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# An Overview of Oral Health Situation and Challenges in Myanmar

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***Authors' contributions***

*This work was carried out in collaboration among all authors. Author EEA designed the study. Authors EEA and KM managed the literature searches and the analyses of the study. Author EEA wrote the protocol and wrote the first draft of the manuscript. Authors KM, TZ and YK reviewed the manuscript. All authors read and approved the final manuscript.*

***Review Article***

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## ABSTRACT

The study aims to give an overview on the oral health situation and challenges in Myanmar for policy consideration to promote the healthy life; and to support the equity position in the implementation of reasonable interventions in the country. This review was based on the data collected from scientific articles, conference presentations, documents and information from reliable websites of governmental and non-governmental organisations related to the context of oral health in Myanmar. From the review, it was observed that the oral health condition of the Myanmar population had not been much improved since 1999. The private sector is the main provider of oral health care services with a large proportion of the population paying out-of-pocket for these services. Dental caries and periodontal diseases are the common oral diseases in Myanmar, and oral cancer occurrences showed upward trends in both sexes. The high proportion of untreated caries showed lack of people's awareness regarding oral problems, low utilisation of oral health care services, and unmet needs. The dentist-to-population ratio is approximately 1:16000, and there are no dental therapists and dental hygienists in Myanmar. These findings suggest an urgent need to address inequalities in access to quality oral health care and oral health status between urban and rural areas. The auxiliary dental health worker should be trained to provide primary oral health

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care services at the locations that are underserved. Moreover, the public oral health care system needs to be strengthened; also, the creation of political priority towards oral health is essential to promote the oral health and overall well-being of the Myanmar population.

*Keywords: Myanmar; oral health status; dental caries; periodontal disease; oral cancer; Myanmar Dental Association; Myanmar Dental Council.*

## 1. INTRODUCTION

Good oral health is extremely important for the general well-being and quality of life of an individual [1]. Comprehensive healthcare cannot be achieved unless oral care is included in all health service programs. Although oral diseases are largely preventable, yet oral diseases like dental caries and periodontal diseases are still the most prevalent diseases of humanity affecting about 3.9 billion people of which untreated caries in the permanent teeth was the most prevalent condition, according to the Global Burden of Diseases 2010 Study [2]. In 2012, the World Dental Federation (FDI) documented the 2020 Vision "Shaping the future of oral health" and identified a wide range of opportunities and challenges on the oral health that needs appropriate and timely action [3].

Myanmar is a turning point, with far-reaching implications for the policy including the health sector, having been undergone significant changes. Moreover, the Myanmar government recently tried to achieve Universal Health Coverage (UHC) in the National Health Plan (2017-2021) [4]. While support for universal access to health care is increasingly widespread, oral health has been neglected in most national health plans and also its political priority on most national agenda is low [5,6]. As the UHC is a unique policy opportunity for oral health [7], dental professionals have an obligation to advocate for integrating efficient oral health care in emerging UHC framework.

In low and middle-income countries, out-of-pocket payments for dental care are a considerable burden on households and pushing families into poverty [8]. Private out-of-pocket expenditure on health is a single largest financier of health in Myanmar [9]. The study of Bernabé et al. [8] reported that the percentage of the household expenditure spent on dental care was 1.5% in Myanmar. But it is questionable that the impact of payments for dental care might be underestimated because people with treatment needs cannot afford the costs of dental services or the lack/limited of health services to provide appropriate treatment. In the latest national budget, the Myanmar government has demonstrated an early commitment by significantly boosting its health expenditure [10,11]. Strong evidence-based information is vital to generate strategic interventions, policy development, and planning of health system. In Myanmar, the oral health information system does not have a proper mechanism to collect data on disease prevalence and trend. Dental professionals are important in the assessment of key dental health needs and coming up with effective solutions to improve the community oral health rather than a laymen.

Therefore, the purpose of this review is to address the oral health situation and challenges in Myanmar for policy consideration to promote the healthy life, and to support the equity position in implementation of reasonable interventions in the country.

