Framework for development of

Oral Health Policy and Strategies in Myanmar

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Contents

I. Background

The Republic of the Union of Myanmar, one of the developing countries, is located in Southeast Asia. Myanmar is 676,578 square kilometers in area and the population is 53.58 million in 2017. The average life expectancy of Myanmar people is 66.6 years in male while 69.9 years in female population.

The national representative oral health survey was unknown in Myanmar until 2016. The lack of nation-wide survey might be due to the limited health expenditure in Myanmar (3.38% of general government expenditure). Beside the national survey, only regional surveys could be performed and there have been a few reports in Myanmar.[1-4] The regional survey as pathfinder oral health survey was collected in four large cities in 2006-2007. Therefore, the WHOHQ, WHOCO in Myanmar, WHOCC Niigata University, WHO Experts in Myanmar, the Borrow Foundation and Ministry of Health in Myanmar were collaborated to perform a National Oral Health Survey in Myanmar.

The first National Oral Health Survey in Myanmar was conducted from December 2016 to January 2017. The 43 local dentists examined a total of 6,273 subjects aged 6, 12, 15-19, 35-44, and 60-74 years olds from 23 townships and districts. The final number of status that were included in data analysis was 5,928 and 4,667 for dental caries and periodontal respectively.

II. Findings from National Oral Health Survey

1. Dental caries status

1.1. Dental caries on primary teeth

Only 15.8% of 6 years old group subjects were free of dental caries on their primary teeth. Most of the 6 years old group subjects (98.6%) and all of the mixed dentition age range have their carious primary teeth left untreated. Most of the primary teeth left within the mixed dentition age range were carious. The 12 years old subjects have caries on all of their primary central incisors. Only one child had a ft score of 3 in 6 years old, while no ft score was found in 12 years or 15-18 years old subjects.

1.2. Dental caries on mixed dentition

The 6 years old group subjects have the highest prevalence of caries (primary and permanent teeth). As early as the age of 6 years, the subjects have already got caries on their newly erupted permanent teeth, hence in the older age groups, they have double burden of caries on their primary as well as permanent teeth.

1.3. Dental caries on permanent teeth

More than 90% of all age groups have left their active carious permanent teeth caries untreated. The percentage of carious maxillary and mandibular anterior teeth was low, and conversely for posterior teeth. A higher percentage of caries experience was detected in left mandibular second premolar. First and second molar were found to have the highest percentage of caries experience.

The DMFT score of 6 years old group have a score of 0.14 and 0.11 for male and female respectively. The highest percentile for the age group of 6 years old was 8. There are also subjects from the age group of 6 years old who has an MT score of 2. Within the age group of 35-44 and 60-74 years old, there are some subjects who have maximum DMFT score and also maximum MT score (32 for the highest percentile). The proportion of missing (M) score was considerably higher than decayed (D) and filling (F) for adult age groups. The 60-74 years old group subjects have the highest prevalence of caries (93.6%) to be compared to the other age groups.

2. **Periodontal status**

Less than 50% of all of the subjects involved in this survey had a healthy gingival condition. The pattern between genders was almost similar within all of the age groups. The female subjects have a smaller proportion of periodontal disease than males.

The age group of 12 years old has the least severe periodontal condition while 60-74 years old was most severe. The proportion of teeth with shallow pocket was slightly lessened in younger age groups. It was found that 2.5% of the subjects were suffering from shallow pocket and gingival bleeding with the age group of 15-18 years old. The proportion pattern of subjects with shallow pocket and gingival bleeding between the age groups of 35-44 and 60-74 years old was similar. The highest percentage (77.2%) of gingival bleeding was found in the male subjects within the age group of 60-74 years old. The 60-74 years old group was the only age group which has some proportions of the subjects with deep pocket and gingival bleeding (4.1%). Within the age group of 60-74 years old, it was found that the highest proportion of teeth with shallow pocket (5.5%).

III. Developments for Oral Health Policies and Strategies in Myanmar

Overall Mission

Provision of adequate and effective oral health promotion programs would be essential to improve oral health situation in Myanmar. It should be accomplished by means of performance goals with different time frames, in a way that may lead to better oral health outcomes for Myanmar people.

Goal 1: Establishment of an appropriate monitoring system on oral health

System of regular oral health examination programs such as annual/routine data collection, analysis and reporting of common oral diseases should be developed in various settings.

Specific Objective 1: To establish a system of routine oral examination for pregnant women and children 0-5 years

As there are no routine oral examination programs for pregnant women and children 0-5 years, it is not easy for them to access and receive required oral health care. Therefore, a system of routinely dental examination should be established as a conjunct with general health check-up. In Thailand as a neighbored country, oral health promotion and prevention service for children 0-2 years is integrated with general health promotion program. Children receiving immunization program are transferred for further oral health check-up for hygiene and early stage tooth decay, with a plan for continuous necessary oral health services and care. In children for 3-5 years, oral health check-up is incorporated into other health care in the day care center for 2 times a year.[7] This system is necessary to establish by proposing government authority for approval and financial support in oral health examination to pregnant women and children 0-5 years. The note book/sheet for dental examination should be established for maternal and child care. Public health dentists should have to collaborate with Maternal and Child Care Society to perform routine infant and mother dental examination, and collaborate with Ministry of Social Welfare, Relief and Resettlement for dental examination in preschool children.

Step by step key facts

(Pregnant women and children 0-2 years)

1. Authorized persons from Ministry of Health and Sports
    - Discuss with Maternal and Child Care Society for monitoring oral health in pregnant women and children 0-2 years

- Create a format oral health examination chart including dental caries, periodontal status and oral hygiene for pregnant women, oral hygiene and early stage of tooth decay for children 0-2 years (If possible, establish a maternal and child care general health note book/sheet including oral health examination chart)
- Consider for model townships (for example, select a township in each region or state)

2. Local dentists from Department of Public Health
   - Perform oral examination using a format chart at Maternal and Child Care Centers of selected townships
   - Collect the first year's data by 2020
3. Local public health experts
   - Analyze the collected data (for example, public health experts from universities will analyze the data)
   - Report the first year's data to authorized persons from Ministry of Health and Sports by 2021
4. International supports
   - With the results of first year's data, international experts will support the authorized persons from Ministry of Health and Sports to establish oral health monitoring system

(Children 3-5 years)

1. Authorized persons from Ministry of Health and Sports
   - Discuss with Ministry of Social Welfare, Relief and Resettlement for monitoring oral health in preschool children
   - Create a format dental examination record including dental caries status and oral hygiene
   - Consider for model preschools (for example, select a preschool in each township)
2. Local dentists from Department of Public Health
   - Perform oral examination using a format chart at selected preschools
   - Collect the first year's data by 2020
3. Local public health experts
   - Analyze the collected data (for example, public health experts from universities will analyze the data)

- Report the first year's data to authorized persons from Ministry of Health and Sports by 2021

4. International supports
    - With the results of first year's data, international experts will support the authorized persons from Ministry of Health and Sports to establish oral health monitoring system

Specific Objective 2: To establish an appropriate annual dental examination and data collection system in the school settings

"School health program" has been started with the main responsibility by School Health Division of Department of Public Health.[5] School health team of a township is visiting schools at least once a year. In each school health team, there is usually a public health dentist who is responsible for the performance of school oral health activities. Their main role are conducting dental examination, emergency dental treatments and giving oral health education to school children.

There is still lacking an appropriate system of collection and recording the data of school children in Myanmar. It should be established a system of annual collection and recording data of dental disease prevalence and severity in the school dental service using format dental examination record form. According to the standard procedures and guidelines, the dentist can check the oral health status of all the students for conditions such as dental caries, malocclusion, gingival status, dental plaque and TMJ disorders. Every school children must have their own dental examination chart and so the dentist can easily recognize their pattern and severity of dental diseases. By collecting the data annually, the dentist can compare and adjust the oral health status and oral health care needs of each child. The dentists should have to collect the data of each child, combine the data of each school, analyze and report these annual data.

Step by step key facts

1. Authorized persons from Ministry of Health and Sports
    - Discuss with Ministry of Education for appropriate monitoring oral health in schoolchildren
    - Create a format dental examination record form including dental caries, malocclusion, gingival status, dental plaque and TMJ disorders
    - Consider for model schools (for example, select a school in each township)

2. Local dentists from Department of Public Health
    - Perform oral examination using a format chart at selected schools (with their own chart)
    - Collect the first year's data by 2020
3. Local public health experts
    - Analyze the collected data (for example, public health experts from universities will analyze the data)
    - Report the first year's data to authorized persons from Ministry of Health and Sports by 2021 (What was the progression or the main problem in each school, how do we solve, and what is the future plan, etc.)
4. International supports
    - With the results of first year's data, international experts will support the authorized persons from Ministry of Health and Sports to establish oral health monitoring system

Specific Objective 3: To establish a system of oral health data collection in the hospital settings (adults and elderly)

Oral health division of Department of Medical services is taking responsibility for delivering hospital-based dental services in the country.[6] Hospital-based dentists are mainly providing oral health care services to community people, who seek for emergency treatments at hospitals. Routine dental examination at public hospitals should be mandatory. Therefore, it should be established a system of routine collection and recording data in hospitals using comprehensive patient record form. If oral health problems are detected, necessary oral health services including emergency treatments should be introduced at any public or private dental office. Public health dentists have to take the collaboration with appointed dentists in township level hospitals for monitoring routine oral health care services till grass root level.

Step by step key facts

1. Authorized persons from Ministry of Health and Sports
    - Create a comprehensive patient record using WHO oral health assessment form
    - Consider for model hospitals (for example, select a township hospital in each region or state)
2. Local dentists from Department of Medical Services
    - Perform oral examination using a format chart at selected public hospitals
    - Collect the first year's data by 2020

3. Local public health experts
    - Analyze the collected data (for example, public health experts from universities will analyze the data)
    - Report the first year's data to authorized persons from Ministry of Health and Sports by 2021 (What was the progression or the main problem in each school, how do we solve, and what is the future plan, etc.)
4. International supports
    - With the results of first year's data, international experts will support the authorized persons from Ministry of Health and Sports to establish oral health monitoring system

Specific Objective 4: To conduct a routine National Oral Health Survey

National as well as regional oral health survey should be conducted periodically to monitor oral health trends and needs. Second National Oral Health Survey for key ages should be conducted by 2022 based on WHO Oral Health Survey Basic Method 5th Edition in order to allow monitoring of changes in oral health among Myanmar. The survey should be performed periodically every 5 years.

Step by step key facts

1. Authorized persons will discuss with international experts for planning
2. Local and/or international public health experts will train local dentists for oral health survey
3. Local public health dentists will conduct 2nd National Oral Health Survey by 2022
4. Local public health experts and/or international experts will analyze the collected data and reports to authorities and plan for future oral health promotion programs
5. Repeat the survey every 5 years

Goal 2: Improvement of the quality of routine oral health care services by developing appropriate oral health guidelines and policies for provision of oral health promotion programs

Public oral health services are taking main responsible by the Oral Health Unit of the Department of Medical Services are run based on the national oral health strategies 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 and promotion of affordable fluoride toothpaste), and (iii) delivery of quality routine oral health care services by hospitals, urban health centers and school health teams.[8] However, there is still a need to address inequalities in oral health care in urban and rural areas of Myanmar. Basic oral health care services should be implemented properly through states and regions of the country till grass root level.

Strengthening strategic coordination and collaboration among multi-sectorial stakeholders is an important way to promote community's oral health.[9] Therefore, it is strongly need to develop a formal set of oral health guidelines and policies based on oral health data that previously collected in various sectors. By using the data that obtained from data collection and data analysis, it is important to notify what kind of preventive strategies would be provided to the community. This should be considered for prevention of all types of oral diseases as well as common risk factors. System of oral health care services including oral health education, prevention and promotion programs should be provided for community such as children 0-5 years, school children, adults and elderly people separately.

Specific Objective 1: To establish/improve oral health promotion program for pregnant women and children 0-5 years

Early childhood caries is currently a serious oral health problem in Myanmar. Previous study has shown that caries prevalence of preschool children in Yangon city was about 83% with mean dmft of 6.4.[10] Recently, the Oral Health Unit of the Department of Health introduced oral health promotion activities for preschool children entitled with "Early Childhood Caries Prevention Program". It is mainly focused on 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. This program should be developed as routine and constant nation-wide program in the future.

The Oral Health Unit should be major concerned with addressing the tooth decay problem among children as it may pose adverse effect on children's oral health, general health and their quality of life. It is also necessary to develop a policy to prevent and control tooth decay among the childhood by setting a national indicator in Myanmar. In line with this national indicator, oral health care services should be provided including oral health checkup, skill trainings on tooth brushing for caregivers, receiving fluoride varnish application or other suitable forms for children with high risk caries. There is also a need for development of oral health care services for pregnant women and children 0-2 years through the collaboration

with Maternal and Child Care Society. Children receiving immunization program should be conjunct with oral health care services.

Step by step key facts

1. With established oral health monitoring system, local public health dentists will perform routine oral examination in various settings through the country
2. International experts will discuss with local authorities to develop relevant oral health guidelines and policies for oral health promotion programs
3. Local authorities will discuss with Maternal and Child Care Society (pregnant women, 0-2 years) and with Ministry of Social Welfare, Relief and Resettlement (3-5 years) for oral health care services in respective settings
4. Local dentists (public health dentists and hospital-based dentists) provide oral health care services in respective settings

4.1. Oral health care services for pregnant women, children 0-2 years

The services should be integrated by local dentists at maternal and child care centers.

(Oral examination)

- With established maternal and child care general health note book/sheet including oral health examination chart, oral check-up for hygiene and early stage tooth decay will be performed in children who will come to maternal and child care centers for immunization programs.
- Plan and advice parents for continuous oral health service and care.
- For pregnant women, it should be emphasized on periodontal examination and oral hygiene instruction, as well as necessary treatments (plan it during pregnant or after labor).
- Necessary oral health services and care will be received at public hospitals (by hospital dentists)

(Oral health education)

- Maternal Oral Health Education Program together with oral health services for pregnant women should be implemented to improve overall maternal and child health.
- Advice the pregnant women for key oral hygiene care (for example, key oral health messages to pregnant women should be included as followed.)

① Brush teeth twice daily with a fluoride toothpaste and mouth rinsing after meals

② Limit foods containing sugar to mealtimes only

③ Choose water or low-fat milk as a beverage. Avoid carbonated beverages during pregnancy

④ Choose fruit rather than fruit juice to meet the recommended daily fruit intake

- Train the pregnant women for self-periodontal check-up (for example gingival color, contour and any signs of gingival bleeding, etc. If positive signs of gingivitis occurred, consult with hospital dentists for necessary oral health care services.)
- Advice and train the parents how to clean and brush their child's oral cavity. (for example, advice the parents the following key messages.)

① Prepare a piece of gauze, cotton or cloth and a glass of drinking water

② Wash your hands thoroughly with soap

③ Wrap the gauze, cotton or cloth around your finger and damp it with water

④ Gently put your finger inside your baby's mouth. Wipe the upper and then the lower gum pad once

(Fluoride program)

- Children with any white sport found should receive any fluoride application such as fluoride varnish or other suitable forms, with follow-up appointments until 3 years old.

4.2. Oral health care services for children 3-5 years

- Early Childhood Caries Prevention Program should be developed as nation-wide routine and constant program in Myanmar.
- The services should be integrated by local dentists at preschools.

(Oral examination)

- With established a format dental examination record form for preschool children, oral health checkup by public health dentists for at least once a year.
- Inform parents for their children's oral health status and advice for necessary treatments
- Necessary treatments except school-based programs will be received at public hospitals (by hospital dentists)

(Oral health education)

- As lunch is providing by government in preschools, supervision of dietary control is keenly important.
- Mainly focus on regular tooth brushing with active motivation to preschool children by means of poems, stories, etc.
- Oral health education aiming at positive behavioral changes including dietary habits should be provided to parents, guardians and preschool teachers.
- Adequate oral hygiene practice should also be provided. If possible (second priority), collaborate with Ministry of Social Welfare, Relief and Resettlement to establish "Campaign for Tooth Brushing after Lunch" in preschools.
  - ① Each child will need to support for the presence of toothbrush and toothpaste
  - ② Toothbrush and toothpaste should be additionally distributed every three months
  - ③ There must be a clean environment to store their own toothbrush at preschools or they will be asked to bring back home and take it everyday
  - ④ Specific time should be decided after meal and supervised by trained nursing teachers

(Fluoride program)

- Preventive measures such as topical application of fluoride varnish should be used on sound teeth and early white spot lesions.
- Active caries treatment such as use of silver diamine fluoride is necessary. Silver diamine fluoride should only be applied to active enamel caries and early dentine carious lesions. GI sealants can also be applied to early dentine carious lesions.
- SMART/ART should be applied to open cavitation lesions.

Specific Objective 2: To establish/improve oral health promotion programs for school-children

In many countries, dental specialists (dentists and dental hygienists) and school teachers spend lots of time in promoting children's oral health. In Thailand, oral health prevention and promotion in school-age children has long been implemented continuously under the structured framework using key strategies.[11] In Vietnam, the School based Dental Program (SDP) was implemented in collaborative work with Ministry of Health and Ministry of Education and Training. The SDP is mainly operating oral health education, fluoride

mouth rinsing and tooth brushing, clinical prevention and fissure sealants to primary schools all over the country.[12] It should also be implemented well organized school-based oral health promotion programs in Myanmar.

2.1. Oral Health Education Program

The result of this survey suggested that oral health promotion programs should include effective oral health education for improving dental awareness. Oral health education is a fundamental and very common approach, whereas effective oral health education could establish good oral health behaviors and habits by enhancing a person's oral health knowledge.[13] Although knowledge was just improved unless attitude or practice improvement, oral health education could not be effective enough for oral health promotion in Myanmar.

In every school, at least a teacher should be trained in school health activities, and he or she will be responsible to make joint activities with school health team of the respective township. Public health dentists, nursing teachers and classroom teachers should be involved in conducting oral health education. Moreover, oral health education for children should be involved in a routine curriculum by classroom teachers and school nursing-teachers. The type and extent of oral health education program is dependent on the individual school's needs, problems, curriculum and timetable. Generally, school nursing teachers will teach schoolchildren how to brush their teeth properly, highlight the importance of oral health for students and how to protect themselves. As dental caries in children is very high in Myanmar, nutritional guidance of limiting snacking sweet foods, drinks and regular dietary patterns should be mainly focused in the educational interventions. Government is expected as a key role to take the initiative and to act in developing and implementing oral health promotional strategies, with support from health care professionals and relevant organizations.

Step by step key facts

1. Authorized persons from Ministry of Health and Sports (with international supports)
    - Develop an appropriate oral health education framework based on previous data
    - Develop the education materials (for example, education poster will be developed and pasted in the classrooms)
    - Public health experts will share knowledge to local public health dentists about effective oral health education with the following information included:
        ① Use correct tooth brushing technique
        ② Brush twice a day with fluoride tooth paste (before immediately bed time and after breakfast)

③ Choice of tooth brush and amount of fluoride tooth paste

④ Brushing time (minimum of two minutes)

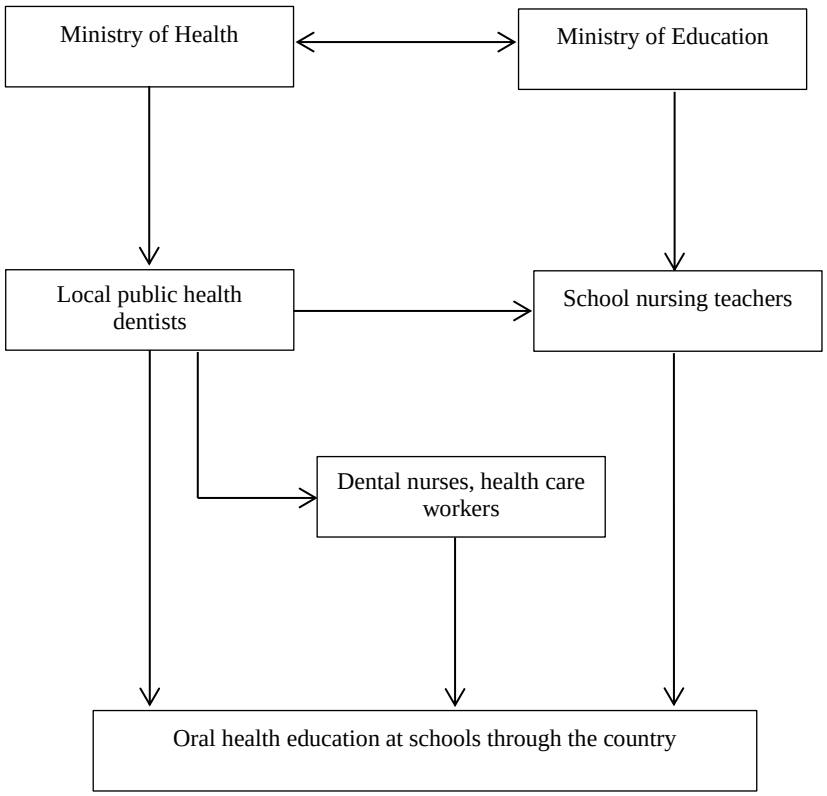
⑤ Spit out well after brushing, but minimize rinsing behaviors with water

- Cooperate with Ministry of Education to form school oral health education team
- Oral health education schedule involve in a school curriculum (government)

  Appropriate tooth brushing with adequate fluoride toothpaste should be actively educated in schools.

