therefore, a longitudinal study needs to be implemented to confirm the current findings.

Conclusion :

Myanmar students with mixed dentition had a high prevalence of dental caries and

gingivitis, poor oral hygiene and still lack proper oral health habits such as toothbrushing, mouth rinsing compared to the previous study. The socioeconomic condition, oral hygiene status, and oral health behaviors were risk indicators for dental caries and gingivitis. Cooperative efforts by school authorities, teachers, health professionals, and parents in a school oral health promotion program would be essential for the improvement of oral health status of Myanmar students.

Table 1. Oral health status and oral bacteria count

Variables	Total (n=537)	Boys (n=251)	Girls (n=286)	p value
Permanent teeth, mean(SD)				
Number of teeth	21.2 (4.58)	20.5 (4.75)	21.7 (4.36)	0.002
DT	0.63 (1.00)	0.66 (1.04)	0.60 (0.98)	0.494
MT	0.01 (0.11)	0.01 (0.09)	0.01 (0.13)	0.798
FT	0.01 (0.12)	0.01 (0.14)	0.01 (0.10)	0.890
DMFT	0.65 (1.02)	0.68 (1.05)	0.62 (1.00)	0.510
Prevalence of dental caries, n(%)				
Permanent teeth (DMFT)	196 (36.5)	97 (38.6)	99 (34.6)	0.333
Primary teeth(dft)	278 (51.8)	139 (55.4)	139 (48.6)	0.117
Primary or Permanent (DMFT or dft)	368 (68.5)	179 (71.3)	189 (66.1)	0.193
Prevalence of gingivitis, n(%)	531 (98.9)	248 (98.8)	28 (99.0)	0.872
PMA index, mean(SD)	16.2 (5.45)	17.1 (5.14)	15.5 (5.61)	<0.001
Debris index(DI) score, mean(SD)	1.30 (0.42)	1.42 (0.42)	1.19 (0.39)	<0.001
Calculus index(CI) score, mean(SD)	0.14 (0.27)	0.17 (0.31)	0.11 (0.23)	0.014
OHI-S (DI+CI), mean (SD)	1.44 (0.59)	1.59 (0.62)	1.31 (0.54)	<0.001
Bacteria count, mean (SD)	$7.33\times10^7(3.43\times10^7)$	$7.91\times10^7(3.17\times10^7)$	$6.81\times10^7(3.58\times10^7)$	<0.001

Table 2. Multiple Linear regression analysis for the association between dental caries (DT+dt), gingivitis with their related factors

Independent variables	Dental caries (DT+dt)			Gingivitis (PMA)		
	B	Standard error	p value	B	Standard error	p value
Sex	0.119	0.186	0.522	−0.057	0.963	0.890
Father's occupation	−0.243	0.255	0.341	−0.252	0.565	0.656
Mother's occupation	0.694	0.381	0.069	1.943	0.843	0.022
Toothbrushing frequency	0.735	0.190	<0.001	1.604	0.421	<0.001
Daily Mouthrinsing habit	0.647	0.203	0.001	0.713	0.449	0.113
Dental visit	0.550	0.181	0.002	−0.445	0.401	0.267
Sweet snacks consumption	0.656	0.268	0.015	−0.122	0.593	0.837
Sweet drinks consumption	0.188	0.256	0.463	1.647	0.567	0.004
OHI-S	0.531	0.168	<0.002	4.021	0.373	<0.001
Bacteria level	−0.166	0.194	0.391	0.986	0.429	0.022

B = regression coefficient

Sex : boy = 0, girl = 1

Father occupation : Others (Unskilled workers, farmer, merchant/seller, dependent/

unemployed）＝0, Professional or government worker＝1

Mother occupation：Others（Unskilled workers, farmer, merchant/seller, dependent/unemployed）＝0, Professional or government worker＝ 1

Tooth brushing frequency：≧2 times daily＝0, once a day＝1,

Daily mouth rinsing habit：Yes＝ 0, No＝ 1

Dental visit：No＝ 0, Yes＝ 1

Sweet snacks：No＝ 0, Yes＝ 1

Sweet drinks：No＝ 0, Yes＝ 1

OHI-S：Low score（<1.5）＝0, High score（≧1.5）＝1

Bacteria level：Low（≦10^8）＝0, High（>10^8）＝1

Presentation：

1. Oral health status and oral health behaviors among school children in Myanmar（Poster presentation）Zar Chi Kyaw Myint et al（The 67th Japanese Society for Oral Health（JSOH）. Hokkaido, 2018.5.19）
2. Oral health status and oral health behaviors among middle school students in Myanmar（Oral presentation）Zar Chi Kyaw Myint et al（The 39th Myanmar Dental Conference, Yangon, Myanmar, 2019.1.25）