## 2. MATERIALS AND METHODS

The literature review of the oral health status and challenges of Myanmar was conducted. For internationally published articles, PubMed and Google Scholar search were performed using the term: oral health care, oral health policy, dental health, dental caries, gingivitis, periodontitis, periodontal disease, gum disease, oral cancer, oral malignant lesion, traumatised teeth, cleft lip and cleft palate, risky oral habits, tobacco, Myanmar; fields: all; limits: English. Moreover, locally published articles, conference presentations, documents and information from reliable websites of the government, non-governmental organisations related to the context of oral health in Myanmar were collected. Two authors independently searched the relevant articles according to the keywords mentioned earlier. If there was a disagreement between the two, a third author was consulted to reach a decision. A total of twenty-five articles and reports matched these criteria. All the data findings were available until February 2018. Unrelated information with objectives of the paper and blogs were excluded.

## 2.1 Characteristics of Myanmar

Myanmar is located in Southeast Asia and administratively consists of seven regions, seven states and Union Territory. Nay Pyi Taw, the capital, designated as Union territory, is under the direct administration of the president. According to the Myanmar Population and Housing Census 2014, the provisional results indicated that the population of Myanmar was 51.4 million with 28.6% were aged below 15 years, 65.6% were aged between 15 to 64 years, and 5.8% were aged 65 years and over. Approximately 30% of the total population lives in urban areas and, the remaining live in rural areas. There are 135 ethnic groups speaking over 100 languages and dialects [12]. Myanmar government currently allocates 3.65% of its total government expenditure on health [4]. Life expectancy at birth is 64.7 years in Myanmar, the lowest among ASEAN countries [4].

## 2.2 Dental Profession in Myanmar

There are two public dental universities in Myanmar: The University of Dental Medicine–Yangon (UDM-YGN) founded in 1964, and the University of Dental Medicine–Mandalay (UDM-MDY) established in 1998. There is no private dental institution in Myanmar. Dental professionals from these universities provide oral health care for the whole population [13]. In addition, limited numbers of the army-dentist are produced under the Defense Services Medical Academy (DSMA) to serve oral health care services in the Myanmar Armed Forces. But, army-dentists occasionally take part in providing essential oral health care services to a community where they are assigned, especially in the country's remote areas.

The Myanmar Dental Council (MDC), formed under the Myanmar Dental Council law and approved by the Ministry of Health and Sports, Myanmar, plays an important roles in the maintenance and upgrade of the qualifications and standard of the health care services delivered by dental practitioners, and in supervising abidance and observance in conformity with the ethics of the dental practitioners [14].

Myanmar Dental Association (MDA), a non-governmental organisation, was formed in 1979 and plays an important role in the improvement of Myanmar dental professional. The association currently has more than 2,500 members and 30 local branches [15]. The MDA holds its annual conferences with scientific paper presentations from both local and international dental educationists who are mainly from those institutions with a few practising dentists. Local branches of MDA are actively involved in giving trainings, continuous education programs, and supporting health care services to local people.

## 2.3 Oral Health Workforce

As of the latest, the total number of registered dentists under the Myanmar Dental Council Law was 4,539. Among them, approximately one-fourth of the registered dentists are working in the public sector, and the rest are in the co-operative or the private sector. Dentist to population ratio is approximately 1:16,000 (based on the 2014 health manpower data and Population and Housing Census data) [16]; hence inequalities in the distribution of dentists across Myanmar cannot be ignored. Furthermore, the estimated dentist-to-population ratio in Myanmar is higher than the WHO recommended ratio of 1:7500 [17]. Reinforcement is needed in the oral health workforce, and allocation of the dentists and distribution of limited resources should be decided based on the population needs.

There were 357 trained dental nurses until 2014, and there is neither a dental therapist nor a dental hygienist training programs in Myanmar. As a compensation for the shortage of dental personnel, the basic health staffs/primary health care personnel (e.g. health assistant, lady health visitor, and midwife) are trained and utilised for provision of primary oral health care needed for the people in remote areas [18,19]. Dental therapist and dental hygienist training programs should be developed to empower the oral health workforce to promote oral health situation, deliver appropriate preventive programs and services. Myanmar's oral health inequalities is a problem of dental public health concern; this problem can be drastically reduced through the exploration of the power of volunteer working groups as a leverage point and promoting public-private partnership.