2. Local dentists from Department of Public Health
   - Branch training from dentists to dental nurses, assistants and health care workers
   - Ask at least a teacher from each school for school oral health education team
   - Oral health education trainings to selected nursing teachers
   - Local dentists will give oral health education to schoolchildren at least once a year (if possible twice a year) in a township level
   - Dental nurses or community health care workers will give oral health education to schoolchildren at least once a years in a rural/village level
   - School nursing teachers will train oral hygiene care and oral health education to schoolchildren with scheduled timetable (for example, once a week)
   - Set up school oral health education teams

School Oral Health Education Team



School-based Fluoride Programs

Base on the national oral health survey, the subjects have already got caries on their newly erupted permanent teeth as early as the age of 6 years. Therefore, various school-based fluoride programs should be developed with the support of government and non-governmental organizations.

Fluoride mouth rinsing program

It is recommended for caries prevention and reduction dental caries inequalities among schoolchildren, and FMR under supervision also frequently has been used in school-based programs to prevent dental caries in children. FMR usually oriented for preschool children, primary school children and junior high school children with different frequency and concentrations, which has contributed to caries prevention of permanent teeth. Supervised regular use of FMR by children and adolescents is associated with a large reduction in dental caries development. WHO documented that FMR should only be used for 6-years-old children and above due to concerns about dental fluorosis. On the other hand, first permanent molars already erupted at the age of 6, and it might be delayed to prevent dental caries occurrence for first permanent molars in 6-years-old. So, measurements for FMR uses among preschool children were performed in Japan, and reported FMR could be performed by preschool children safely and efficiently.

Step by step key facts

1. Authorized persons from Ministry of Health and Sports (with international supports)
    - First step is to attempt for easily available in local markets
    - Training programs to local dentists for effective FMR methods
2. Local dentists from Department of Public Health
    - Branch trainings to school nursing teachers, dental nurses, assistants and health care workers
    - Practice the initial mouth rinsing with water in schoolchildren to avoid swallowing or left over in cups
    - Implement 10ml 0.2% sodium fluoride mouth rinse weekly under supervision of school nursing teachers at schools
    - Start fluoride mouth rinsing from grade 1 primary schoolchildren and continue until end of middle school

Clinical application of sealants or fluoride varnish

- Perform annual dental examination with established format dental examination form
- Clinical application of sealant or fluoride varnish should be used in children who need preventive measures in the school settings

(Resin-based sealants or GIC protective coatings)

It should be applied to the first permanent molars (once they have fully erupted) of 5- and 6- year-old children who have

- one or more primary teeth missing due to caries,
- three or more filled primary teeth, or
- deep, sticky and retentive fissures on their first permanent molars.

(Fluoride varnish applications)

Topical fluoride varnish applications should be used in schoolchildren on early smooth-surface lesions on

- permanent teeth or
- deciduous teeth which have at least two years remaining prior to exfoliation.

(Silver diamine fluoride applications)

Active caries treatment such as use of silver diamine fluoride is necessary. Silver diamine fluoride should only be applied to

- active enamel caries of deciduous teeth or
- early dentine carious lesions of deciduous teeth.

(SMART/ART)

It is also considered to be an alternative method of restorative treatment of primary tooth in school-based environment. Simply remove dental caries, minimal cavity preparation using only hand instruments and fill it with glass ionomer cement. It is suitable to apply in

- open cavitation lesions (involving dentine),
- accessible to hand instruments, or
- one surface more than multiple surface cavities.

After lunch tooth brushing program

In 2013, Live-Learn-Laugh Project (LLL project) was successfully established with the joint cooperation of Myanmar Dental Association, FDI and Unilever. According to these results, after lunch tooth brushing would be beneficial to reduce prevalence and incidence of oral diseases among the school children. Therefore, "Campaign for Tooth Brushing after Lunch" should be re-performed at model schools and then developed nation-wide in the future.

2.2. Clinical Prevention (Early Treatments)

Clinical preventive activities consist of periodic oral examinations and early treatment for emergency dental care in schoolchildren.

Step by step key facts

1. Public health dentists will go to schools for oral examination (with established oral examination form) at least once a year
2. Refer to public health centers or hospitals for necessary treatments except school-based fluoride programs
3. If possible (second priority), collaborative work with public health dentists and hospital dentists. Provide early treatments such as deciduous teeth extraction, ART, scaling, etc. in the school settings

Specific Objective 3: To establish/improve oral health promotion programs for adults (including elderly)

Based on this survey, dental caries status and periodontal status were severe in both 35-44 years and 65-74 years age groups. The 60-74 years old group subjects have the highest caries prevalence as well severe periodontal disease to be compared to the other age groups. People awareness on oral diseases seems to be still poor and their oral health literacy is low. Accordingly, their oral health behaviors as well as status are inadequate. These factors may be attributed to increase prevalence of dental caries and periodontal disease in Myanmar. Therefore, prompt and adequate preventive strategies and measures should be implemented for Myanmar people.

Nowadays, it is moving toward an aging society worldwide and also expected to be aged society in future in Myanmar. A higher proportion of elders cause higher prevalence of

oral diseases with common risk factors and need more complexity care than the younger. Tooth loss is the main oral health problem in aging population and related with eating, chewing and swallowing inabilities, affected to poor nutrition, unhealthy and low quality of life. Therefore, oral health programs for aging population related with improved quality of life should be considered.

3.1. Oral Health Education

Oral health education pamphlet and video programs were telecast on the national TV program.[1] It is also performing by dental public health section of Myanmar Dental Association and joint dental public health activities with international organizations such as JICA, IADR, ICD, etc. In education, motivation is more important than informing the people. Simply education is not enough and so, the most important thing is to use effective and motivational education approach instead of traditional education approach in the future nationwide. It is necessary to involve local leaders as people learn the best from whom they respect and regard. Further, education strategies (based on previous data) should be considered with different purposes in community.

For example,

- Focus on the dietary control, fluoride use, oral hygiene care, etc. for caries-risk community
- Focus on regular tooth brushing, nutrition guidance, oral hygiene care, etc. for periodontal disease-risk community
- Focus on restriction of fluoride uses for high fluoridated areas
- Focus on betel quid chewing, oral cancer awareness, making tobacco free zone in public areas, etc.

Step by step key facts

1. Local dentists from Department of Public Health
    - Branch training to dental nurses, assistants and health care workers
    - In addition to institutionalized services, local public health dentists together with dental nurses and community health care workers will go to community until grass root level
    - Give oral health education to community people at rural health centers

- Involvement of local authorized persons (i.e. head of a village, religious leaders such as monk)
- Set up community-based oral health education teams
    - Local dentists, dental nurses, community health care workers
    - Local leaders
    - Village health volunteers

2. Authorized persons from Ministry of Health and Sports
    - Continue national TV programs through the country (oral health messages for common oral diseases as well as oral cancer awareness)

3.2. Oral health care services

- Oral health care of Myanmar people is mainly providing by private practitioners. So, private sector is also important, the general practitioners should provide not only dental treatments but also oral health check-up. It is necessary to persuade the patient for recall visits and regular oral health check-up.
- It is also necessary to improve oral health care services in hospitals by actively providing efforts in urban areas, rural areas, remote areas
- Continue outreach activities of Myanmar Dental Council, Myanmar Dental Association and other international organizations (with emphasis on preventive procedures)

Oral health care services for elderly

If a person who lose their teeth, it would be difficult to enjoy food and make them feel unhappy, mental health is ill and lost their quality of life. So, it should be covered denture services and preventive services for root caries in community outreach activities all over the country. Oral health programs for institutionalized elderly (elderly care centers, nursing home) should also be designed to improve their oral health status. Oral health care services such as oral examination, emergency treatments and oral prophylaxis should be provided. Oral hygiene care such as tooth brushing to elderly should be supervised or performed by nurse-aids and caregivers. In Thailand, the Bureau of Dental Health offered a development program for elderly club to arrange the activities for oral health promotion of members. It is necessary to initiate new approach to oral health care system for elderly (such as elderly club) on selected townships, and then gradually expand to nationwide.

1. Charity dentist groups
    - Provide denture services in community field trips
    - Provide root caries preventive services (silver diamine fluoride, fluoride mouth rinse, sealants) for elderly in community field trips
2. Local dentists from Department of Public Health
    - Routine oral health care delivery for institutionalized elderly (nursing home, elderly care centers)
3. Local dentists from Department of Medical Services
    - Support and contribute the current oral health care efforts in hospitals (including dentures, fixed prosthesis, etc. for elderly)
4. Authorized persons from Ministry of Health and Sports
    - Initiate elderly club and activities groups in selected townships and expand gradually nationwide
    - Arrange various activities including oral health care

3.3. Community fluoridation programs

- There is still lacking information about community fluoridation in Myanmar. So, it is necessary to update the information on the fluoride content of water supplies.
- Provide the most appropriate fluoridation method in community
  For example, water fluoridation to public water system in selected townships. Then, evaluate their oral health status after 5 years.
- There is still no special fluoride mouth rinse program in Myanmar. Therefore, (if possible) it should be initiated some fluoride mouth rinse program such as home care use for adults and elderly.
- Authorized persons should evaluate the fluoride contents of locally available fluoride toothpastes and strictly perform to add accurate fluoride content in toothpastes.

3.4. Oral Cancer Awareness Program

Among the subjects involved in the survey, some subjects were indicated to have oral cancer by the examiners. Areca/betel nut chewing habit was commonly found within some traditional ethnics, in Myanmar. Since 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.[14] Myanmar is one of the highest prevalence in tobacco consumption countries with an increasing trend. As betel quid chewing habits are widely spread in Myanmar, it should be necessary to widely motivate people for

oral cancer awareness nationwide. Further, government should be initiate the public restrict areas for tobacco smoking and chewing.

Step by step key facts

1. Authorized persons from Ministry of Health and Sports
    - Government should initiate public restrict areas for tobacco smoking and betel quid spitting with some punishments
    - Training to local dentists for oral cancer screening methods
    - Active programs in oral cancer awareness month
2. Local dentists
    - Oral cancer screening should be widely performed at public hospitals (by hospital dentists)
    - Oral cancer awareness messages should be developed nationwide (by public health dentists)

Specific Objective 4: To establish public health insurance system

As there is no universal health coverage in Myanmar, it is also a big threat for people to cure effectively even though they know treatment is actually needed. Installment of health insurance scheme (national/private) can be considered to reduce future incidence and prevalence of common oral diseases in Myanmar.

Step by step key facts

1. Authorized persons should have to report to government for developing public health insurance system
2. With international supports, plan and develop the mandatory health insurance system (e.g. deduction of some amount of salary for performing health insurance)

<u>Goal 3: Develop oral health human resources development plan</u>

Specific Objective 1: To increase the numerous qualified oral health personnel who aid various oral health promotion programs with future perspectives

Dental human resources are very limited in Myanmar compared with WHO standard. There are only 3695 dentists (2014) and the number of dentist per population ratio is 6.8 per 100,000 populations in Myanmar. Regarding the dental education, there are only two dental schools (both are nationals) in Myanmar, while 10 dental schools (8 public and 2 private) in Thailand, 7 public dental schools in Vietnam. As the role of oral health professionals is to

support the community people for a leading outcome and better process of health promotion, increment of dental human resources is keenly important for better oral health situation in Myanmar. Therefore, it is necessary to develop new dental schools (public or private) in Myanmar. Further, there is still limited number of teaching staffs in dental universities.

In townships without school health teams, township medical or dental officer is taking the duties for school health affairs. It is necessary to appoint public health dentists in every township in Myanmar. Public health dentists take main responsibility for monitoring routine oral health care services through the country. There is no dental hygienist in Myanmar. Currently, limited number of the dental nurses is producing by Universities of Dental Medicine in Myanmar. Those dental nurses are appointing at public hospitals for assisting the duties and responsibilities of public dentists. It is still necessary to develop capacity of the dental nurses to be able to practicing such as emergency dental care and preventive fillings etc, especially in rural areas, to offer available dental services.

Key facts (teaching)

1. Develop the number of qualified teaching staffs in dental universities
2. Authorized persons have to propose the government for development of new public dental schools, private dental schools
3. Train the dental students with intensive courses

Key facts (public health and medical services)

1. Increase the number of public health dentists
2. Available of the dentists and/or oral health personnel to grass root level of community (special offers to those dental workers)
3. Promote the number of dental nurses and appoint to every public hospital
4. Format dental workforce system should be developed in every township. (e.g. at least a public health dentist, a hospital dentist, a dental nurse in each township)

Specific Objective 2: To train oral health personnel

For contributions of oral health education and preventive procedures to the community, the dentists, dental nurses and dental assistants should be trained and guided routinely as part of their continuing education. This is an urgent need to ensure adequate and appropriate continuing dental education in preventive dentistry.

Key facts

1. Ensure adequate and appropriate continuous education in dental public health
2. Advanced studies, trainings and/or hand-on courses to the dentists, dental nurses and dental assistants by means of free and/or low cost (*not only to government staffs but also to private dentists)
3. Training of basic dental treatments (such as scaling, ZOE dressing, etc.) to community health workers
4. Attendance of continuous dental education by means of point system
5. Point system will be aid for consideration of dental license extension, foreign trainings and promotions

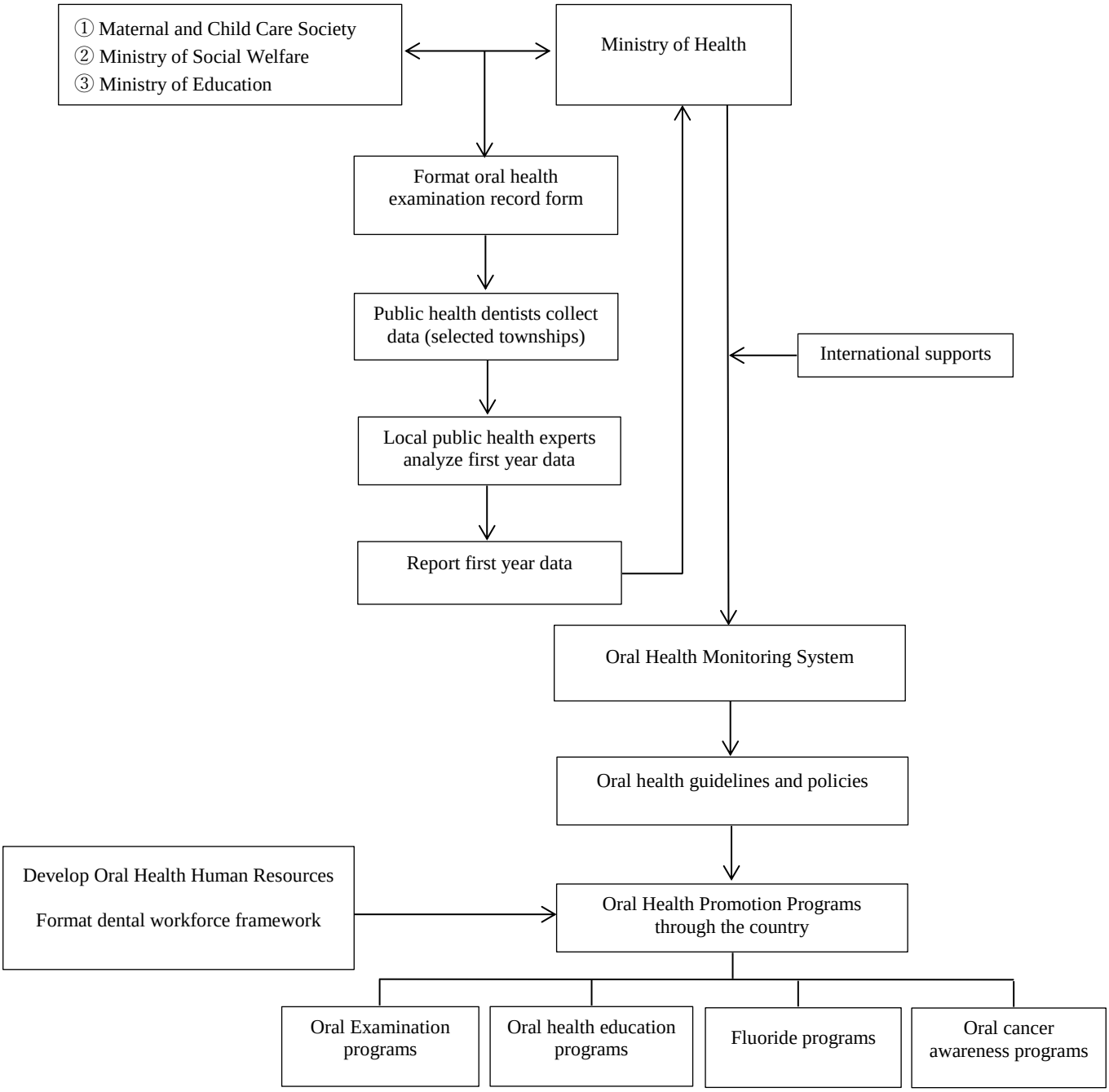
Specific Objective 3: To involve public health experts in national level

- The government need to empower the dental workforce by their direct involvement and participation in the national level oral health policy formulation, implementation and planning to overcome oral health challenges.
- Public health experts will format dental workforce framework with assigned role and action of dentists in various sectors (public health dentists, hospital dentists, university dentists, MDA, MDC, private dentists)
- This is critical for appointing and active participation of dental public health specialists in the national level in order to ensure that the steps being taken currently and to develop further oral health betterment in Myanmar.

Summary

1. Multi-sector collaborative works with other ministries and organizations should be performed.
2. Format dental examination record forms should be urgently implemented in various settings.
3. A national oral health database should be established which can be accessible in various ways.
4. Routine national oral health survey should be conducted every 5 years.
5. An appropriate oral health guidelines and policies for provision of oral health care services should be developed in various settings.
6. A formal dental workforce framework should be conducted.
7. Dental human resources should be developed for various oral health care programs in Myanmar.
8. Routine basic oral health care services should be implemented properly through states and regions of the country.
9. Adequate and appropriate continuing dental education in dental public health should be developed.
10. The government needs to empower the dental workforce by their direct involvement and participation in oral health policy formulation, implementation and planning to overcome oral health challenges.
11. Well-trained dental public health specialist is necessary to ensure the steps being taken currently and develop further oral health care programs in Myanmar.

Summary Flowchart



Missions to be considered with different time frames (emphasis within 3 years)

Term	Short term		
	1 (2019)	2 (2020)	3 (2021)
Goal 1: Oral health monitoring system			
1.1. Pregnant women and children 0-2 years	-Discuss with Maternal and Child Care Society -Establish maternal and child care book included oral examination chart -Select model townships	-Collect the data at selected townships	-Combine, analyze and report the first year's data
1.2. Children 3-5 years	-Discuss with Ministry of Social Welfare -Establish format record form -Select model preschools	-Collect the data at selected preschools	-Combine, analyze and report the first year's data
1.3. Schoolchildren	-Discuss with Ministry of Education -Establish format record form -Select model schools	-Collect the data at selected schools	-Combine, analyze and report the first year's data
1.4. Adults and Elderly	-Establish comprehensive patient record in hospitals (if possible, record form for institutionalized elderly) -Select model hospitals	-Collect the data at selected hospitals and (if possible, at elderly institutions)	-Combine, analyze and report the first year's data
Goal 2: Routine oral health care services			-Plan for public health insurance system -Discussion with international experts to set up guidelines and policies and assign for oral health programs
Goal 3: Human resources Development		-Increase the number of dentists -Involve well-trained dental public health specialists in national level -Plan for dental workforce framework	-Ensure trainings for ongoing oral health care programs -Special trainings -CDE with point system

Missions to be considered with different time frames (emphasis within 6 years)

Term	Middle term		
	4 (2022)	5 (2023)	6 (2024)
Goal 1: Oral health monitoring system	**-National Oral Health Survey** -Collect routine data through the country -Establish a national oral database	-Analyze and report the data of NOHS - Analyze and report the annual data	-Continue routine data collection through the country
Goal 2: Routine oral health care services	-Start public health insurance system		
2.1. Pregnant women and children 0-2 years	-Oral health education to mothers and pregnant women -Fluoride program	-Continue oral health care services	-Continue oral health care services
2.2. Children 3-5 years	-Training to preschool teachers -Oral health education -Fluoride program	-Continue oral health care services	-Continue oral health care services
2.3. Schoolchildren	-Develop education materials and train to school teachers and educate to children -Fluoride programs and early treatments		
2.4. Adults and Elderly	-Public education (e.g. TV program) -Education through local leaders -Oral cancer awareness program	-Continue oral health care services	-Continue oral health care services
	-Oral health care services through hospitals, field trips and elderly home -Prosthesis for elderly -Community fluoridation programs	-Continue oral health care services -Initiate the elderly club in selected townships (if possible)	-Continue oral health care services -Spread the elderly club through the country (if possible)
Goal 3: Human resources Development	-Consider for new dental schools -Special trainings, CDE with point system	-Consider for new dental schools -Special trainings, CDE with point system	-Consider for new dental schools -Special trainings, CDE with point system

Missions to be considered with different time frames (emphasis within 10 years)

Term	Long term			
	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Goal 1: Oral health monitoring system	- Continue routine data collection through the country	- Continue routine data collection through the country	**-National Oral Health Survey**	-Evaluation
Goal 2: Routine oral health care services	-Continue oral health care services	-Continue oral health care services	-Continue oral health care services	-Evaluation
Goal 3: Human resources Development	-Special trainings, CDE with point system	-Special trainings, CDE with point system	-Special trainings, CDE with point system	-Evaluation

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Ⅴ. Appendix

Report of National Oral Health Survey in Myanmar (2016)

Prepared by

WHO Collaborating Centre for Translation of Oral Health Science

Niigata University, Japan

1. INTRODUCTION AND BACKGROUND

1.1. Myanmar demographic profile

The Republic of the Union of Myanmar is located in South East Asia bounded by India, Bangladesh, China, Laos and Thailand on the land side and 1760 miles of coast line is bounded on west by Bay of Bengal and Andaman Sea. Myanmar covers wide geography of 676,578 square kilometers in total land and water. The country is divided into Nay Pyi Taw Council Territory and 14 States and Regions. It consists of 74 districts, 330 townships.[1] The provisional result of 2014 population census shows the total population of Myanmar as 51,419,420 where Female 51.8% and Male 48.2% which does not include people who were out of the country at the time of census. The population density shows 76 persons per square kilometer and 30% of population resides in urban areas.[2] There are 8 major national ethnic races which comprises 135 distinct ethnic groups. The 89% are Buddhists while the rest are Christian, Islam, Hinduism and others. Total population life expectancy is 65.24 years where 89.9% of population can read and write. Development of social sector has kept pace with economic development. Expenditures for health and education have risen considerably.[3]

1.2. Political situation and health care system in Myanmar

Myanmar health care system evolves with changing political and administrative system since 2010 first election. Myanmar has life expectancy at birth 67 years old. Based on 2014 census, the maternal mortality ratio is 282 deaths per 100,000 live births, and under five child mortality rate is 72 deaths per 1,000 live births, malnutrition is highly prevalent, the burden of disease from Non-communicable diseases is alarming. Health care system reform brings in introducing health related policies in 2013 and 2014 and public spending on health has increased 9 folds. But the health care delivery services and interventions does not reach entire population due to limited readiness of health facilities and human resources which may shows great variations of quality of care.[4] Since 2016 April, new presidential government has started with new administration structure in Ministry. There are lots of new opportunities and numerous challenges in this transition stage. NLD health committee is leading initiatives to achieve Universal Health Care Coverage in 2030. Ministry of Health is now combined with Ministry of Sports and stand as Ministry of Health and Sports with new administrative structure with challenges in human resource management under new organization structure and system. In each ministry, 100 days project activities have been started from 1st May 2016 to 30th July, 2016 as initial steps of change.

1.3. Human resources for oral health and oral health care system in Myanmar

There are two dental universities (Yangon and Mandalay) offering B.D.S, Dip.D.Sc, M.D.Sc, Dr.D.Sc, Ph.D, Diploma in Dental Technology, Diploma in Dental Nursing and B.D.S, Dip.D.Sc, M.D.Sc, Dr.D.Sc respectively. In year 2013 – 14, there are 3219 registered dental surgeons in country where 782 dentists in public sector and 2437 in co-operative and private sector. There are only 357 dental nurses in the whole country.

With the new administrative structure of Ministry of Health and Sports, Oral Health Unit is under Department of Medical Services. Under which every township hospital has dental care unit which provides dental services to community with shared cost. There will be variations of health facilities, human resources and quality of care in each township. There has no defined and specific basic oral health care services available free of charge at public hospitals yet which need to discuss in moving forward universal coverage for 2030. Since 1992, Primary oral health care services have been integrated into primary health care services in collaboration with WHO SEARO. There were nationwide school heath programs running which comprise of dental health education, tooth brushing and oral health examination and treatment. Dental fluorosis is prevalent in some part of country and fluoride mapping was once conducted in collaboration with occupational health division in Wet Let Township, Sagaing Region.

Under new organization structure of Ministry of Health, dental public health activities have been diminished or blurred with no specifically defined and assigned unit or department of dental public health unit. Oral Health Unit under new ministerial structure is also implementing 100 days project activities. But the clear vision, planning and management is challenging part to effectively manage and sustain those dental public health programs.

1.4. Oral health status of Myanmar people

The Oral Health statistics previously available for Myanmar was from the research articles carried out on specific populations and could not represent the whole population in the country. The 2003 WHO figures says Myanmar as low dental caries region (1.2 to 2.6) for 12 years old children which need to update with representative data.

2. AIM AND OBJECTIVES

2.1. Aim

There were limited information and evidences challenge in strategic planning, policy making and delivering effective oral health care services and prevention programs for the whole population under clear vision and objectives. Therefore, the aim of this survey was to investigate the oral health status and oral health behaviors of the people of Myanmar, compare internationally and perform strategic planning and effective management of oral health programs integrating with other public health programs.

2.2. Specific objectives

1. To access the dental caries status of the indicator aged groups as mentioned in WHO pathfinder methodology
2. To access the periodontal status
3. To access the status of oral mucosal lesion, dental fluorosis and relevant oral conditions in indicator aged groups according to WHO pathfinder
4. To access the Oral health behaviors of the people in selected indicator aged groups
5. To access the fluoride concentration from different sources of drinking water from selected sample site

3. METHODOLOGY

3.1. Study design

The survey was a cross-sectional descriptive study using WHO oral health survey basic methods (fifth edition) at the national level. It was conducted in twenty one selected locations from fourteen states and regions including Nay Pyi Taw.

The study was performed in 6 years old, 12 years old, 15 to 18 years old, 35 to 44 years old and 60 to 74 years old. The survey was conducted between December 2016 to January 2017 at selected townships from all states and regions.

The following data collection instruments was used

1. WHO oral health clinical assessment form (2013) for oral health diseases and conditions, occurrence, severity and treatment needs
2. WHO questionnaire (2013) to collect data about Oral Health seeking behaviors, knowledge, attitude, oral hygiene practices and habits

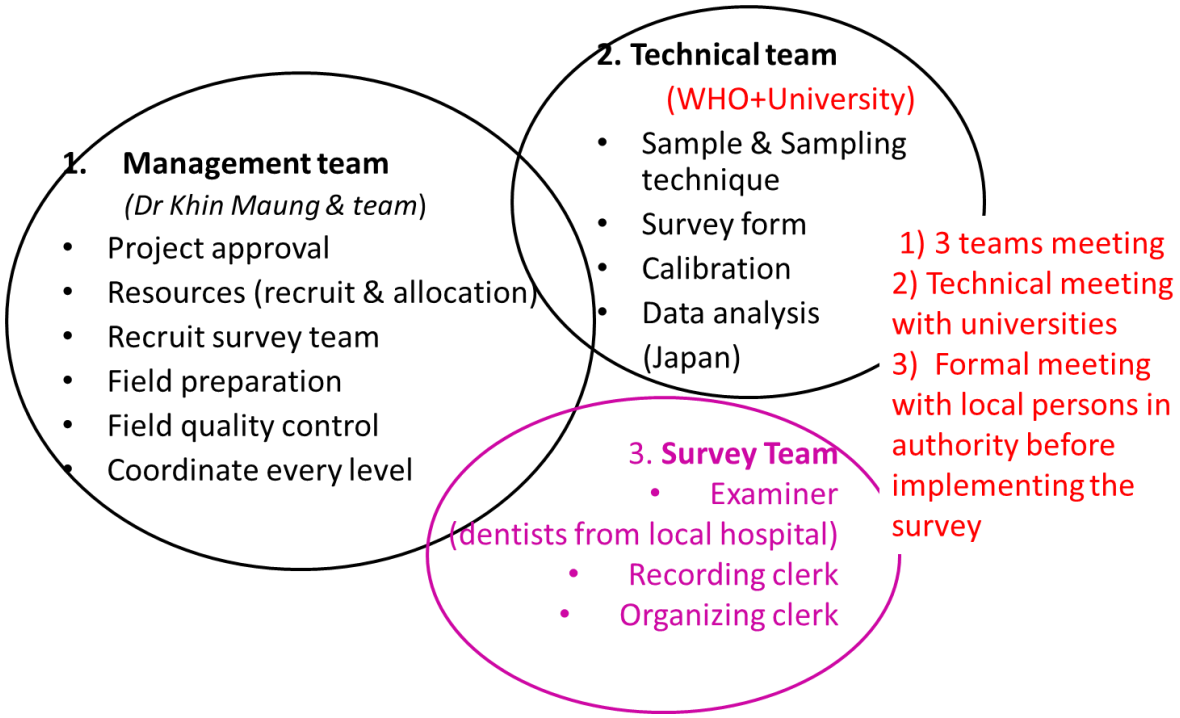
3.2. Personnel involved (role and responsibility)

Protocol was developed with contribution from National and International dental public health professionals.

- Management team (chief of oral health unit, Dr. Khin Maung was the PI of the survey) with a committee members from some technical and survey team and senior public health dentists and a potential secretary.
- Technical team (dental university, statistics, preventive and community dental department, senior dental public health dentists, WR, internal and external experts)
- Survey team had at least 3 team member:
    - team leader (local senior dentists) who was the liaison officer or coordinator to conduct the survey smoothly with local administration staff under ministry of home affair and health volunteers to do logistical arrangement. Local senior dentist was the most responsible person for the survey to recruit the dentists as examiner and recorder of the team.
    - young dental officers (dentists) who has the good eight sight and can cope with the travelling and can also participate fully with the team in each

location) as one dentist to do examination as examiner and one dentist to do recording as recorder.

- Questionnaire assessment was performed by non-dentist in local language and pretest.



3.3. Sample selection

The sampling is based on administrative divisions of a country which has 14 different states and divisions. Each state and regions reside by majority of each different ethnic group. Specific sample site selection is based on administration figure of 2014 population census. The 21 locations were selected using stratified 2-stage sampling technique (based on geographic location, township simple random sampling, urban/rural, schools SRS >> student systematic sampling, and for other age groups: in township base on schools).

State/Region	**Township**
KACHIN	Shwegu
KAYAH	Demoso
KAYIN	Hpa-An
CHIN	Falam
MON	Mudon
RAKHINE	Pauktaw
SHAN South	Pindaya
SHAN East	Kengtung
SHAN North	Namhkan
SAGAING	Monywa
TANINTHARYI	Yebyu
NAY PYI TAW	Tatkon
BAGO	Zigon
YANGON	Dagon Myothit (South)
YANGON	Hlaingtharya
MANDALAY	Amarapura
MANDALAY	Pyigyitagon
MAGWAY	Chauk
MAGWAY	Magway
AYEYARWADDY	Bogale
AYEYARWADDY	Pantanaw

The number of subjects to be examined in each index age groups was planned to have 30 for each sampling sites with equal number of males and females. There are 5 index age groups at each site.

Total sample = number of subjects to be examined in each index age group x number of index age group x selected sites x urban and rural

30 sample for each age group (30 x 5 x 21 x 2 = 6,300)

On the initial design for this *pathfinder* survey, it was planned to have an equal number of subjects (1,260 subjects) for each age group.
However, due to some unforeseeable conditions in the field (the age of 27 subjects were out of the age-range which has been determined for this pathfinder survey, based on the WHO categorization), there were in total of 6,273 subjects examined for this survey. Furthermore, due to some technical examination errors, the final number of subjects who were eligible to be analyzed was 5,928 and 4,667 for caries and periodontal status respectively (Table 1).

Table 1. Description of number of subjects involved in the survey

Age group	Initial design of the number of subjects			Number of subjects examined*			Number of subjects analyzed for caries status**			Number of subjects analyzed for periodontal status***		
	Total	Sex		Total	Sex		Total	Sex		Total	Sex	
		Male	Female		Male	Female		Male	Female		Male	Female
Total	**6,300**	**3,150**	**3,150**	**6,273**	**3,132**	**3,141**	**5,928**	**2,943**	**2,985**	**4,667**	**2,312**	**2,355**
6	1,260	630	630	1,260	635	625	1,260	635	625	-	-	-
12	1,260	630	630	1,260	624	636	1,155	557	598	1,155	559	596
15-18	1,260	630	630	1,260	630	630	1,022	508	514	1,021	510	511
35-44	1,260	630	630	1,248	621	627	1,246	621	625	1,246	621	625
60-74	1,260	630	630	1,245	622	623	1,245	622	623	1,245	622	623

Notes:

* Out of age group range for 27 subjects

** Incomplete data for 345 subjects

*** Incomplete data for 373 subjects

3.4. Training and calibration of examiners

In order to obtain an acceptable level of reliability, all examiners were trained and calibrated prior to the survey. To limit the confounding factors arising from inter-examiner and intra-examiner variations, dentists received training and calibration course from WHO-CC at Niigata University, Japan with the gold standard (Dr. Hiroshi Ogawa and team).

The non-dental personnel were also calibrated to take care of action for questionnaire under the supervision of survey team leader.

The operation manual, survey manual (code and criteria of every index and questionnaire) and guideline for water collection was developed before calibration.

3.5. Pilot survey

After the calibration workshop to test the validation and practice the survey team, a real pilot survey was exercised in the examination site in September 2016.

3.6. Consent form

Adults were participated by signing in consent form themselves, while for the age of 6 and 12 years, parents or caregivers signed a written consent form to allow their children to participate in the study.

3.7. Data collection procedure

There were 10 survey teams, where as a team consists of a local senior dentist (team leader), two young dentists (examiner and recorder). During data collection, the teams were actively involved with the local authorities as well as school principals and administrators. Person in authority of institution or organization where people will be examined was contacted one month ahead. In school, the principal or head teacher was consulted about school term dates and when the children would be available for examination and for suitable area or room to arrange for assessments. The total data of the whole country was collected over a period of two months.

The team began by explaining to the participant the reasons for the survey and the benefits thereof, checking and re-confirming the consent obtained that the participant was willing to participate in the survey. Oral examinations were carried out with a plain mirror and periodontal probes under daylight or, where necessary with a portable light source. No radiographs were taken.

Clinical Assessment was include assessment of

- Dentition Status for all age groups
- Periodontal Status with revised basic method in older age groups: 15 – 19, 35 – 44 and 60 – 74 years old
- Dental Fluorosis with Dean's index for 12 and 15-19 years old
- Dental Erosion for 15-19 and 35-44 years old
- Traumatic Dental Injuries for all age groups
- Oral Mucosal Lesion for 15-19, 35-44, 60-74 years old
- Tooth Loss and Denture Status and Need for 15-19, 35-44, 60-74 years old

Self –assessment, interview of oral health status, practices and risk factors through questionnaire (which need to be in Local language) were performed for12 years old, 15 –19 years old, 35 – 44 years old and 60 –74 years old age groups.

3.8. Statistical analysis

The daily data verification, entry and cleaning was performed every evening in Myanmar to verify and check the missing data and consistency of data. After the data entry, two dentists from Myanmar were sent to Niigata University, Japan for trainings in data analysis and they performed data analysis in Niigata University, Japan.

Statistical analysis was carried out using statistical software SPSS 23.0 (SPSS, Chicago, IL, USA). Descriptive statistics such as Chi-square test and ANOVA test were computed to report the mean or proportions of their oral health status and habits. The level of statistical significance for all tests was set at $p<0.05$.

4. RESULTS AND DISCUSSION

4.1. Dental caries status

4.1.1. Dental caries on primary teeth

Based on the dentition data for primary teeth, it can be observed that only 15.8% of 6 years old group subjects who were free of dental caries on their primary teeth. As shown in Figure 1, even within the mixed dentition age range, the prevalence of primary dentition was still considerably high. This result indicates that even in the mixed dentition age range, some of the subjects still have carious primary teeth. Moreover, the data showed that most of the 6 years old group subjects (98.6%) and all of the mixed dentition age range have their carious primary teeth left untreated.

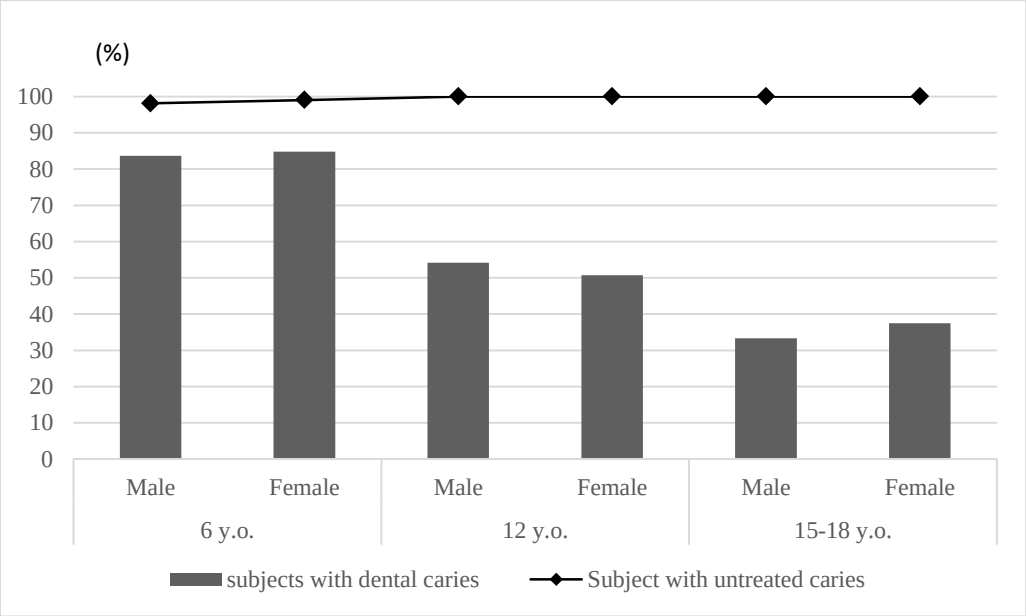


Figure 1. Primary teeth caries prevalence

Figure 2 shows that the age group of 6 years old has the highest total dft score (5.2) which were similar between males and females (5.21 and 5.13, respectively). The age group of 6 years old was also the one who have the highest percentage of teeth with df. However, even the dft scores for mixed dentition age range (12 and 15-18 years old) was lower, the percentage of primary teeth left with df was similar to the 6 years old group. This result indicates that most of the primary teeth left within the mixed dentition age range were carious.

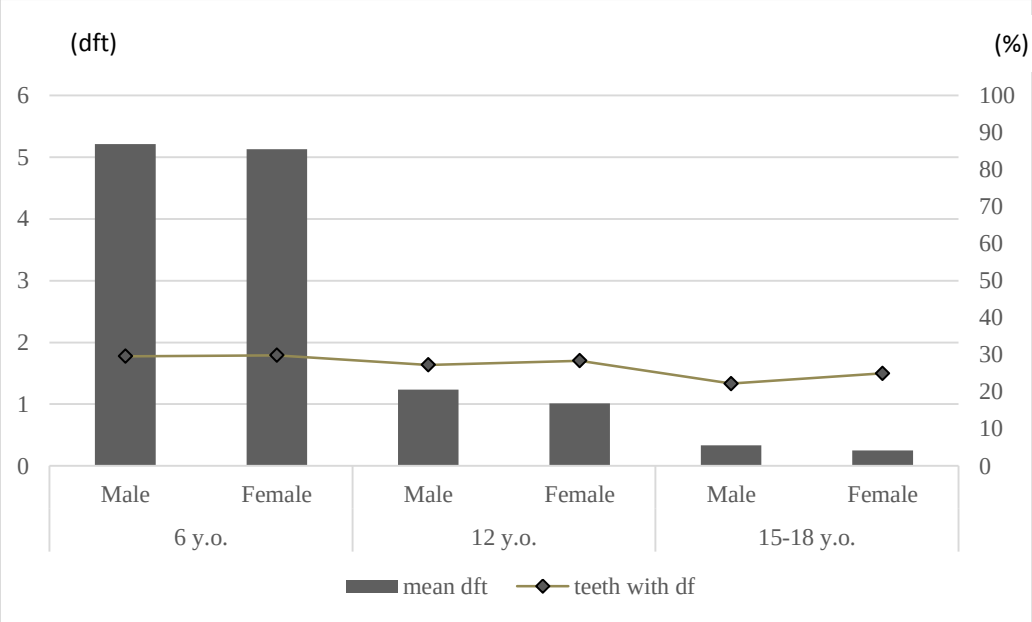


Figure 2. Mean dft and percentage of teeth with df

As shown in Figure 3, within the age group of 6 years old, there are some subject who have caries (dft score) on all of their primary teeth (20 for the maximum percentile). The median for this age group was 4. On the other hand, the maximum percentile for the age group 15-18 years old was 1. Figure 4 which shows the distribution of dt score, was showing the similar pattern with Figure 3. This can be explained by the pattern shown in Figure 5, which indicated that only 1 subjects who have an ft score of 3 as the maximum percentile for the age group of 6 years old, while no ft score found in the other age groups.