## 2.4 Strategic Oral Health Care Services

The Oral Health Unit of the Department of Health, under the Ministry of Health and Sports, Myanmar takes the main responsibility for delivering routine oral health care services in the country through state and region oral health

sections. Public oral health care services are run based on the national oral health strategies [20] with an emphasis on: (i) strengthening primary oral health care services for rural and remote communities (focusing on the health promotion and education, disease prevention, and provision of basic and emergency oral health care), (ii) the fluoride project (including prevention of dental fluorosis in endemic areas together with Occupational Health Division to perform the testing of fluoride content in drinking water resources, and promotion of affordable fluoride toothpaste), and (iii) delivering quality routine oral health care services at hospitals, urban health centers and schools. As public oral health services are limited, the private sector becomes the leading provider of oral health care services and a large proportion of the population paying out-of-pocket for these services.

According to the report of a regional consultation workshop on "Formulating Oral Health Strategy for Southeast Asia" [20], the coverage of oral health care services in Myanmar is shown in Table 1.

**Table 1. Coverage of oral health care services**

| Oral Health care services | Coverage (%) |
|---|---|
| Regular Oral Examination (12 years old) | 73.0 |
| Emergency Care – Adults | 35.0 |
| Emergency Care – Elderly | 34.5 |

## 2.5 Oral Health Care Programs

Since 1977-78, the government has been started the "School Health Program", and School Health Division of the Department of Health, takes the main responsibility for planning and implementation of school health programs. School health services were initiated in 1996 under "Health Promoting School". The "Primary Oral Health Care (POHC)" project is included in the "Community Health Care Program" and was initiated in 1991 with support from WHO. Since 1999, primary oral health care services had been provided jointly by the Ministry of Health and Sport (MOHS) formerly called Ministry of Health and World Health Organization (WHO). Later in, "Campaign for Tooth Brushing after Lunch" is introduced at primary schools of selected townships [21].

Recently, the Oral Health Unit of the Department of Health introduced various oral health promotion activities and programs for different targeted groups to reduce oral disease burden, and to promote community oral health status such as: (i) "Early Childhood Caries Prevention Program" with correct tooth brushing activities in below 5-year-old children, and giving oral health education to caregivers through collaboration with the Ministry of Social Welfare, Relief and Resettlement, (ii) "Institutional based School Oral Healthcare Activity" in school children, (iii) "Maternal Oral Health Education Programs" together with oral health services for pregnant women to improve overall maternal and child health, (iv) "Feasible Effective and Affordable Fluoride Program" for good oral health for the whole population [21]. Additionally, since April 2013, the special interest group of Oral Medicine and Oral Pathology initiated the "Oral Cancer Awareness Program" by screening among tobacco and betel quid consumers at suburban and rural areas [22].

## 2.6 Oral Health Status

Although there are many dental research contributions in Myanmar, yet there is still a significant gap in knowledge of population oral health. Many studies were mainly focusing on common oral diseases such as dental caries, periodontal conditions, and also on targeted groups.

### a) Dental caries and periodontal conditions

The first pathfinder survey with a large volume of samples (only in Yangon Division) was conducted in 1992 jointly with the WHO. Then, the second pathfinder oral health survey was done in 2006 and 2007 in selected regions. Approximately ten years later, at the end of 2016, the first "National Oral Health Survey" was successfully conducted with the purpose of evaluating the current oral health status as a benchmark. The Myanmar government also has the goal of doing such national survey after every 5-years of interval with the aim of using the survey outcomes to enhance proper