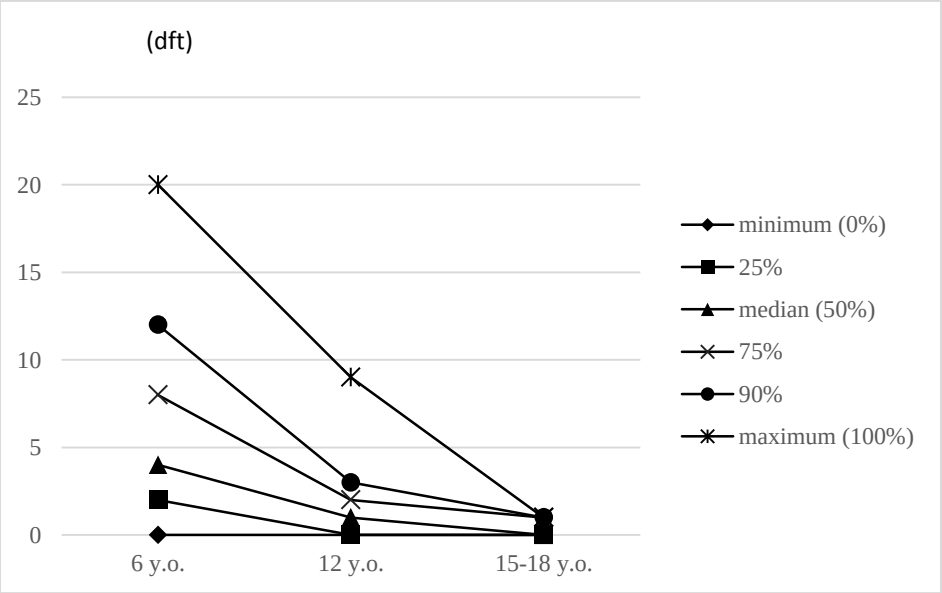


Figure 3. Percentile distribution of dft score

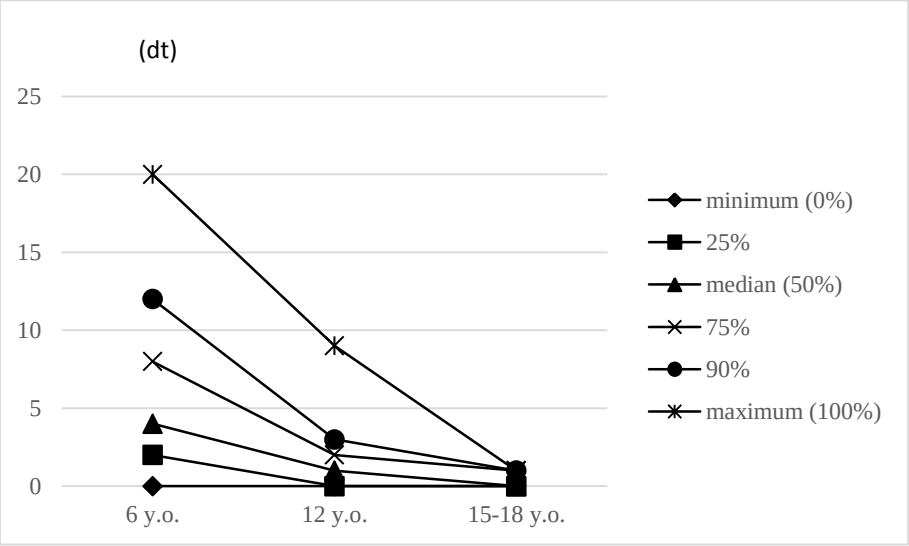


Figure 4. Percentile distribution of dt score

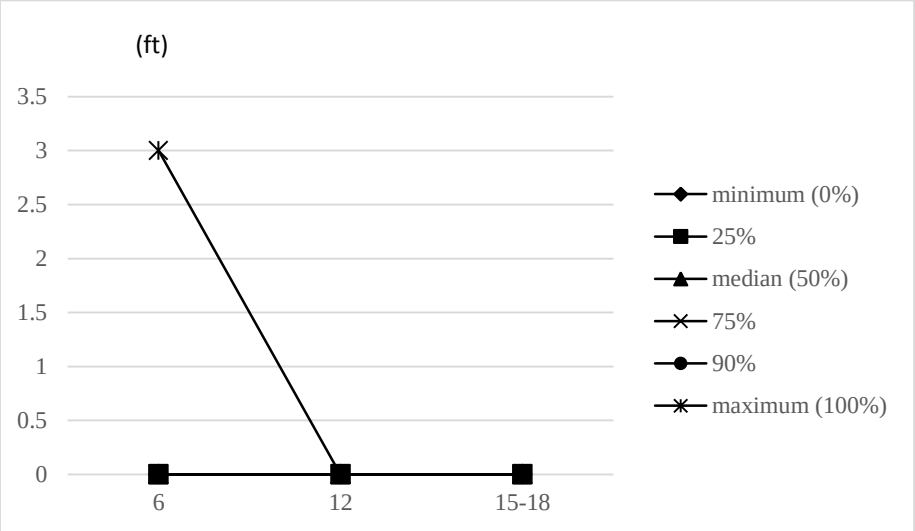


Figure 5. Percentile distribution of ft score

Figure 6 shows pattern difference of the percentage of dft scores by tooth type between the age group of 6 and 12 years old. It can be observed that the similar pattern was found for the mandibular teeth. The percentage of carious mandibular anterior teeth was low, and conversely for posterior teeth. On the other hand, a significant different pattern was found for the maxillary teeth. The group of 12 years old subjects has caries on all of their primary central incisors, while for the age group of 6 years old, approximately 43% of these teeth were carious. These findings might be explained by the nature of mandibular incisor which has been replaced by permanent teeth within the age of 6-12 years old. Whilst, the existence

of maxillary central incisors in the age of 12 years old was prolonged, since they should have been replaced by permanent teeth within the age of 9-11 years old. However, the high percentage of carious posterior teeth either maxillary or mandibular will certainly need an appropriate attention.

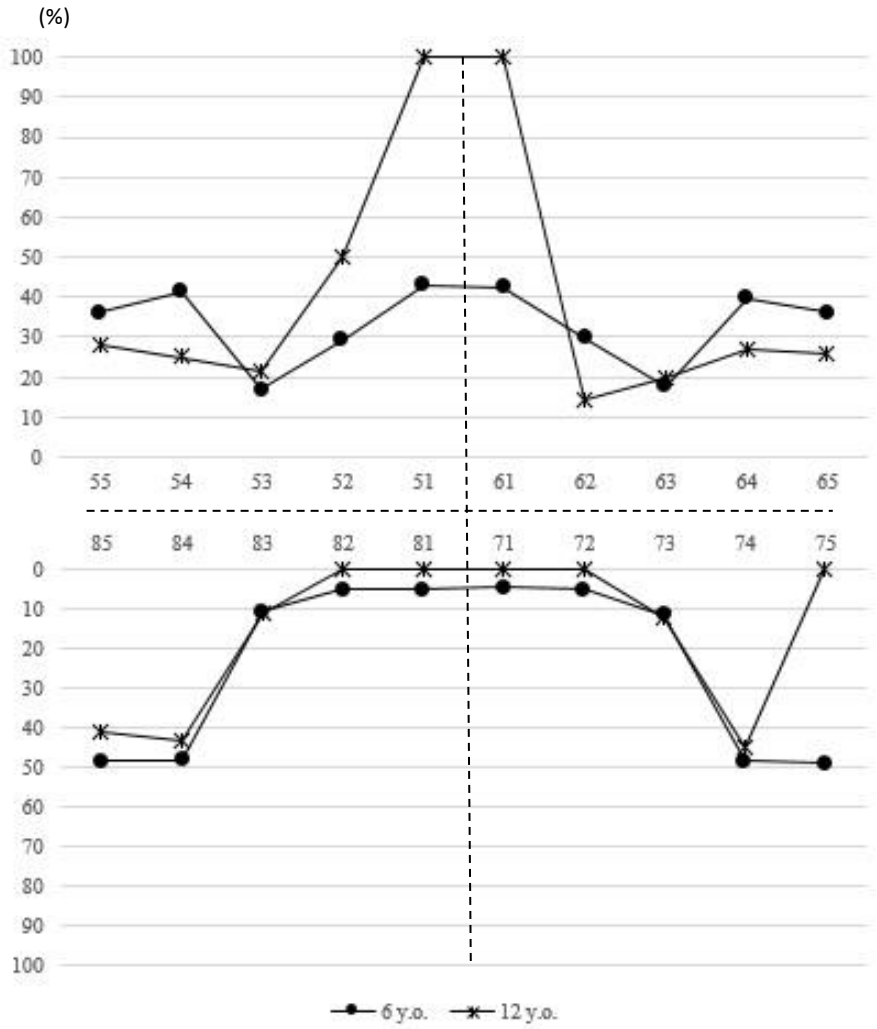


Figure 6. Percentage of dft scores by tooth type

4.1.2. Dental caries on mixed dentition

Based on the data for mixed dentition, it can be observed that the 6 years old group subjects have the highest prevalence of caries (primary and permanent teeth) to be compared the 12 and 15-18 years old group (Figure 7). Furthermore, as shown in Figure 8, it can be observed that the score of dft was higher than DMFT for 6 and 12 years old group of subjects. On the other hand, the 15-18 years old group have almost equal proportion of scores between dft and

DMFT, 0.3 and 0.6 respectively (appendix Table III-2). This finding indicate that as early as the age of 6 years, the subjects have already got caries on their newly erupted permanent teeth, hence in the older age groups, they have double burden of caries on their primary as well as permanent teeth.

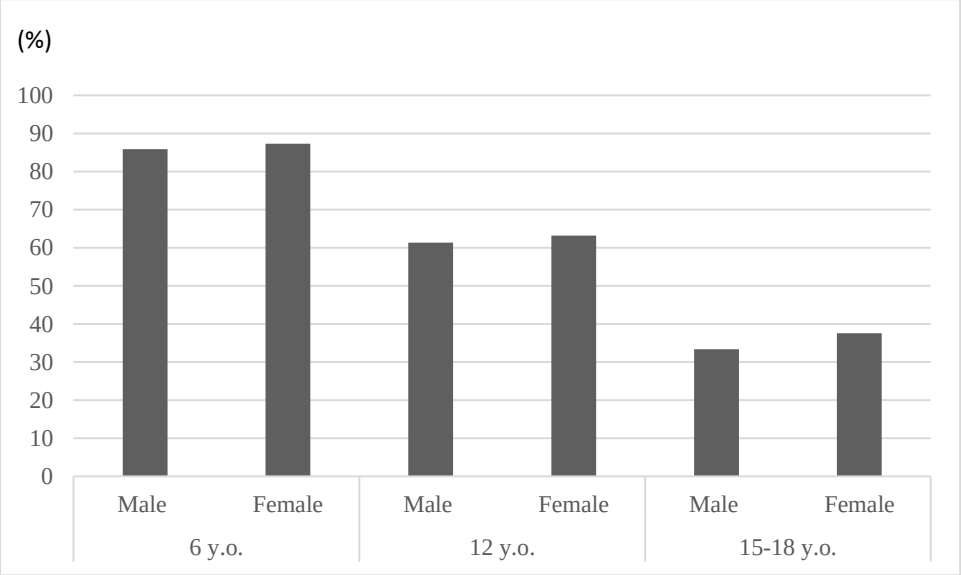


Figure 7. Mixed dentition caries prevalence

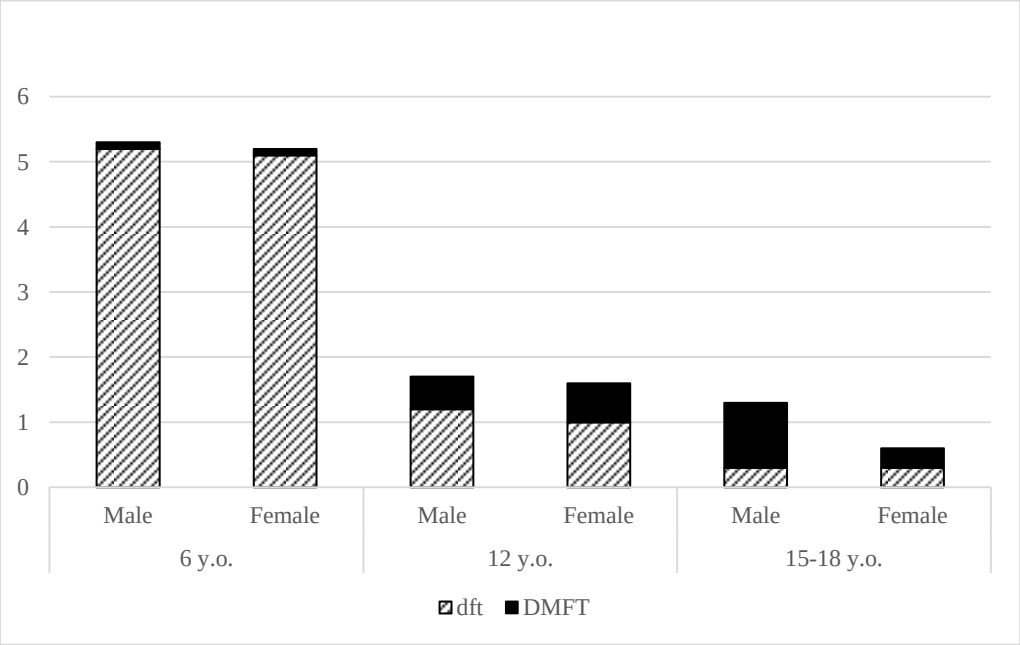


Figure 8. Proportion of dft and DMFT in mixed dentition

4.1.3. Dental caries for permanent teeth

Figure 9 shows that the 60-74 years old group subjects have the highest prevalence of caries to be compared to the other age groups. The total caries prevalence for this age group was 93.6% with a similar condition between males and females (93.7% and 93.4% respectively). Furthermore, as shown in Figure 10, it can be observed that female subjects of the 60-74 years old group have the highest DMFT score of 12.04, and the subjects of the 6 years old group was having the lowest DMFT with a score of 0.14 and 0.11 for male and female respectively. Likewise, the highest percentage of teeth with DMF was found in the female subjects of the 60-74 years old group (56.9%), while the lowest was for female subjects of the 6 years old group with a percentage of 1.9%. Furthermore, the proportion of Missing (M) score was considerably higher than Decayed (D) and Filling (F) for adult age groups. Moreover, Figure 11 showed that more than 90% of all age groups have left their active carious permanent teeth caries untreated.

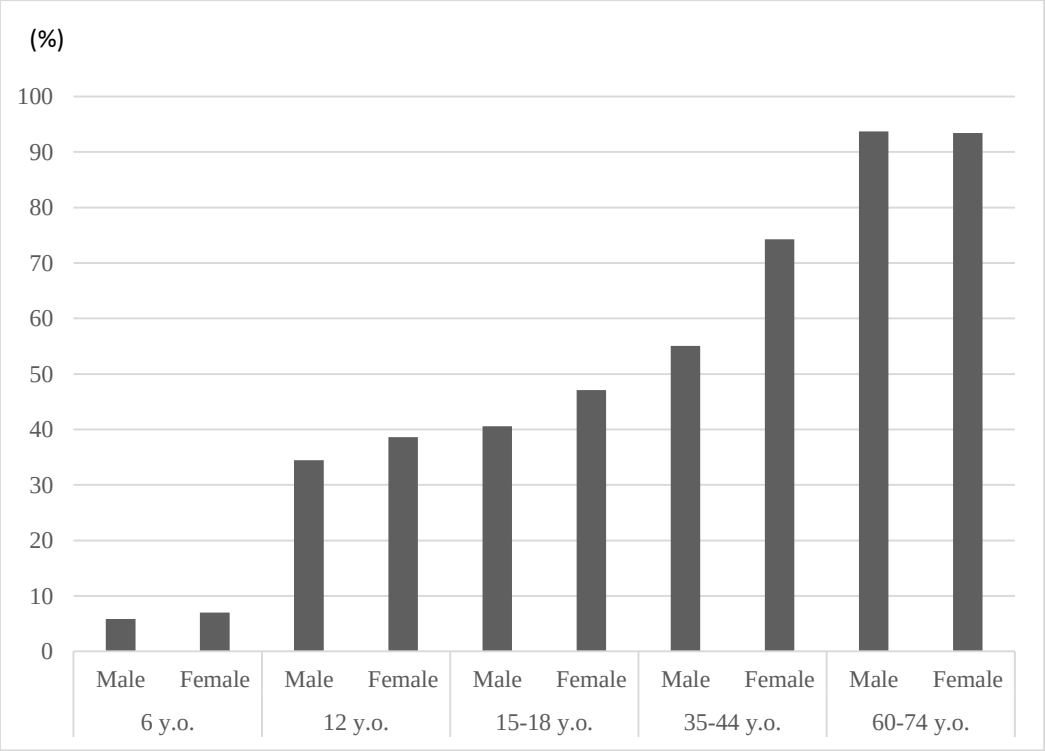


Figure 9. Caries prevalence of permanent teeth

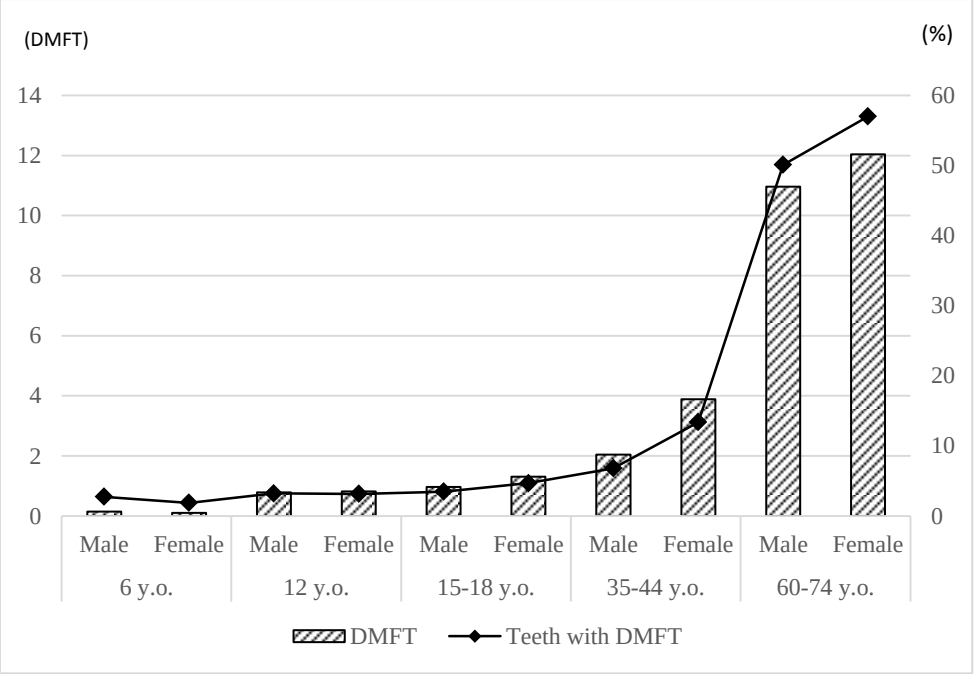


Figure 10. DMFT and percentage of teeth with DMF

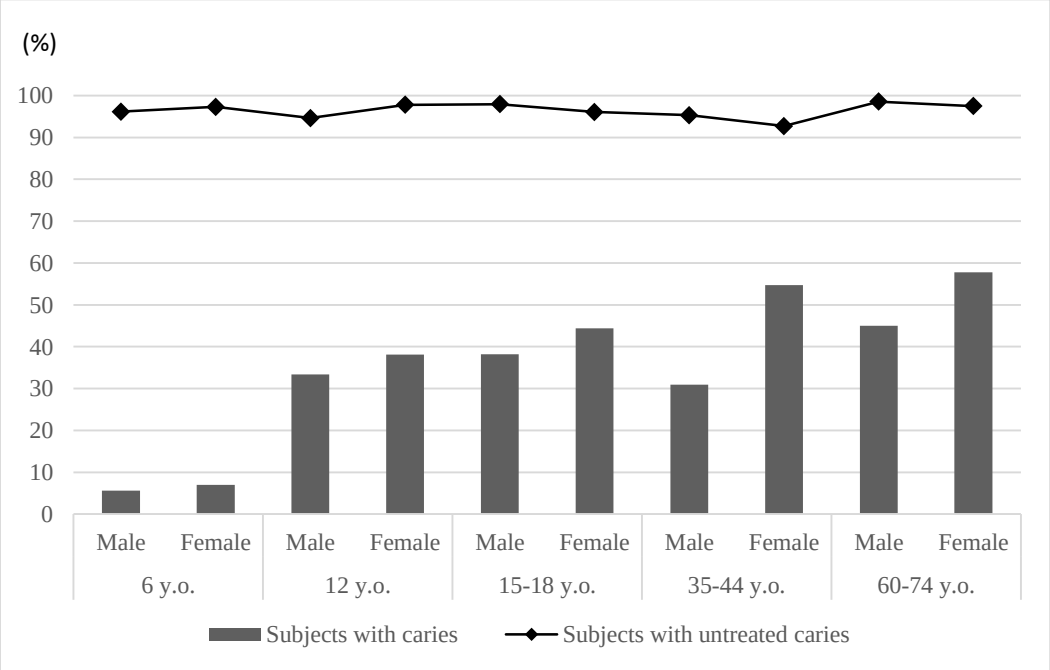


Figure 11. Percentage of untreated active caries

As shown in Figure 12, within the age group of 35-44 and 60-74 years old, there are some subjects who have maximum DMFT score (32 for the highest percentile). The median for these age groups were 1 and 9, respectively. On the other hand, the highest percentile for the age group 6 years old was 8. Figure 13 and 14 which shows the distribution of DFT and DT score was showing the similar pattern. This can be explained by the pattern shown in Figure 15, which indicated that only few subjects who have an FT score for each of the age groups which shown as their highest percentile. Furthermore, Figure 16 shows that within the age group of 35-44 and 60-74 years old, there are some subjects who have maximum MT score (32 for the highest percentile). Moreover, surprisingly there are also subjects from the age group of 6 years old who has an MT score of 2. These findings indicate that tooth extraction was still being one of the solutions in favor for the subjects involved in this survey on overcoming tooth caries, even for the young generation.

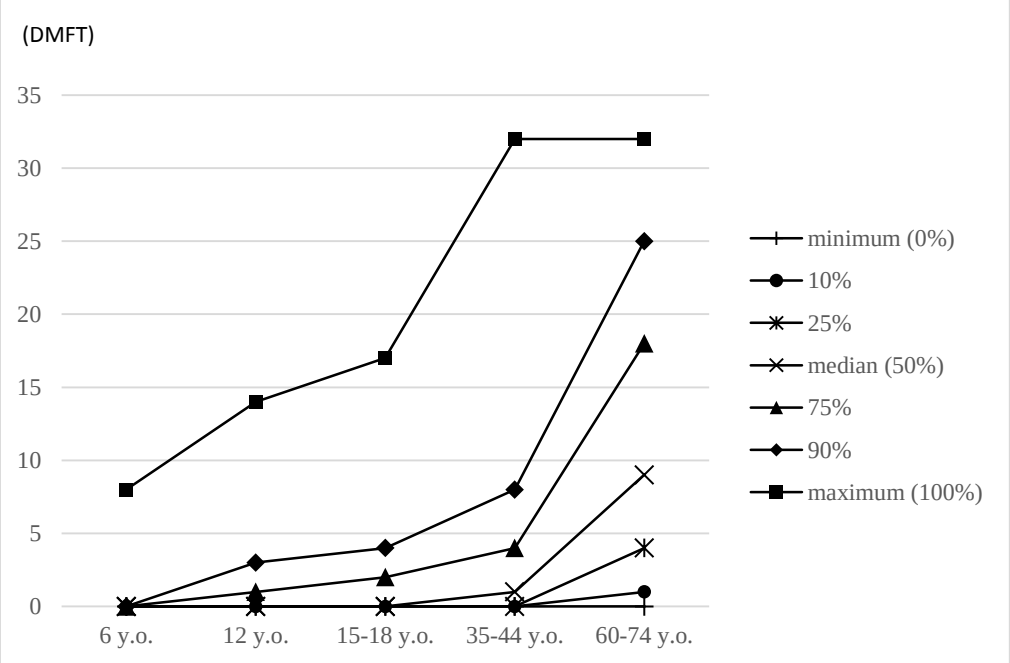


Figure 12. Percentile distribution of DMFT score

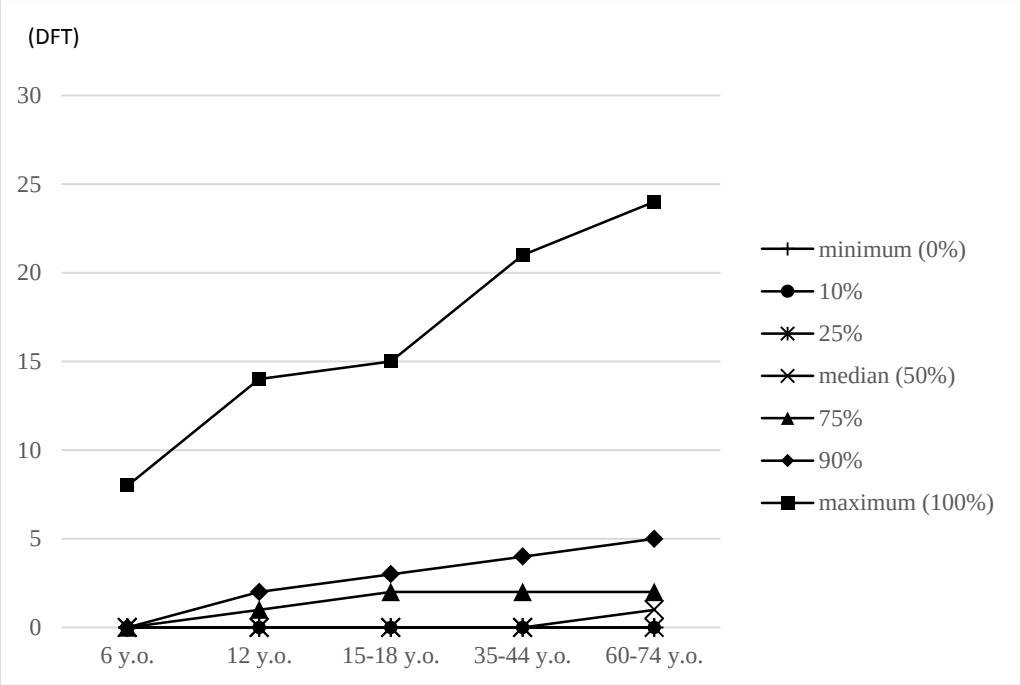


Figure 13. Percentile distribution of DFT score

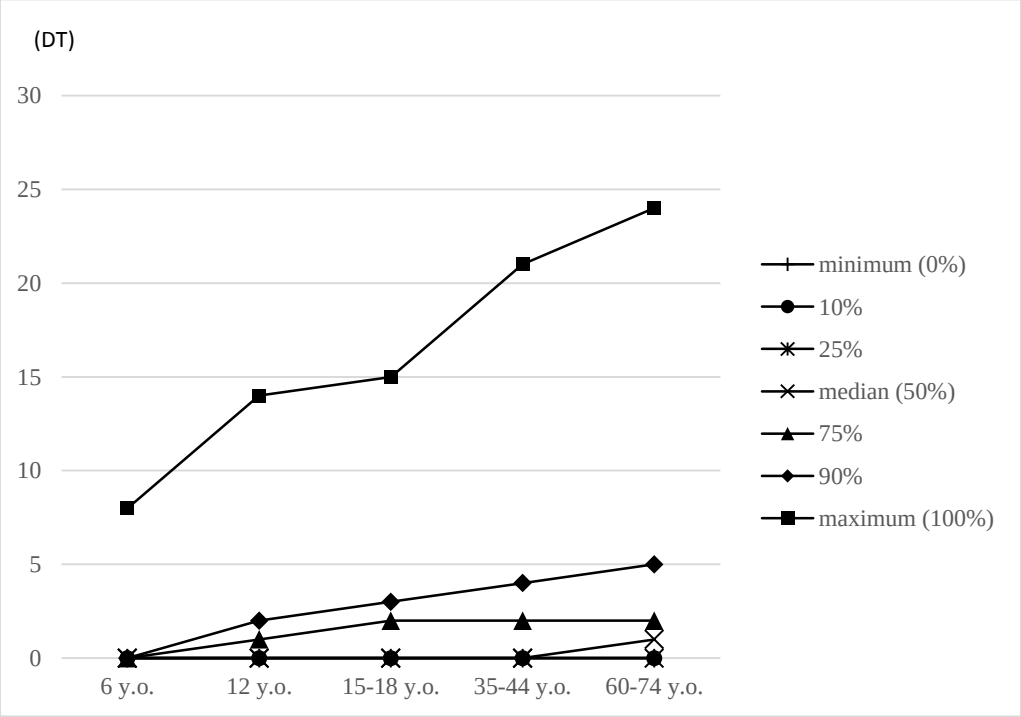


Figure 14. Percentile distribution of DT score

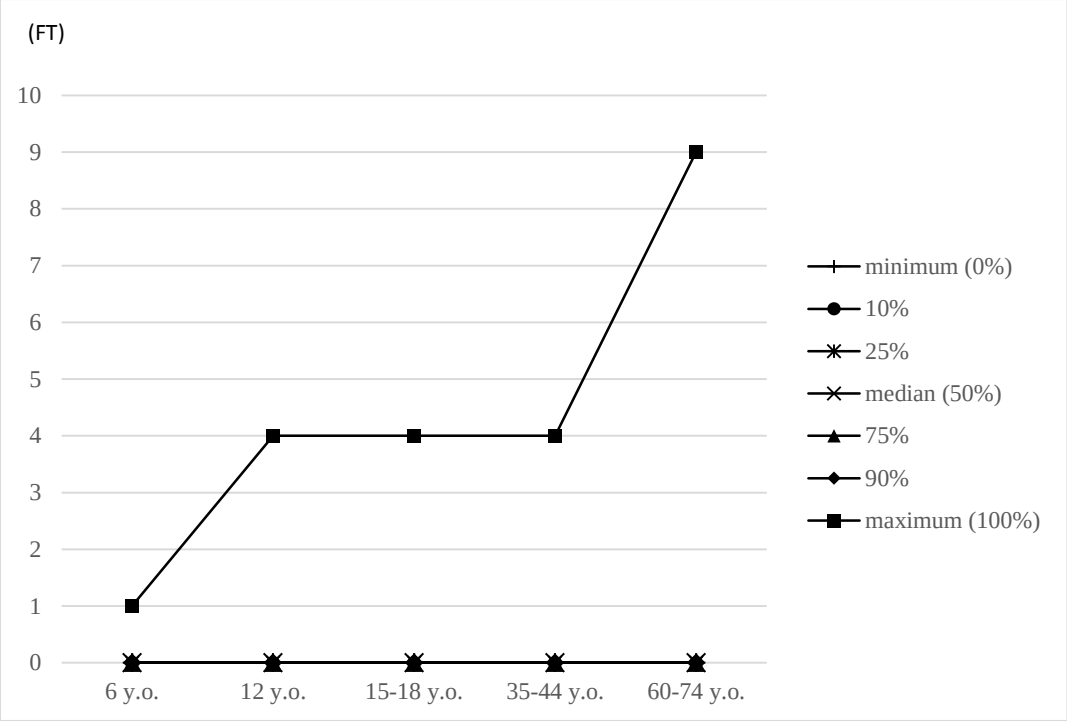


Figure 15. Percentile distribution of FT score

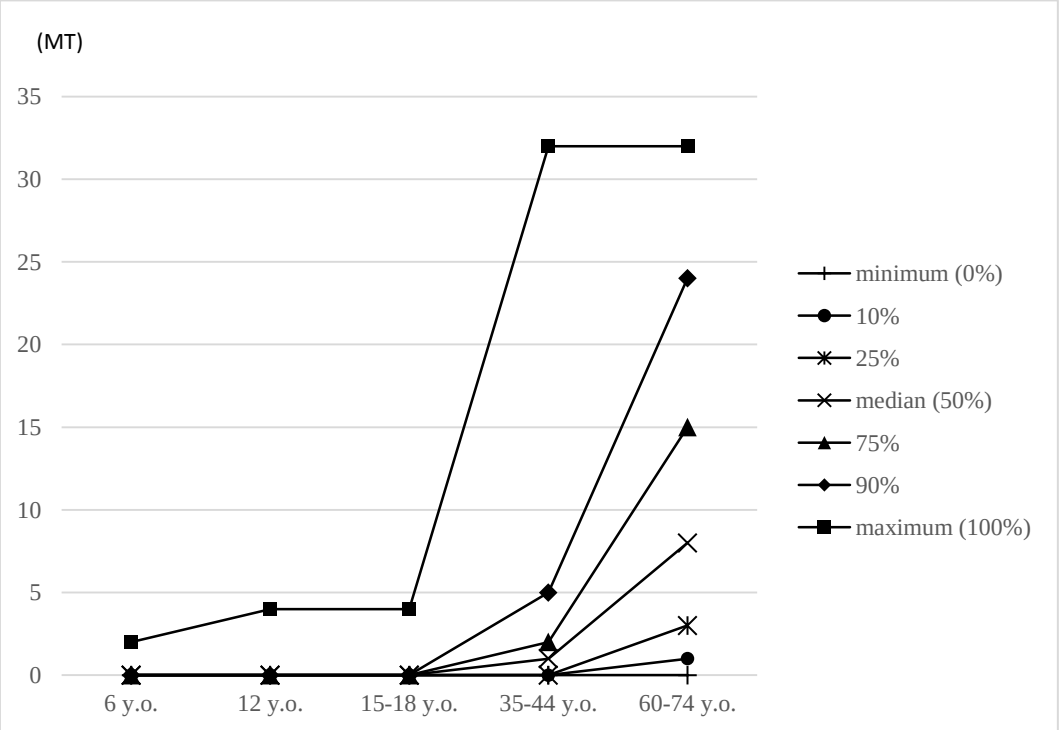


Figure 16. Percentile distribution of MT score

Figure 17 shows pattern difference of the percentage of DMFT scores by tooth type among all of the age groups. It can be observed that the similar pattern was found for the maxillary and mandibular teeth. The percentage of carious maxillary and mandibular anterior teeth was low, and conversely for posterior teeth. First and second molar were found to have the highest percentage of teeth experiencing caries. However, surprising finding was observed for the age group of 6 years old who have a high caries experience percentage for left mandibular second premolar. This finding indicates that caries were still found even in the period of early teeth eruption. This unfortunate event will certainly need an appropriate attention to prevent the incidence of decayed teeth.

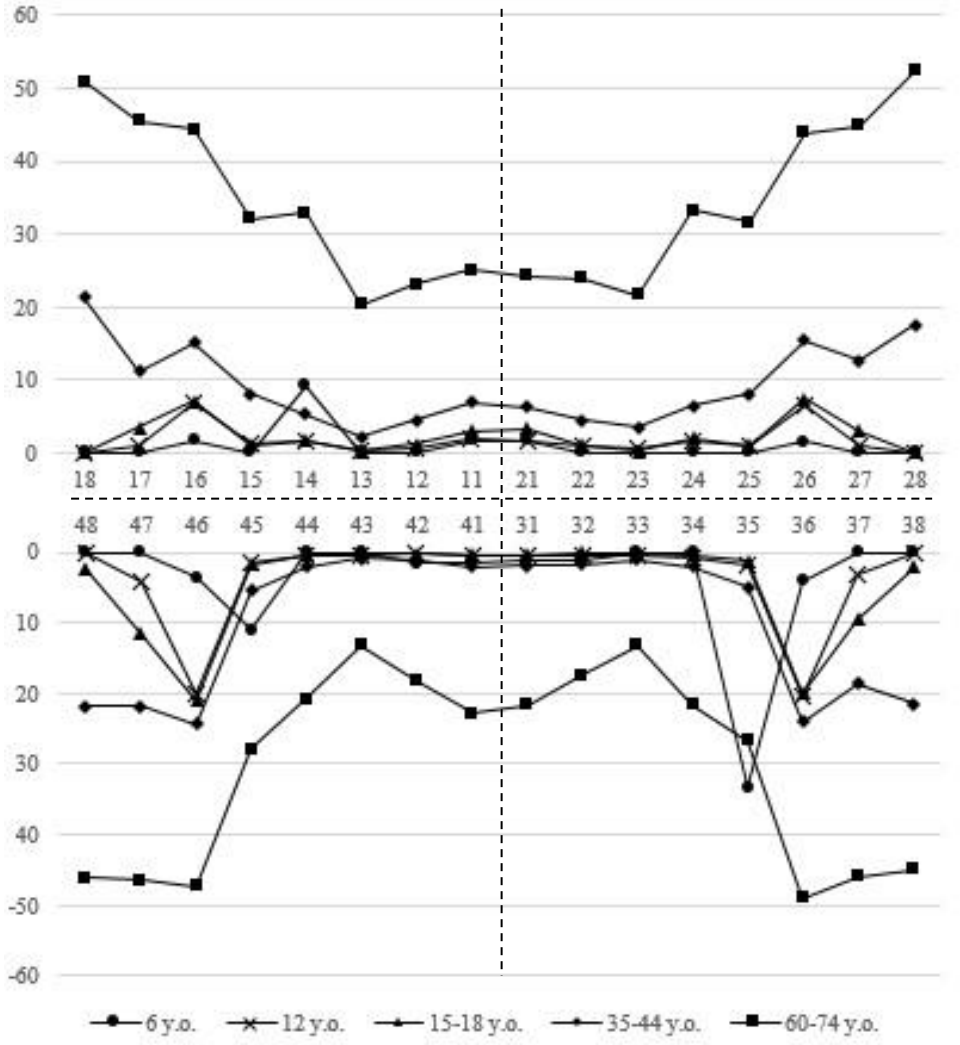


Figure 17. Percentage of DMFT scores by tooth type

4.2. Present permanent teeth and Denture wearing

The mean of present permanent teeth (PT) of all the age groups were shown in Figure 18. The highest mean PT was found on the male subjects of 35-44 years old age group (30 teeth). However, within the age group of 60-74 years old, it was found that the mean PT was similar between males and females subjects at 21.9 and 21.1 teeth respectively. This finding indicates that within this age group, there were in average of 10 – 11 tooth loss. Furthermore, as shown in Figure 19, it can be observed that the mean PT among urban, peri-urban, and rural originated subjects was similar within each age group.

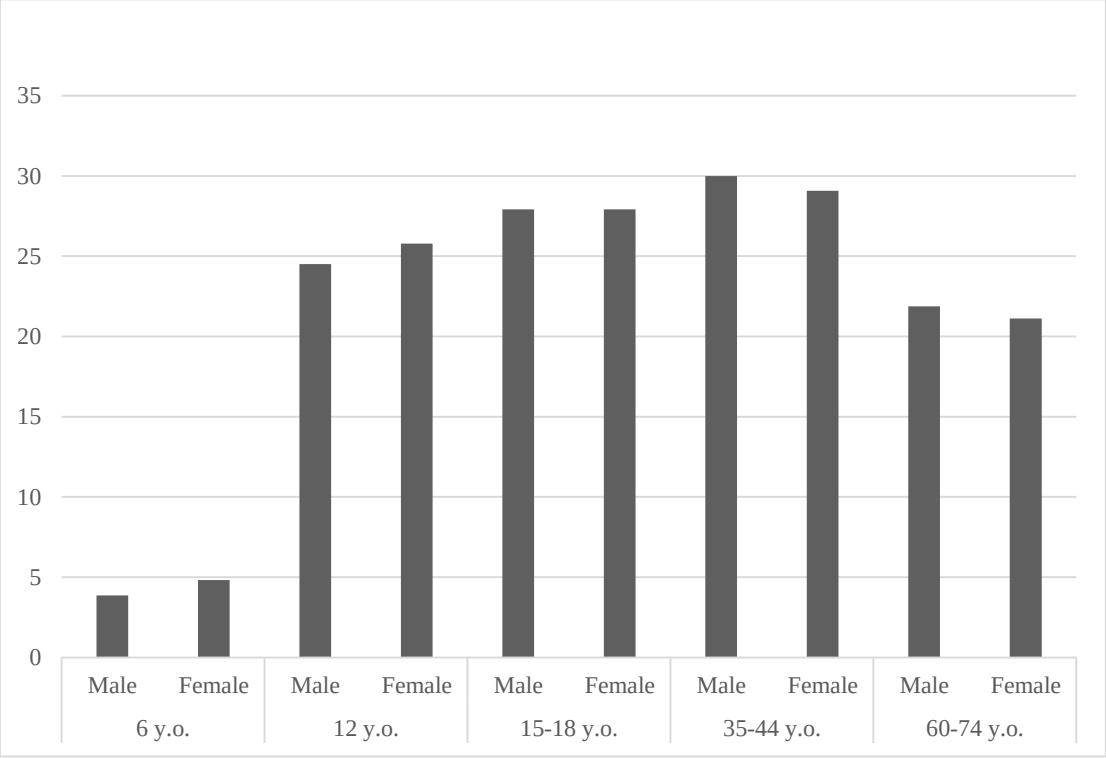


Figure 18. Mean of present teeth by age group and sex

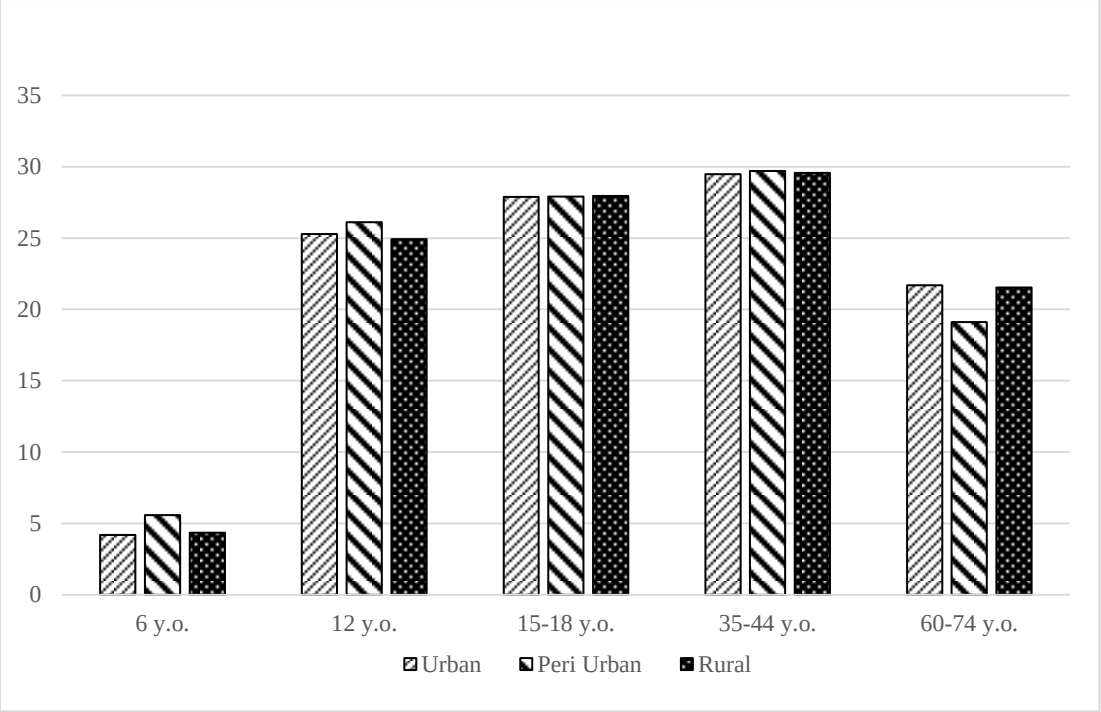


Figure 19. Mean of present teeth by age group and urbanity

In regard with permanent teeth present (Figure 20), the age group of 15-18 and 35-44 years old have a similar pattern. Most of the subjects within these groups were still having ≥ 28 teeth (87.4% and 83.7%, respectively). However, within the age group of 60-74 years old, the pattern was considerably different. The number of present teeth of 20-27 teeth was being the highest percentage for this age group (36.5%), with a considerable proportion of 1-9 and 10-19 teeth present. Furthermore, as shown in Figure 21, there were subjects within the age group of 35-44 years old who have no permanent teeth present. This finding is important in the need of raising the awareness to prevent total tooth loss at an early age which is not a favorable issue.