**Table 2. Caries prevalence with decayed, missing, filled teeth (DMFT/dmft) by age groups**

| Research study | Study year | Study area | Age (years) | Number of people surveyed | Caries prevalence (%) | Decayed teeth | Missing teeth | Filled teeth | dmft/ DMFT | Untreated caries prevalence (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| WHO survey [23] | 1977 | | 6 | 1161 | | | | | 0.2 | |
| Sein K [23] | 1974 | | 6-14 | 860 | | | | | 4.3 | |
| Win M [23] | 1994 | | 3-5 | 283 | | | | | 5.8 | |
| Chu et al. [24] | 2009 | Rural (Shan State) | 5 | 95 | 25.2 | 0.9 | | | 0.9 | |
| | | | 12 | 80 | 15.0 | 0.2 | | | 0.2 | |
| Thwin et al. [25] | 2015 | Yangon | 3 | 318 | 78.9 | 5.65 | 0.02 | 0.01 | 5.69 | |
| | | | 4 | 285 | 87.0 | 7.24 | 0.04 | 0.06 | 7.34 | |
| Path finder survey [26] | 1992 | five projected townships in Yangon Division | 12 | 4000 | 37.7 | | | | 0.83 | |
| | | | 35-44 | | 69.0 | | | | 2.94 | |
| | | | 65-74 | | 91.6 | | | | 6.94 | |
| Ogawa et al. [27] | 1999 | Urban (Yangon) | 12 | 303 | | 0.56 | 0.04 | 0.01 | 0.65 | |
| | | | 35-44 | | | 2.15 | 1.7 | 0.11 | 3.97 | |
| | | | 65-74 | | | 2.63 | 9.15 | 0.00 | 11.78 | |
| | | Rural (Yangon) | 12 | 481 | | 1.17 | 0.13 | 0.00 | 1.31 | |
| | | | 35-44 | | | 2.92 | 1.85 | 0.03 | 4.8 | |
| | | | 65-74 | | | 2.83 | 11.08 | 0.00 | 13.9 | |
| Path finder survey [28] | 2006 | Taunggyi, Mandalay, Pathein, Mawlamyine | 5 | 779 | 81.7 | | | | 5.21 | |
| | | | 12 | 793 | 51.9 | | | | 1.38 | |
| | | | 35-44 | 783 | 69.5 | | | | 2.96 | |
| | 2007 | Yangon, Monywa, Pyi, Hpa-An | 5 | | 67.9 | | | | 4.13 | |
| | | | 12 | | 26.6 | | | | 0.56 | |
| | | | 35-44 | | 63.7 | | | | 2.56 | |
| Oo et al. [28] | 2010 | | 14 | | 31.2 | 0.51 | 0.02 | 0.06 | 0.59 | |
| Aung et al. [29] | Oct 2009 – Oct 2010 | Yangon - Thingyangyun and North Okkala Townships | 21-23 (teacher) | 147 | 35.4 | | | | 0.91 | |
| | | | 21-23 (factory worker) | 147 | 44.2 | | | | 1.27 | |
| Thwin et al. [30] | 2012 | Chin | 20-45 | 50 | 90.8 | | | | 3.1 | |

| Research study | Study year | Study area | Age (years) | Number of people surveyed | Caries prevalence (%) | Decayed teeth | Missing teeth | Filled teeth | dmft/ DMFT | Untreated caries prevalence (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Mon et al. [31] | 2014 | Urban (Ygn)<br>Rural (Bago) | 15 (school children) | 217<br>193 | 44.7<br>32.1 | | | | 0.98<br>0.53 | |
| National Oral Health survey [32] | Dec 2016-Jan 2017 | 15 geographic area, 21 Township | 6<br>12<br>15-18<br>35-44<br>60-74 | 6300 | | | | | 5.7<br>0.80<br>1.13<br>2.96<br>11.44 | 84.1<br>34.8<br>40.7<br>41.0<br>49.6 |

**Table 3. Prevalence of periodontal condition by age groups**

| Author - study year | Age group | Healthy gingival (%) | Bleeding on probing (%) | Pocket < 3 mm, Calculus and plaque (%) | Pocket 4-5mm (%) | Pocket > 6 mm (%) |
|---|---|---|---|---|---|---|
| Path finder in Yangon division – 1992 [26] | 35-44 | 13.84 | 2.16 | 66.65 | 14.86 | 2.64 |
| | 65-74 | 2.96 | 1.53 | 50.87 | 20.36 | 10.43 |
| National Oral Health Survey 2016 (Pilot analysis data) [32] | 12 | 39.57 | 60.43 | - | - | - |
| | 15-18 | 28.03 | 71.57 | - | 0.88 | - |
| | 35-44 | 24.56 | 72.81 | - | 12.88 | 0.32 |
| | 60-74 | 16.75 | 76.83 | - | 24.76 | 1.03 |

implementation of appropriate oral health programs; prioritise the oral health interventions needed by the people, within limited resources. The pilot statistical findings obtained from the National Oral Health Survey was presented in an internal stakeholders' meeting in Myanmar, however, those findings have yet to be published officially. The overview of common oral diseases in Myanmar population is presented in Tables 2 and 3.