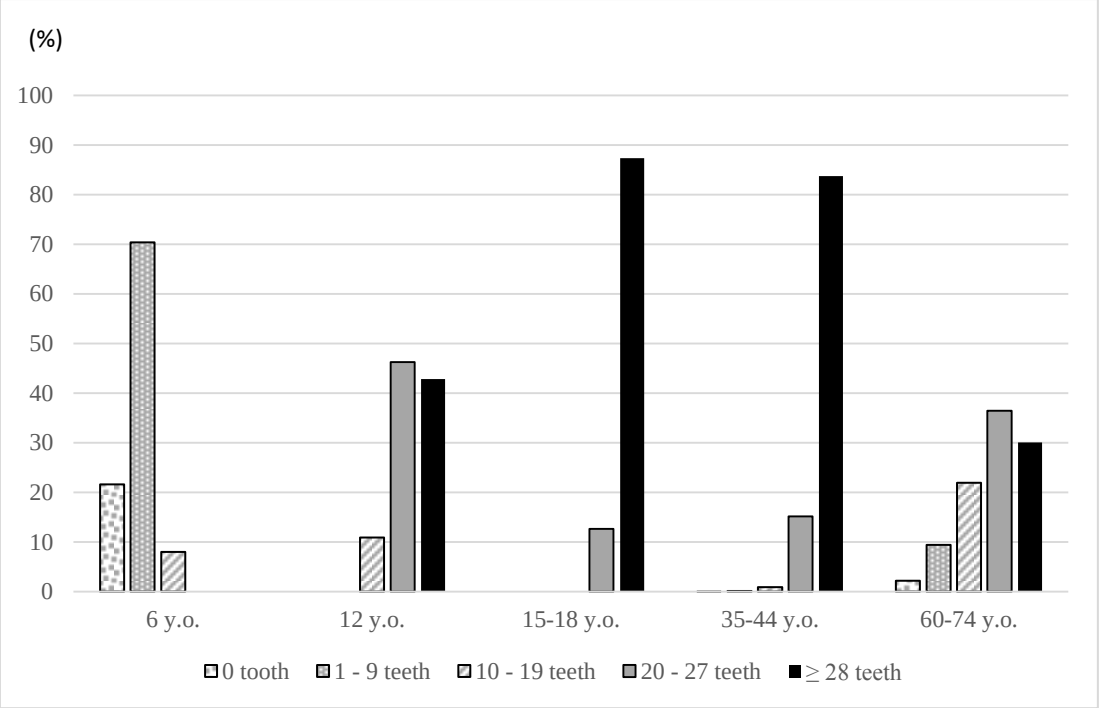


Figure 20. Mean percentage of present teeth category by age group

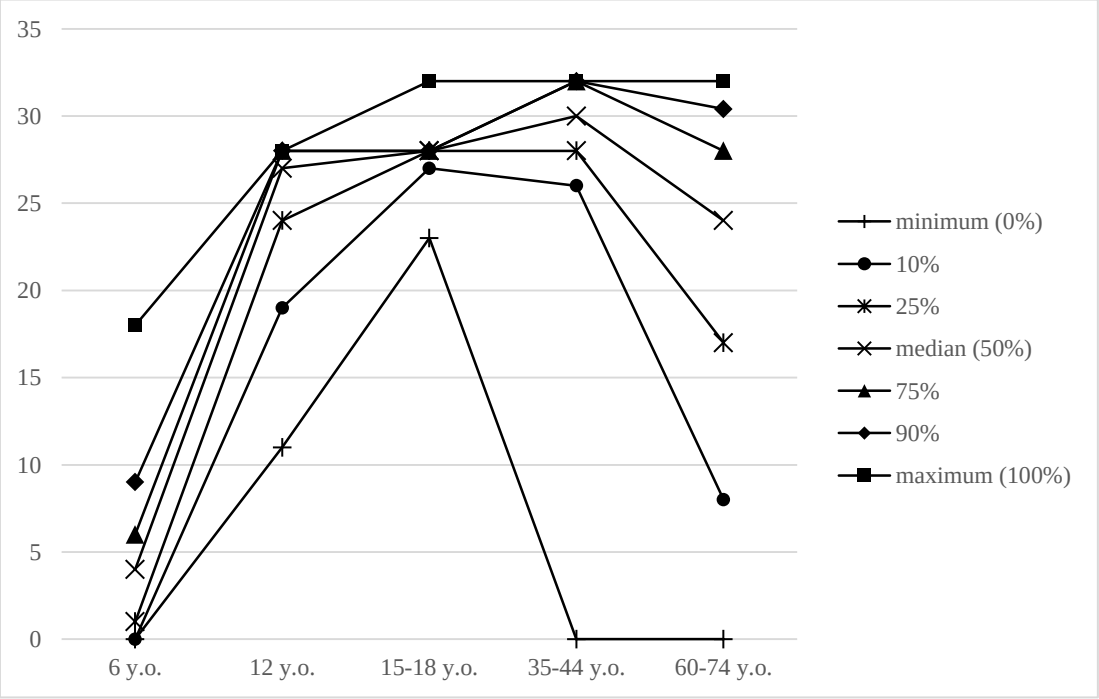


Figure 21. Percentile distribution of permanent teeth present

Figure 22 shows the percentage of denture need and wearing. The age group of 60-74 years old was the highest age group in need for dentures (96.14%). There were similar proportions for males and females among the age groups, except for the age group of 35-44 years old (42.77% and 59.58, respectively). However, the percentage of subjects wearing dentures was very low. In the total average, only 0.5% of the subjects in need of dentures were wearing it, with the male subjects aged 60-74 years old being the highest proportion (0.8%). This finding indicate that the awareness of the subjects involved in this survey was still very low in terms of rehabilitating their oral health and teeth function by wearing dentures according to their necessities.

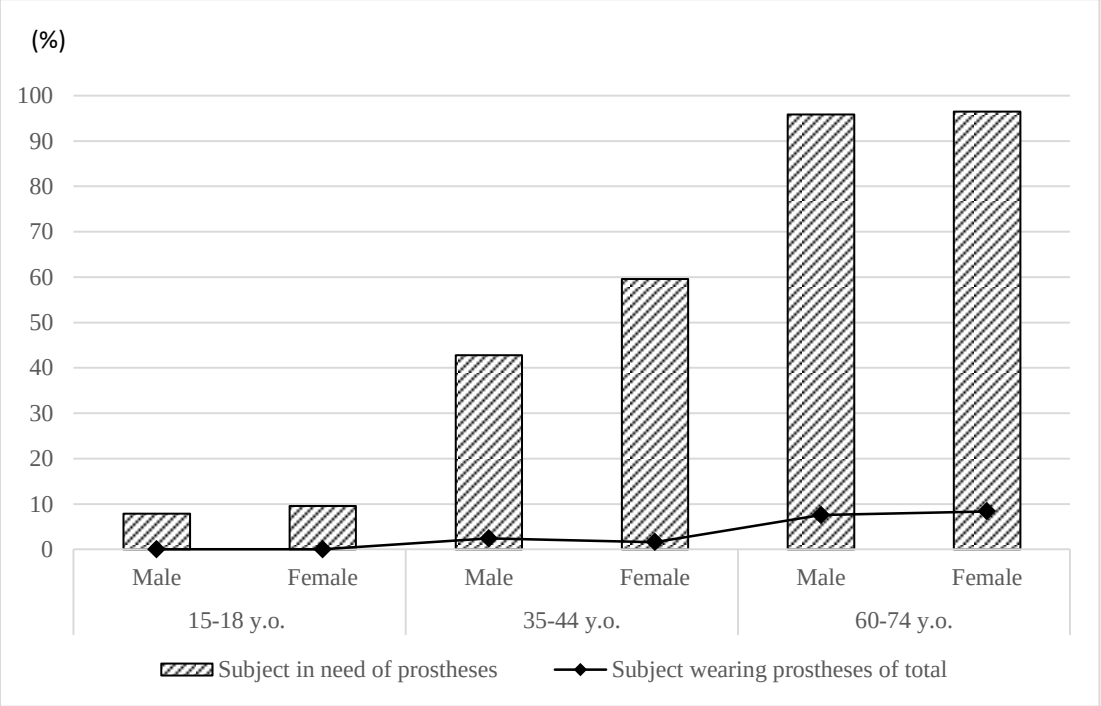


Figure 22. Percentage of denture needs and wearing

4.3. Periodontal status

Based on the data shown in Figure 23, it can be observed that less than 50% of all of the subjects involved in this survey were having a healthy gingival condition. The highest percentage (77.17%) of gingival bleeding was found in the male subjects within the age group of 60-74 years old. The pattern between genders was almost similar within all of the age groups. Furthermore, based on the highest score of periodontal condition, the age group of 60-74 years old has the most severe periodontal condition. This age group was the only age group which has some proportion of the subjects with deep pocket and gingival bleeding (4.1%). Moreover, within the age group of 15-18 years old, it was found that 2.5% of the subjects were suffering from shallow pocket and gingival bleeding. On the other hand, none of the groups have a proportion of subjects with deep pocket and no gingival bleeding (Figure 24). The proportional pattern of subjects with shallow pocket and gingival bleeding between the age groups of 35-44 and 60-74 years old was similar, with female subjects have a smaller proportion than males (Figure 25).

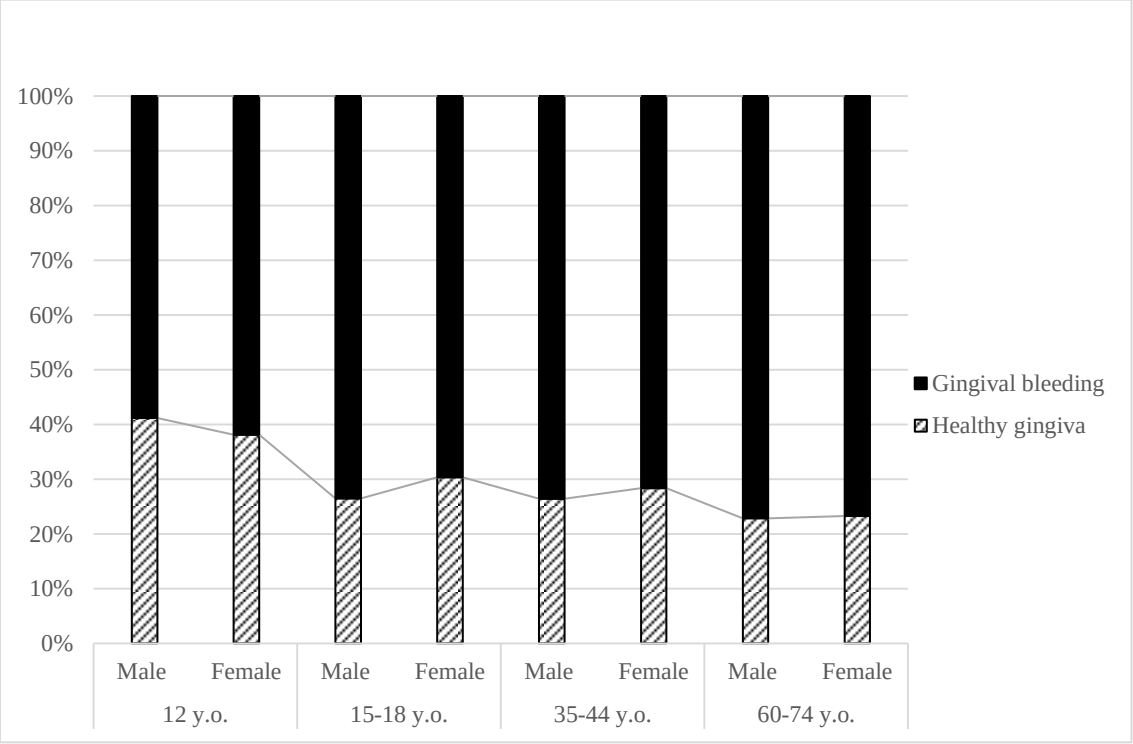


Figure 23. Proportions of subjects with gingival bleeding

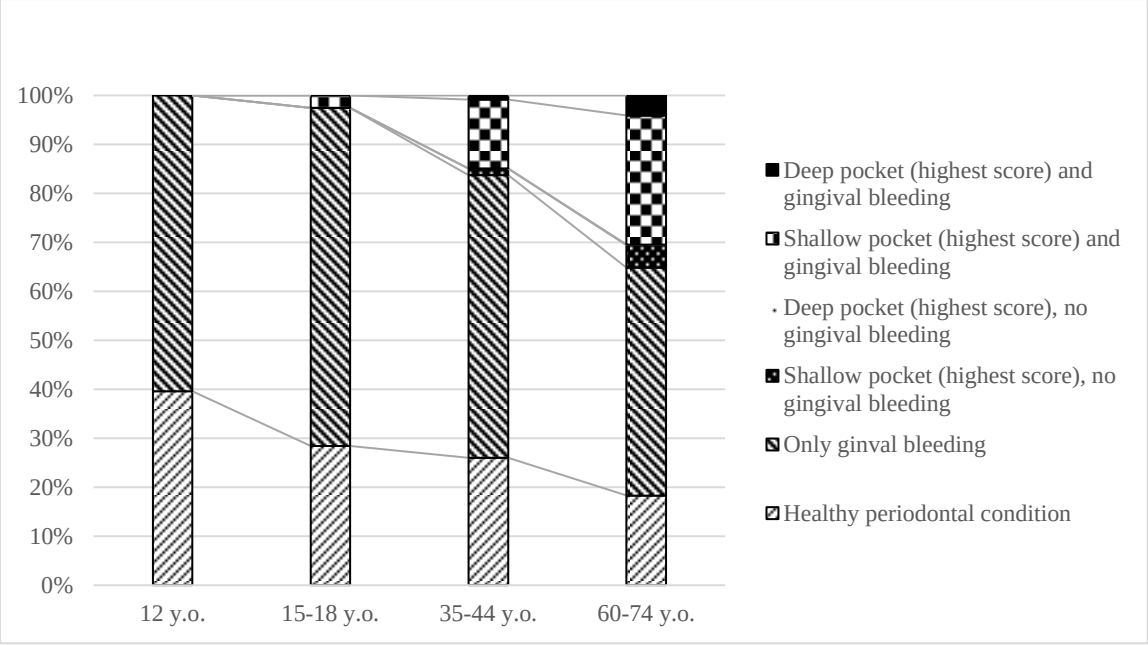


Figure 24. Proportions of subjects' periodontal conditions

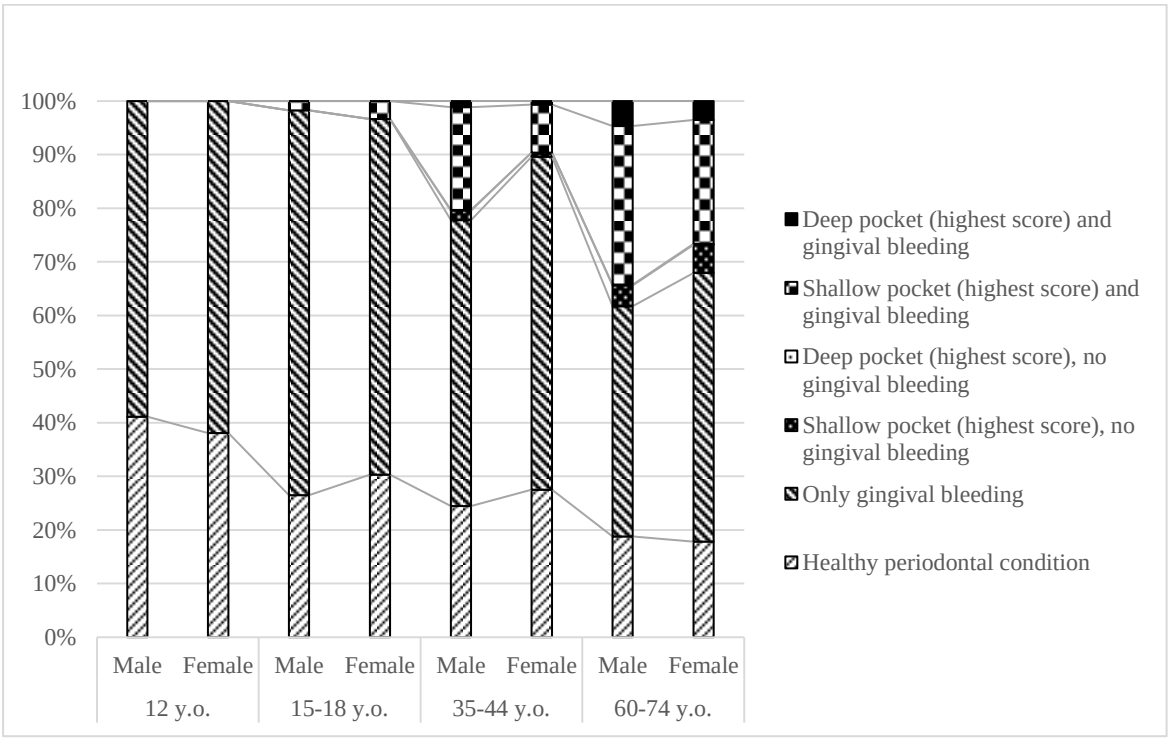


Figure 25. Proportions of subjects' periodontal conditions by sex

Figure 26 shows the proportion of teeth with gingival bleeding (bleeding on probing). The age group of 60-74 year old has the highest proportion of teeth with bleeding on probing (29.3%). This finding indicates that within the average number of 22 teeth present, there will be approximately 6 teeth with bleeding on probing found in the age group of 60-74 years old. Furth more, the proportions of teeth with bleeding on probing were slightly lessened in younger age groups. Furthermore, the pattern of gender differences within each groups were similar between males and females (Figure 27).

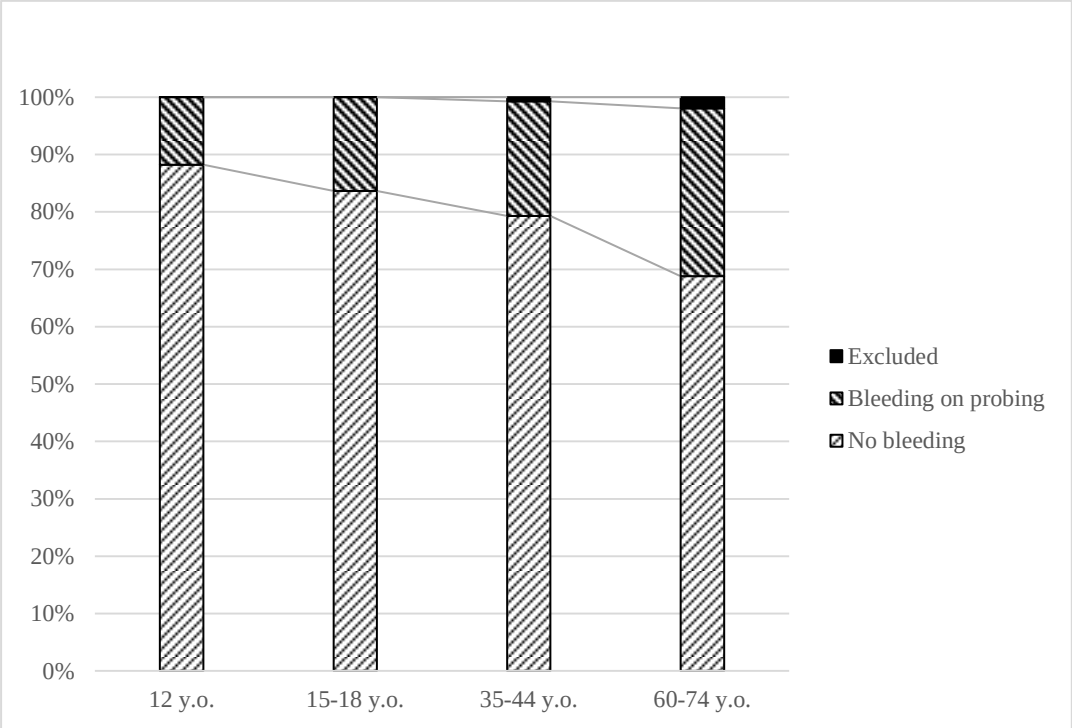


Figure 26. Proportions of teeth with bleeding on probing

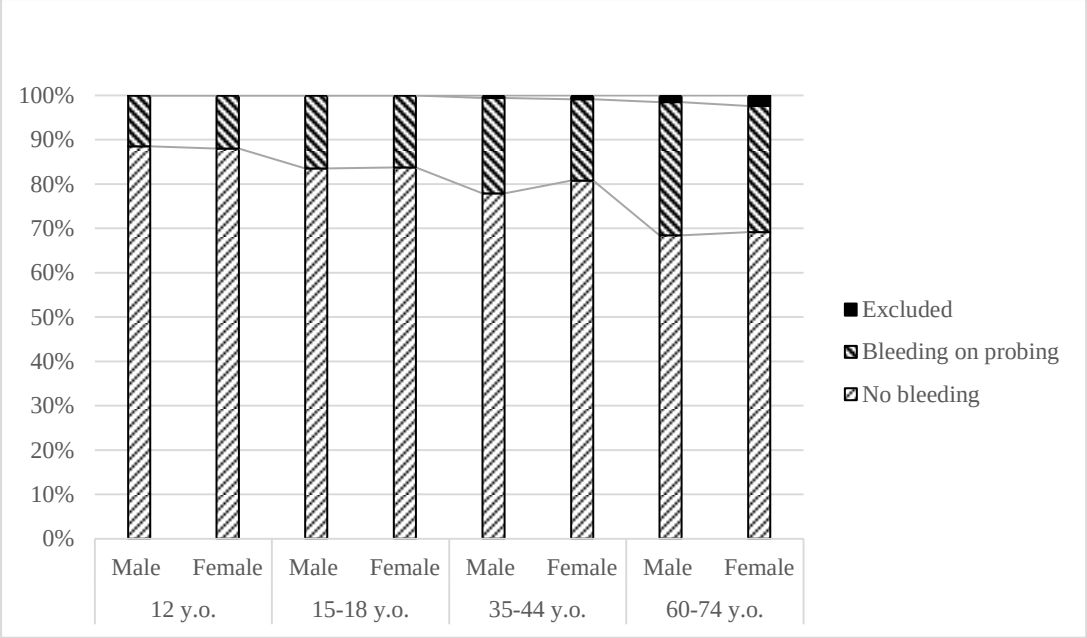


Figure 27. Proportions of teeth with bleeding on probing by sex

Figure 28 shows the proportion of teeth with periodontal pockets. The age group of 60-74 years old has the highest proportion of teeth with shallow pocket (5.5%). Moreover, this age group was also the age group who has the highest percentage of teeth with deep periodontal pockets (0.34%). Furth more, the proportions of teeth with shallow pocket were slightly lessened in younger age groups. The proportional pattern of teeth with shallow and deep periodontal pockets between the age groups of 35-44 and 60-74 years old was similar, with female subjects having smaller proportions than males (Figure 29).

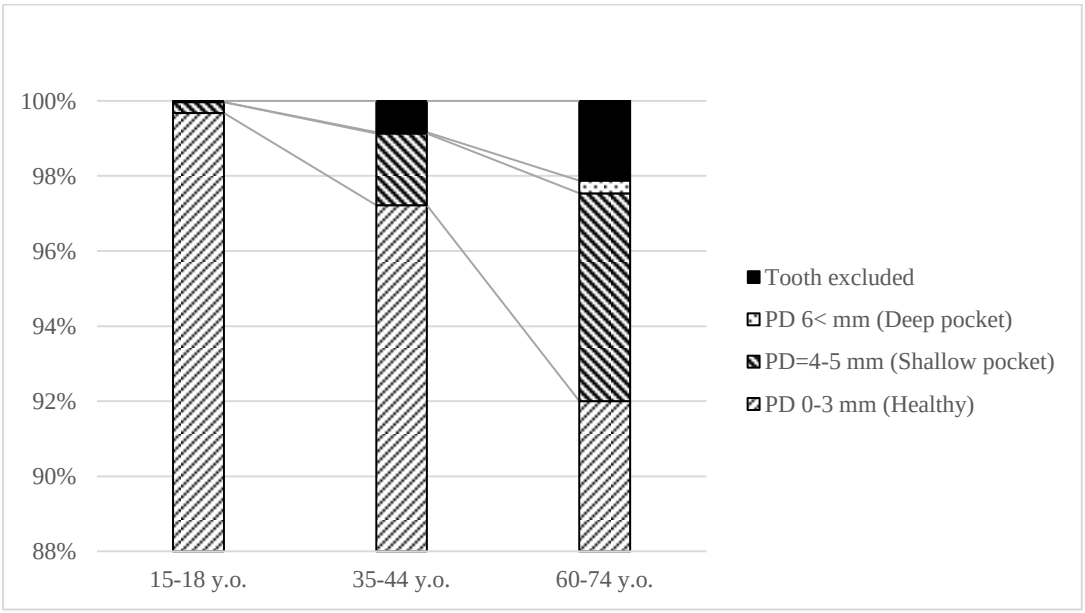


Figure 28. Proportions of teeth with periodontal pockets

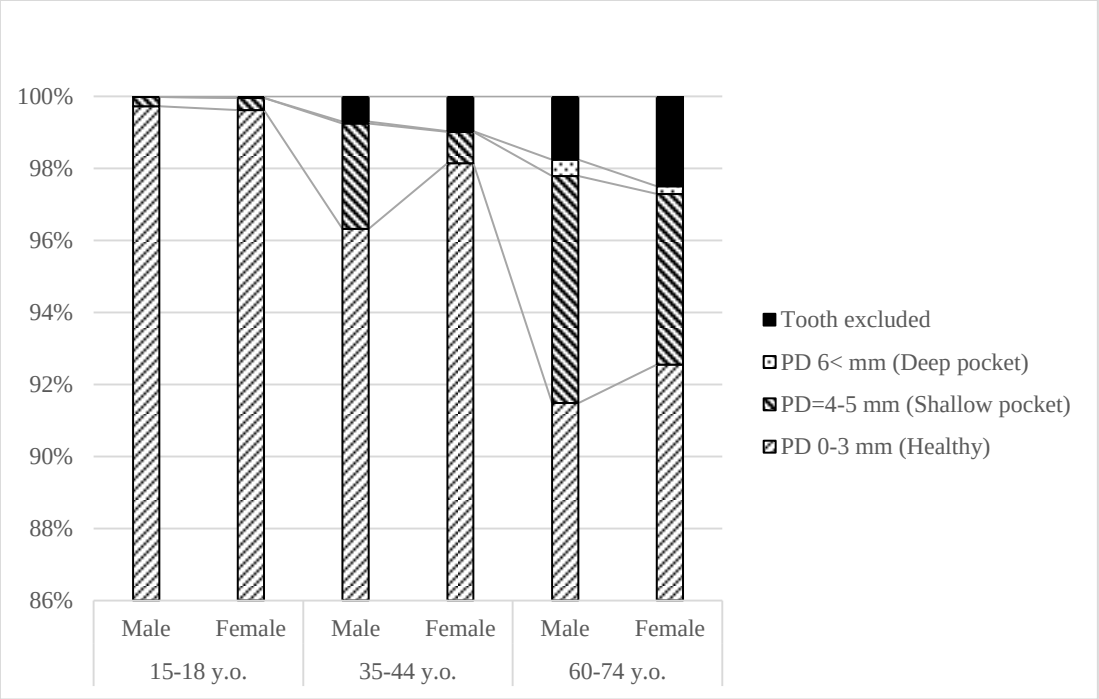


Figure 29. Proportions of teeth with periodontal pockets by sex

4.4. Oral mucosa abnormalities

Among the subjects involved in the survey, there were some subjects indicated to have oral cancer by the examiners. This condition was found in the age group of 6, 12 and 60-74 years old (Figure 30). Furthermore, the most prevalent oral mucosa abnormalities found was ulceration, with age group of 15-18 years old having the highest number among all the age groups. Other oral mucosa abnormalities found were leukoplakia, abscess and other condition (unspecified). The oral cancer finding should raise the awareness for the importance of oral health, particularly cancer early detection measures to prevent any life-threatening conditions.

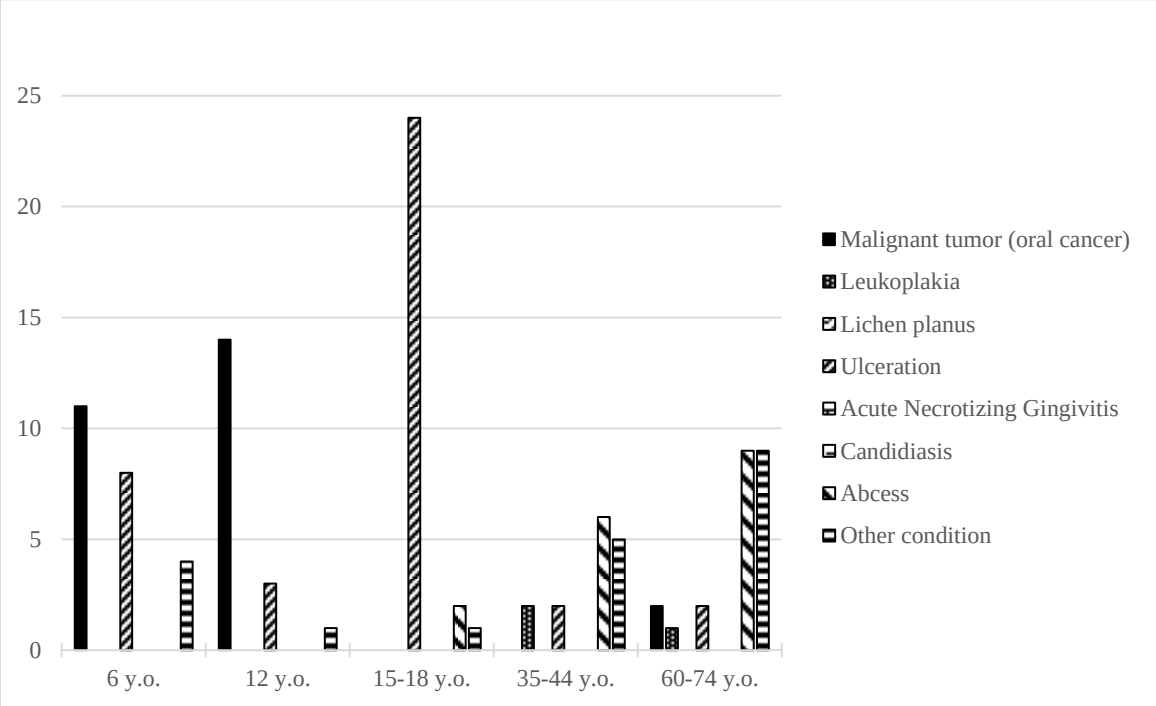


Figure 30. Oral mucosa abnormalities

4.5. Tooth-brushing frequency

Figure 31 shows the frequency of tooth-brushing by the subjects involved in the survey. Most of the subjects stated that they have brushed their teeth at least once daily and two or more times a day. However, there were some subjects who stated that they have only brushed their teeth 2-3 times a month, or once a week, or 2-6 times a week. Moreover, there were also still some subjects from the age group of 6, 12, 35-44, and 60-74 years old stated that they never brushed their teeth. These findings indicate that oral health education will still be needed in order to habituate a proper tooth-brushing behavior with a right method, frequency, and appropriate timings.

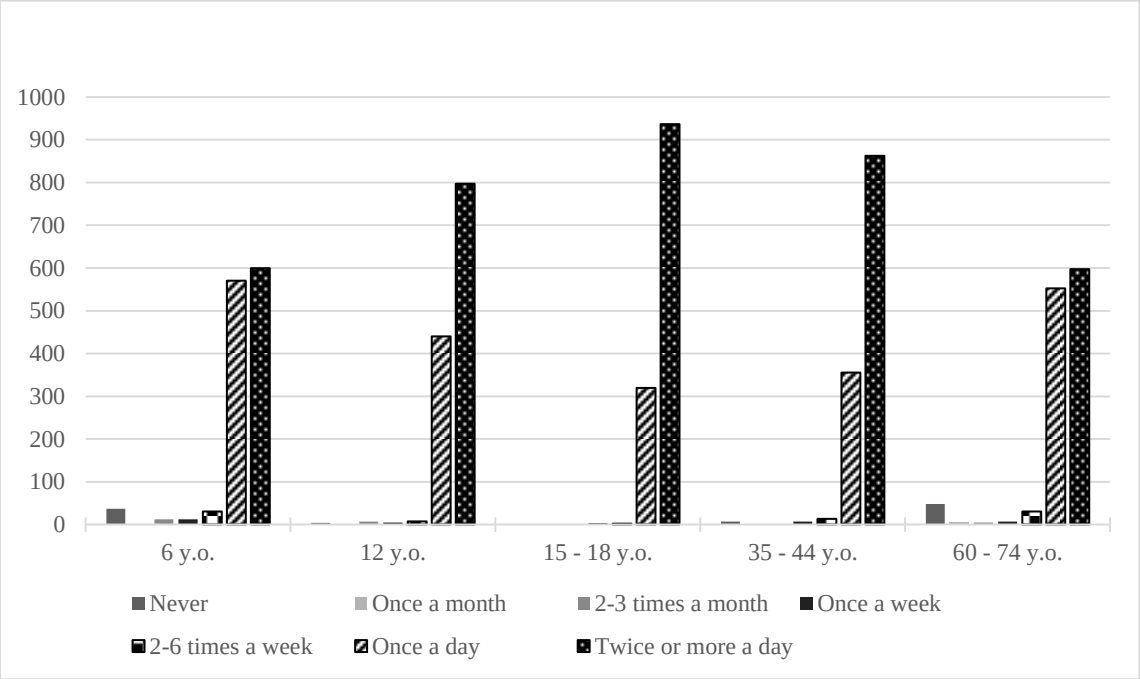


Figure 31. Tooth-brushing frequency

4.6. Cigarette smoking behavior

Tobacco use, particularly cigarette smoking, was scientifically proven to be a risk factor for general and oral diseases. As can be observed on Figure 32, most of the subjects involved in this survey stated that they are ‘never smokers’. However, there were also some subjects who were daily smokers in the age group of 35-44 and 60-74 years old. Moreover, surprisingly there were some subjects from the age group of 15-18 years old, who stated that they were smoking seldom, or several times a month, or once a week, or even several times a week. These findings urge the need of smoking cessation action and strengthening the control for tobacco use in order to save the younger generation from this bad habit, which eventually will prevent them from general as well as oral diseases.

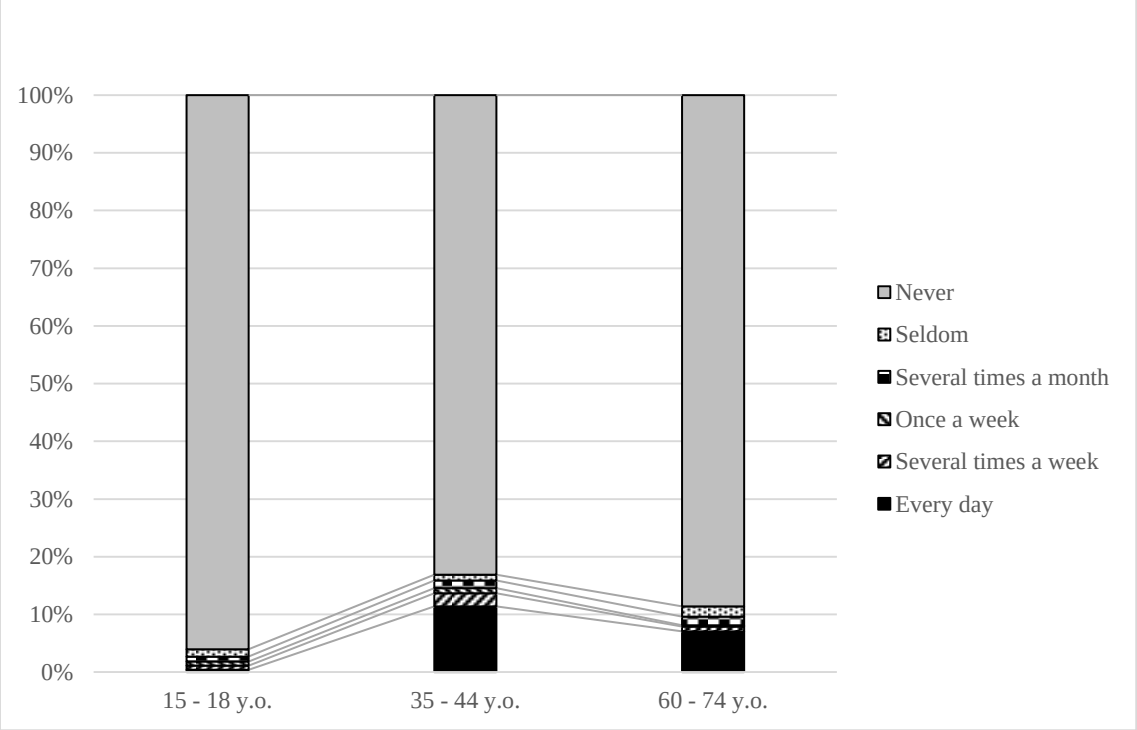


Figure 32. Cigarette smoking frequency

4.7. Areca/betel nut chewing

Another risk factor which has also been scientifically proven to be related with oral cancer was areca/betel nut chewing. Areca/betel nut chewing habit was commonly found within some traditional ethnics, particularly in South-east Asian countries. Figure 33 shows the frequency of this activity. It can be observed that within the adult age group (35-44 and 60-74 years old), some part of the population were having a daily habitual of this activity. Surprisingly, there were also some subjects form the younger generation (15-18 years old) who has been practicing this habit. These findings indicate that oral health education particularly related with healthy oral health behavior, need to be started at an early age, in order to prevent the incidence of lifestyle-induced oral cancer. Since this habit was also partly institutionalized with some cultural beliefs, a considerable grounded approach might be needed in ensuring the effectiveness of the education action.

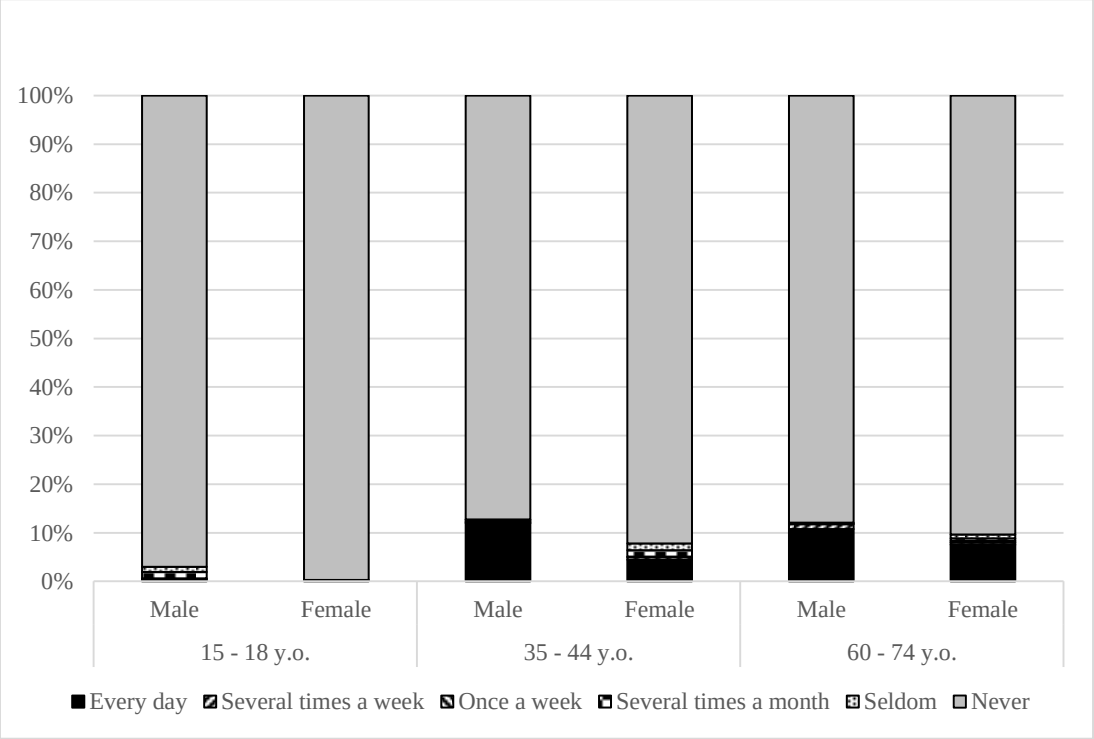


Figure 33. Areca/betel nut chewing frequency

4.8. Food/sugar consumption

Figure 34 to 42 shows the sugar consumption based on the type of foods and beverages consumed by the subjects involved in this survey. Within the types of daily beverages such as tea, coffee, as well as milk (particularly for children and adolescence), as shown in Figure 40 to 42, it can be observed that approximately 50% of the subjects among all of the age groups were consuming these beverages with sugar added. Furthermore, consumption of biscuit, lemonade and sweet pie were considerably high, with a frequency of at least several times a month (Figure 35, 39, and 43) for all of the age groups. Moreover, consumption of sugary chewing gum and sweet candy (Figure 37 and 38) were also considerably high, particularly within the age group of 6, 12 and 15-18 years old. However, as shown in Figure 34, the consumption of fresh fruit was high among all of the age groups; with none of the subjects aged 12 years old and only few of the subjects within the other age groups were stating that they were seldom/never consume fresh fruits. On the other hand, approximately 70% of the subjects within all of the age groups were seldom/never consuming jam/honey (Figure 36). Since excessive sugar consumption was one the main risk factor for dental caries as well as systemic disease such as diabetes, sugar consumption control needs to be included in the oral and general health promotive policy.