High decayed, missing and filled teeth (dmft) were observed in children (below 5 years) in Myanmar ranged from 5 to 7, although the data of dentition status were not able to compare between studies. Moreover, DMFT of the aged 35-44 years and aged 65 to 74 were also high but varied across the geographical areas and the population groups of the study. A high proportion of decayed teeth with the low number in filled teeth in both dentition stages (i.e. dmft or DMFT) suggest delays or barriers to receiving appropriate oral health care services among the people in Myanmar, and this might be due to the insufficiency of dental professionals and lack of peoples' awareness on proper oral health. Additionally, financial hardship and geographical barriers may prevent people to reach service places in some remote areas.

**b) Oral cancer conditions with risky oral habits**

The adverse effects of tobacco on oral health are well documented. Among Southeast Asia countries, Myanmar is one of the highest prevalence in tobacco consumption countries with an increasing trend in both sexes. In Myanmar, the Global Youth Tobacco Survey (GYTS) 2016 found that the prevalence of current users of tobacco (both smoked and smokeless tobacco) was 13.6% among students aged between 13-15 years with 26.3% in boys and 3.7% in girls [33]. The reasons for the high prevalence of tobacco use in young students remind us to consider the efficiency of implemented school health programs and tobacco (both smoked and smokeless) control policy. Moreover, the high prevalence of tobacco use has been reported as tobacco products are readily available and can be purchased from street vendors in Myanmar. And also, there is no strict action prohibiting young people, especially pre-adolescents and adolescents, from buying tobacco. According to GYTS survey [33], among those current smokers who are students, 62.9% were not refused by cigarette sellers from purchasing cigarettes because of their young age.

Moreover, as tobacco chewing is a common habit which is widely spread in Myanmar, the prevalence of oral cancer and precancerous lesion are increasing. A study on oral mucosal changes among tobacco users [34] reported that among 794 study subjects, 44% (n= 315) of them had a history of tobacco habits. Prevalence of the detection of premalignant lesions and oral cancer among those tobacco users were 5.4% (2.14% of total 794) and 1.3% (0.5% of total 794), respectively [35]. In 1982, a large-scale house-to-house survey (n= 6,000) in Mon State, Myanmar reported that the prevalence of the precancerous lesion and cancer were 8.5% and 0.03% of the study population. According to the hospital-based study in Yangon, Myanmar by Oo et al. [36], oral cancer stood at the $6^{th}$ position in males and $10^{th}$ in females contributing to 3.5% of whole body cancers in both sexes. Furthermore, the oral cancer occurrences in the 6-year period (2002 to 2007) showed upward tendencies both in males and females [36]. It is important to develop healthy lifestyle behaviours among young children and adults.

**c) Other oral health problems**

Addition to the common oral diseases, other oral health problems such as dental fluorosis, dental trauma, and cleft lip and palate (birth deformities) are also important in implementing the strategic interventions to promote the oral health-related quality of life.

Dental fluorosis is a common problem in the Southeast Asia region, especially in Myanmar, Sri Lanka, and Northern Thailand. The study on fluorosis in Central Myanmar reported that high prevalence of fluorosis cases was found in Myingyan and Taungtha region, where the major source of drinking water for these people is deep wells [28]. The National Oral Health Survey also reported that the prevalence of dental fluorosis in the areas of Central Myanmar are relatively high (13.3%- 21.67%) when compared with other studies(0.8%-8.3%) [32].

Regarding dental trauma, single study was found which reported that the prevalence of traumatic dental injuries to permanent incisors was 14.5% in school children aged between 10-16 years (n= 3,217) in Yangon Division, Myanmar [37]. Among those trauma cases reported, 81.4% of the subjects had only one tooth affected, and very

high level of untreated traumatise cases (99.5%) was noted.

According to the "Prevention and control of birth defects in South-East Asia region: Strategic framework (2013-2017)" report [38], cleft lip and palate is the 3rd most common birth defects in Myanmar. Cleft lip and palate forms 18.5% of all congenital malformations in Myanmar, according to the Annual Hospital Statistics Report in 2013 [39].

### 2.7 Challenges of Oral Health in Myanmar

In Myanmar, the poor involvement of dental professionals by government decision-making bodies is one of the challenges for promoting oral health care. Other challenges include poor implementation of efficient oral health promotion programs and absence of surveillance of oral health status and oral health care services which is helpful to government decision-makers. Moreover, a high prevalence of untreated caries in permanent teeth (40-50%), untreated caries in deciduous teeth (85%), and severe periodontitis in adults remained a challenge. Barriers to accessing oral health services in remote and rural areas are also a major concern, and it is very much essential to provide quality oral health care professionals to embark on primordial prevention programs against oral diseases.

## 3. CONCLUSION

It is clear that Myanmar strongly needs an oral health goal, guidelines and policies. There exists an urgent need to address inequalities in oral health care both in urban and rural Myanmar through proper implementation of the "Basic Package of Oral Care and Services" under the upcoming universal health care approach. The public oral health care system in Myanmar needs to be strengthened and get fully integrated into the general health systems' programs. The auxiliary dental health workers should be trained to provide primary oral health care services at underserved geographical locations. Strengthening strategic coordination and collaboration among multi-sectorial stakeholders is an important way to promote people's oral health. It is also recommended to examine the socio-cultural behaviour, economic and environmental context of the whole societal perspective, not merely focus on health. Moreover, the Myanmar government needs to empower the dental workforce by their direct involvement and participation in the national level oral health policy formulation, implementation and planning dialogue to overcome oral health challenges.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Sterenborg BA, Bronkhorst EM, Wetselaar P, et al. The influence of management of tooth wear on oral health-related quality of life. Clin Oral Investig. 2018;22(7):2567–257.
2. Marcenes W, Kassebaum NJ, Bernabé E, Flaxman A, Naghavi M, Lopez A, et al. Global burden of oral conditions in 1990-2010: A systematic analysis. J Dent Res. 2013;92(7):592-7.
3. Glick M, Monteiro da Silva O, Seeberger GK, Xu T, Pucca G, Williams DM, et al. FDI vision 2020: Shaping the future of oral health. Int Dent J. 2012;62(6):278-91.
4. Ministry of Health and Sports. National Health Plan 2017-2021 Nay Pyi Taw: Ministry of Health and Sports, The Republic of the Union of Myanmar. 2016; 32.
5. Benedetti G, Stauf N, Strohmenger L, Campus G, Benzian H. Political priority of oral health in Italy: An analysis of reasons for national neglect. Int Dent J. 2015;65(2): 89-95.
6. Janakiram C, Sanjeevan V, Joseph J, Stauf N, Benzian H. Political priority of oral health in India: Analysis of the reasons for neglect. J Public Health Dent. 2018;78(2): 144-53.
7. Mathur MR, Williams DM, Reddy KS, et al. Universal health coverage: A unique policy opportunity for oral health. J Dent Res. 2015;94(3):3S-5S.
DOI: 10.1177/0022034514565648
[Pub Med PMID: PMC4541093]
8. Bernabé E, Masood M, Vujicic M. The impact of out-of-pocket payments for dental care on household finances in low and middle income countries. BMC Public Health. 2017;17(1):109.
9. Than TM, Saw YM, Khaing M, Win EM, Cho SM, Kariya T, et al. Unit cost of healthcare services at 200-bed public hospitals in Myanmar: What plays an important role of hospital budgeting. BMC Health Serv Res. 2017;17(1):669.

10. Latt NN, Cho SM, Htun NM, Saw YM, Myint MN, Aoki F, et al. Healthcare in Myanmar. Nagoya J Med Sci. 2016;78(2): 123.
11. Thi MK. National plan aims to boost health budget [Internet]. The Myanmar Times; 2017.
[Cited 2018 Feb 26]
Available:URL:https://www.mmtimes.com/news/national-plan-aims-boost-health-budget.html
12. Department of Population, Ministry of Immigration and Population. Summary of the main results. In: The 2014 Myanmar Population and Housing Census, The Union Report: Sensus Report. Nay Pyi Taw; Ministry of Immigration and Population. 2015;2:12–42.
13. University of Dental Medicine (Yangon). About: University of Dental Medicine (Yangon) [Internet].
[Cited 2018 Feb 26]
Available:URL:http://udmyangon-edu.com/
14. Myanmar Dental Council. Duties of the Council: Myanmar Dental Council [Internet]. [cited 2018 Mar 2]. Available from: URL:http://www.myanmar-dental-council.org/about-mdc
15. Myanmar Dental Association. About MDA: Myanmar Dental Association (MDA) [Internet].
[Cited 2018 Mar 2]
Available:URL:http://www.mda-myanmar.org/
16. Department of Health. Health in Myanmar 2014. Nay Pyi Taw; ministry of health and sports. The Republic of the Union of Myanmar. 2015;151.
17. Thomas S. Plenty and scarcity. Br Dent J. 2013;214(1):4.
DOI: 10.1038/sj.bdj.2013.4
18. Hpoo P. Providing wider oral health care. Myanmar Dent J. 2005;6(1).
19. Nwe KT, Soe KK. The effectiveness of oral health educational program on basic health staffs in Taunggyi township. Myanmar Dent J. 2008;7(2):32-39.
20. World Health Organization, Regional Office for South-East Asia. Formulating oral health strategy for South-East Asia: Report of a regional consultation, Chiang Mai, Thailand; 2008. WHO Regional Office for South-East Asia; 2009;34.
[Report No. SEA-NCD-81]
21. Maw K. Profile of oral health in school health programmes of Myanmar. Myanmar Dent J. 2004;5(2):15-19.
22. Win SS. Battle against oral cancer. Myanmar Dent J. 2014;21(1):3-4.
23. Win M. Caries in the pre-school child: The most common cause of tooth loss in children. Myanmar Dent J. 1995;1(2):9-13.
24. Chu CH, Chau AM, Wong ZS, Hui BS, Lo EC. Oral health status and behaviours of children in Myanmar—a pilot study in four villages in rural areas. Oral Health Prev Dent. 2012;10(4):365.
25. Thwin KM, Zaitsu T, Ueno M, Kawaguchi Y. Early childhood caries and related risk factors among Myanmar preschool children. Int J Clin Prev Dent. 2016;12(4): 229-236.
26. Kyaing M. Country presentation on the profile of the Dental Profession in Myanmar. Myanmar Dent J. 2003;5(1):1-3.
27. Ogawa H, Soe P, Myint B, Sein K, Kyaing MM, Maw KK, et al. A pilot study of dental caries status in relation to knowledge, attitudes and practices in oral health in Myanmar. Asia Pac J Public Health. 2003; 15(2):111-7.
28. Yupin Songpaisan, editor. Caries control throughout life in Asia. International Dental Conference on “Caries Control throughout life in Asia”; 2013; Beyond Resort Krabi, Krabi, Thailand. 2013;354.
29. Aung SN, Soe KK, OO HM, Aung ST. Assessment of oral health status and awareness of dental problems among young female adults. Myanmar Dent J. 2013;20(1):36-41.
30. Thwin KM, Lin WT, Than A. A pilot study of oral health situation of chin population in West Hilly Regions of Myanmar. Myanmar Dent J. 2018;1:31-39.
31. Mon A, Maung KK, Soe KK, Aung ST. Study of dental caries status and oral health knowledge, attitude and practice (KAP) among 15-year-old Schoolchildren in North Okkalapa and Tharyarwaddy Townships. Myanmar Dent J. 2018;1.
32. Oral Health Unit. Oral health status data from Myanmar National oral health survey. Nay Pyi Taw, Department of Health, Ministry of Health and Sports. The Republic of the Union of Myanmar; 2017.
33. Tun NA, Chittin T, Agarwal N, New ML, Thaung Y, Phyo PP. Tobacco use among young adolescents in Myanmar: Findings from global youth tobacco survey. Indian J Public Health. 2017;61(5):54-9.
34. Oo MW, Naing SY, Oo HTS, Win PM, Kyaw K, Win SS, et al. Study of oral

mucosal changes among tobacco users. Myanmar Dent J. 2018;1.

35. Zaw KK, Ohnmar M, Hlaing MM, Win SS, Aye PP, Shwe S, et al. Betel quid and oral potentially malignant disorders in a periurban township in Myanmar. PloS One. 2016;11(9):e0162081.
36. Oo HN, Myint YY, Maung CN, OO PS, Cheng J, Maruyama S, et al. Oral cancer in Myanmar: A preliminary survey based on hospital-based cancer registries. J Oral Pathol Med. 2011;40(1):20-6.
37. Htun TM, Soe KK, Oo HM. prevalence of traumatic injuries to the permanent incisors among middle school children in yangon division. Myanmar Dent J. 2009;8(1):26-30.
38. World Health Organization. Prevention and control of birth defects in South-East Asia region: Strategic framework (2013-2017). WHO Regional Office for South-East Asia; 2013.
[Report No. SEA-CAH-12]
39. Department of Public Health, Department of Medical Services. Annual Hospital Statistics Report 2013. Nay Pyi Taw, Ministry of Health and Sports, The Republic of the Union of Myanmar. 2015; 195.