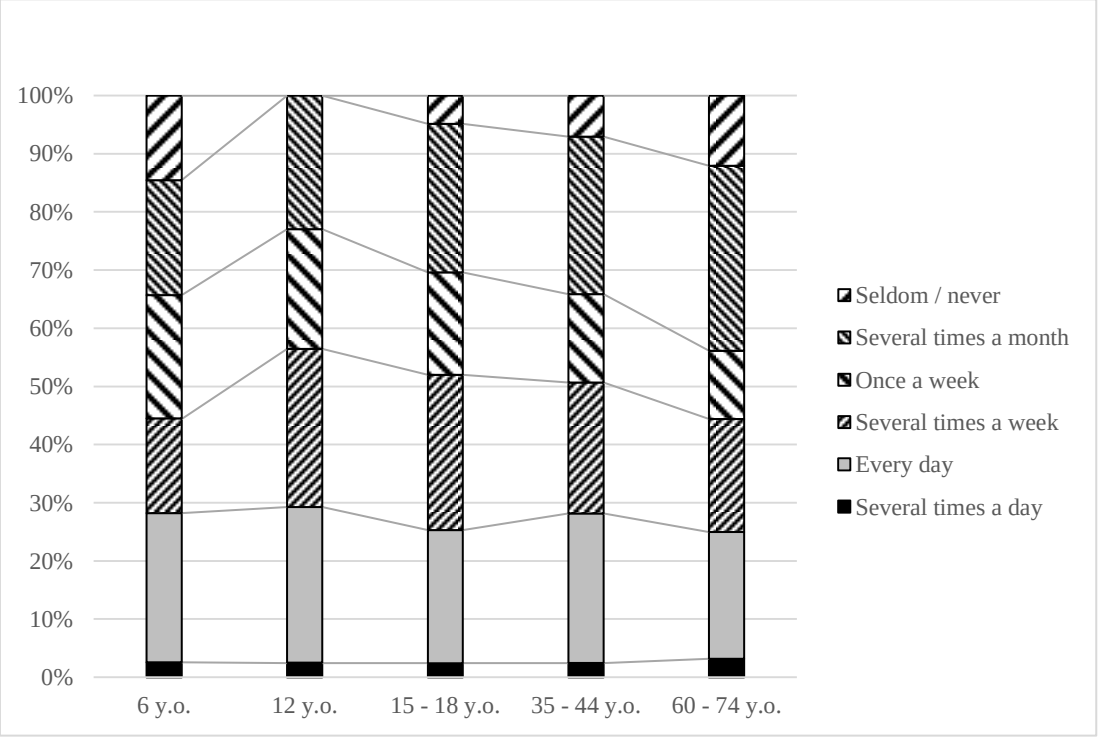


Figure 34. Fresh fruit consumption frequency

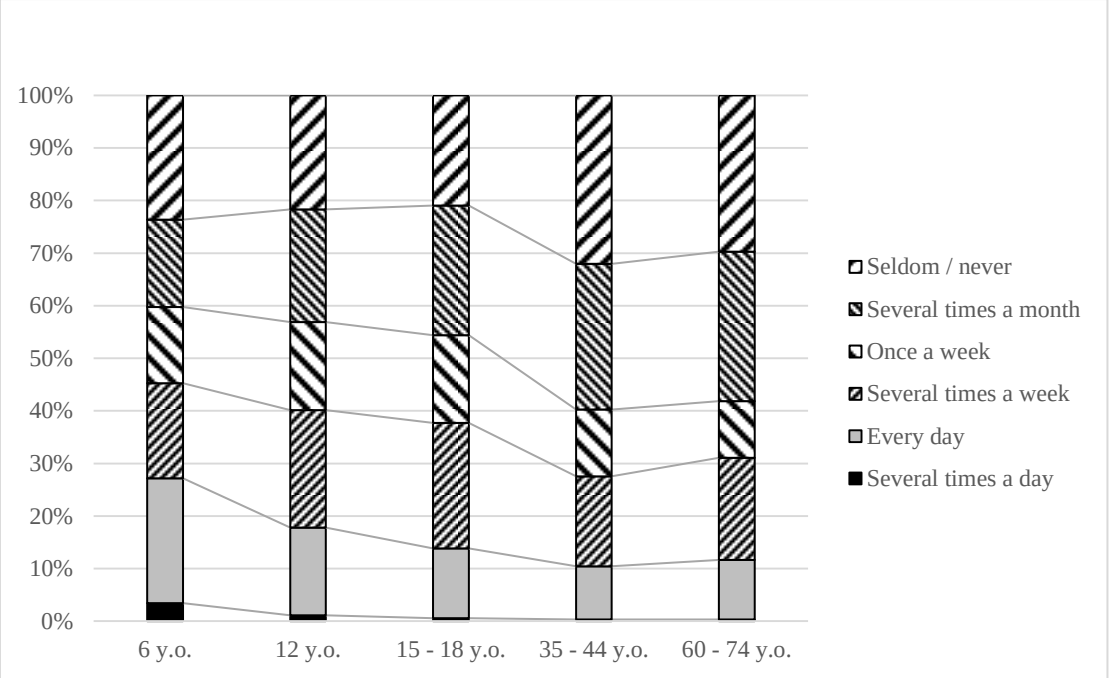


Figure 35. Biscuit consumption frequency

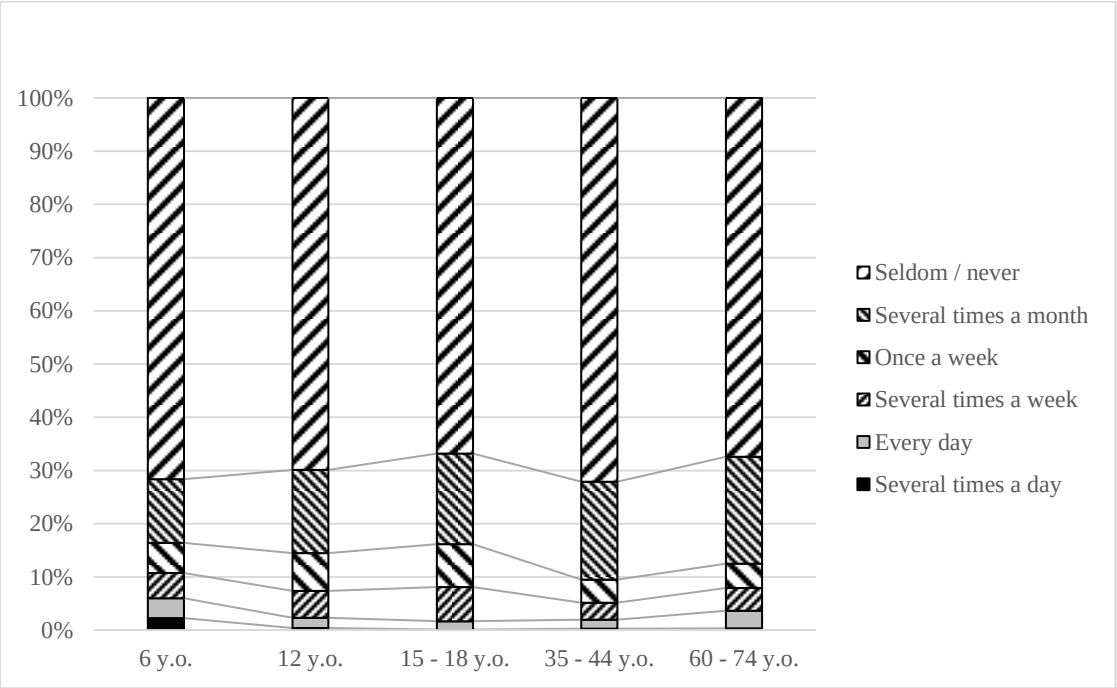


Figure 36. Jam/honey consumption frequency

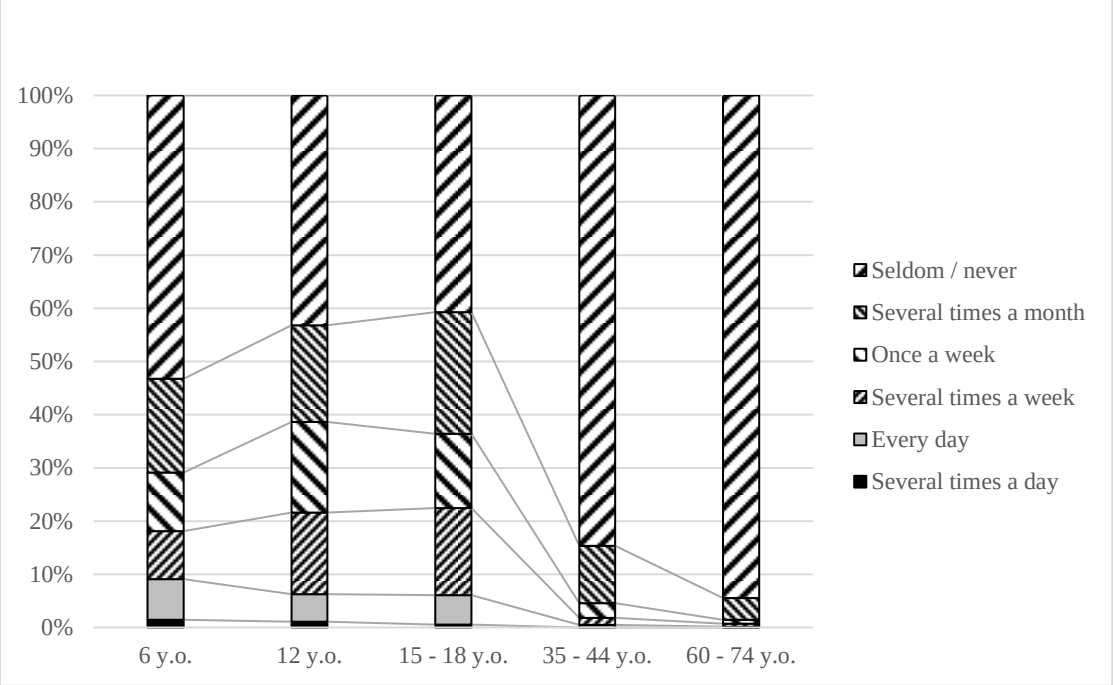


Figure 37. Sugary chewing gum consumption frequency

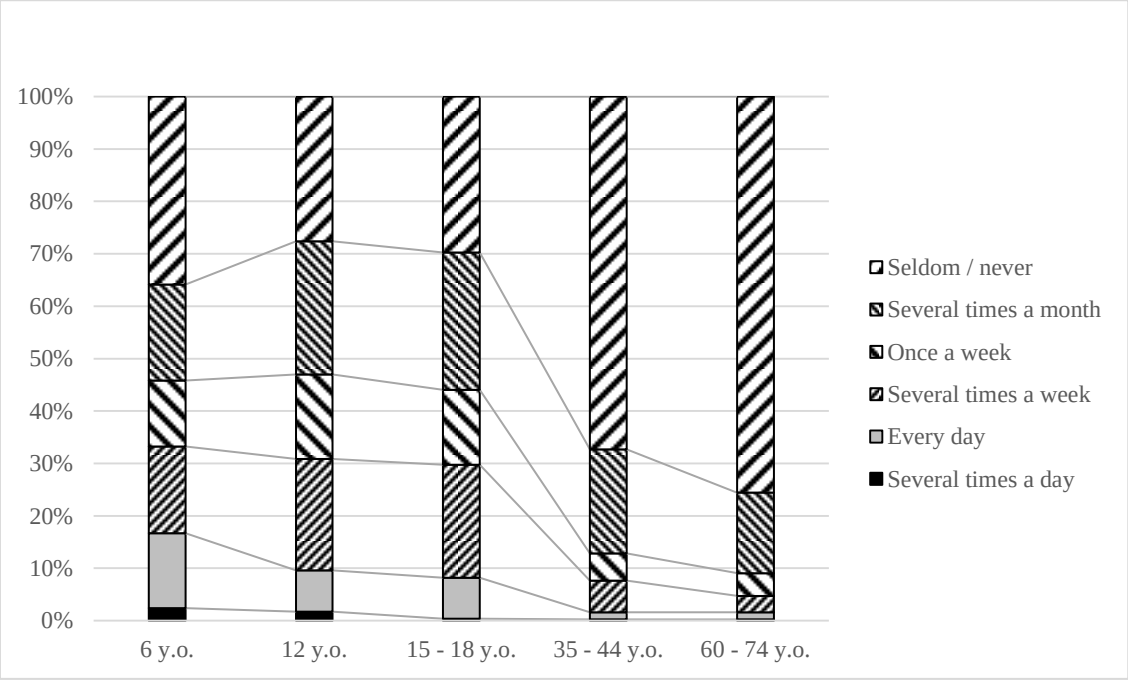


Figure 38. Sweet candy consumption frequency

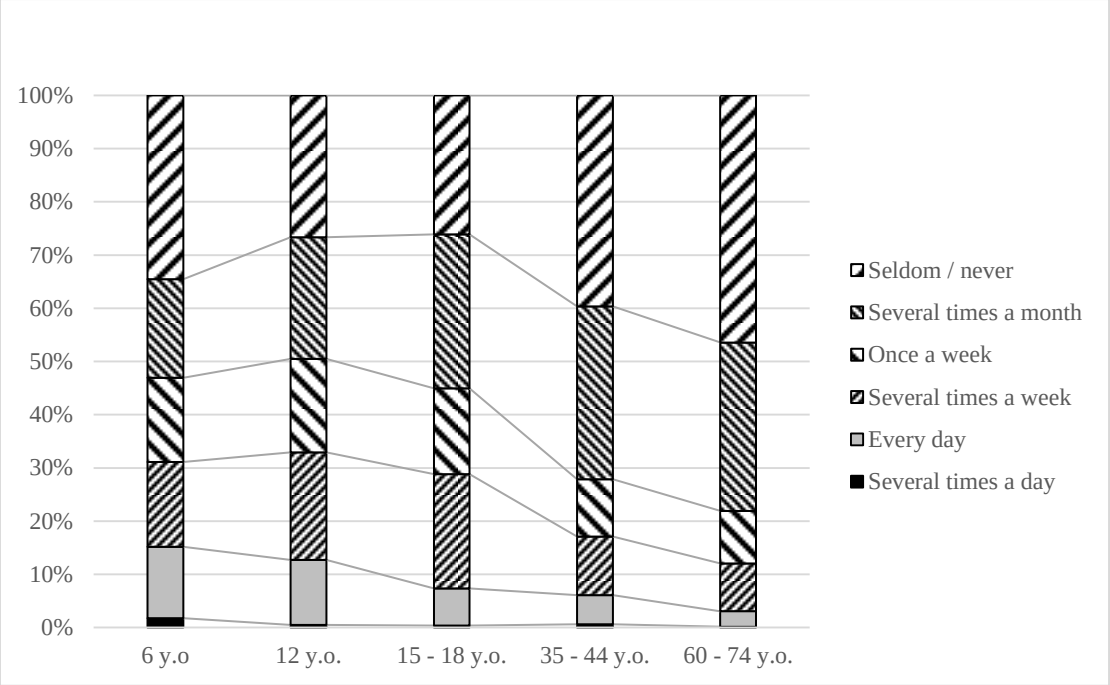


Figure 39. Lemonade/Coca-Cola consumption frequency

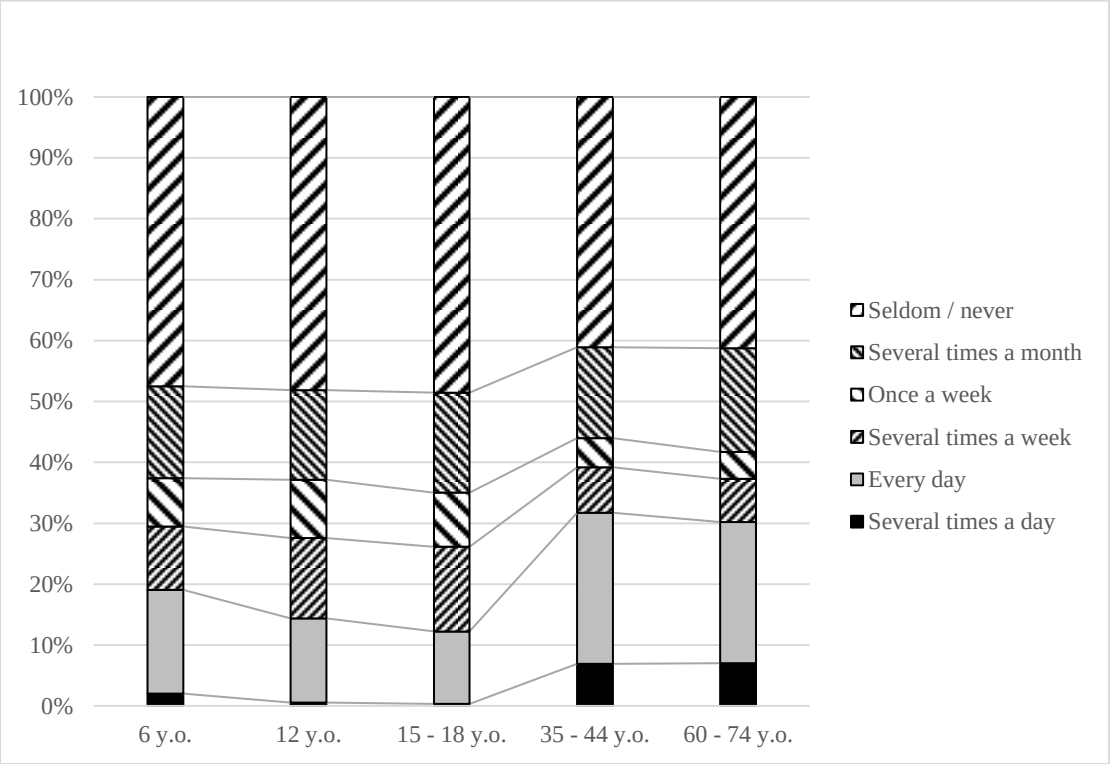


Figure 40. Tea with sugar consumption frequency

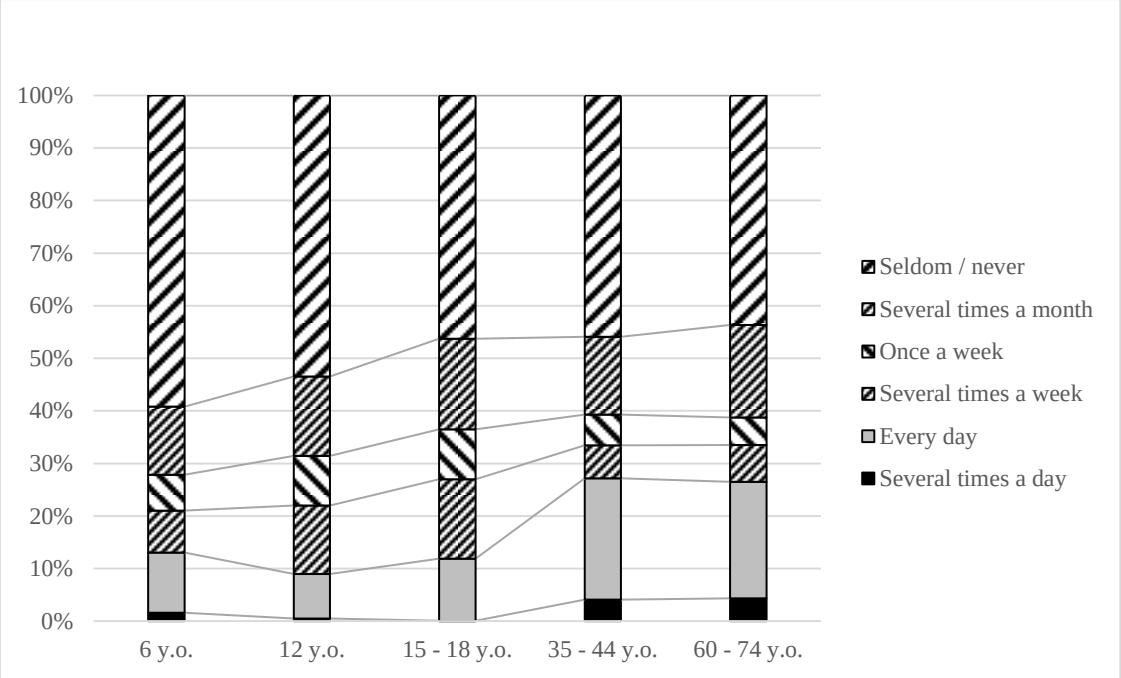


Figure 41. Coffee with sugar consumption frequency

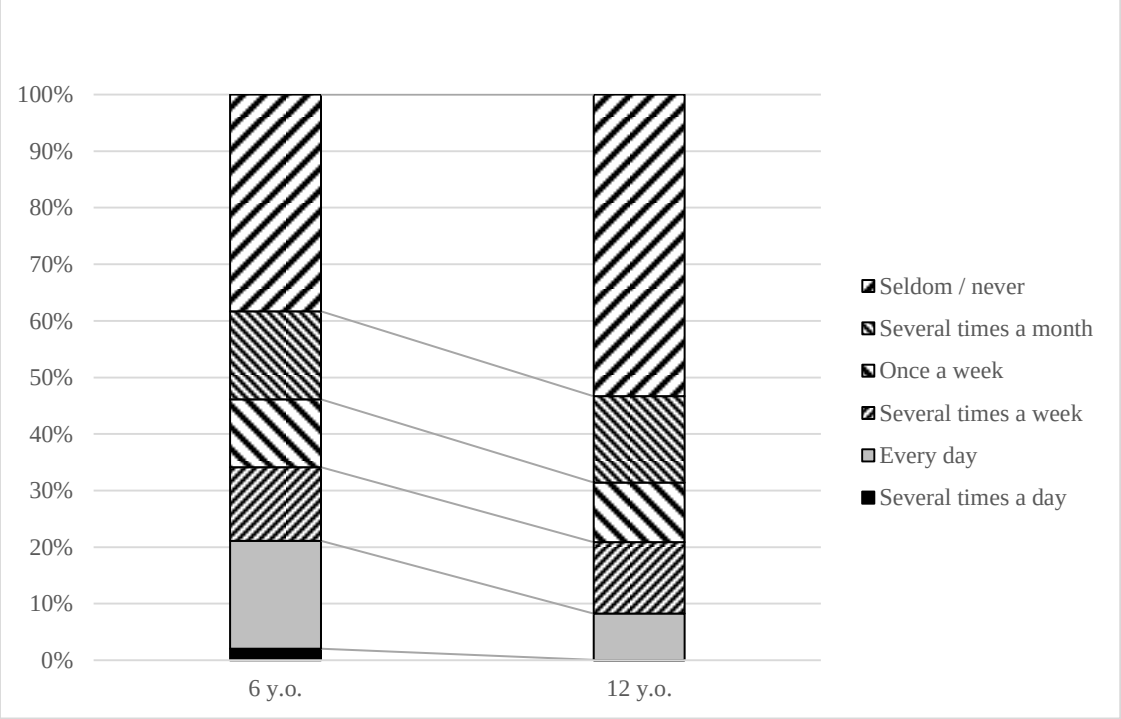


Figure 42. Milk with sugar consumption frequency

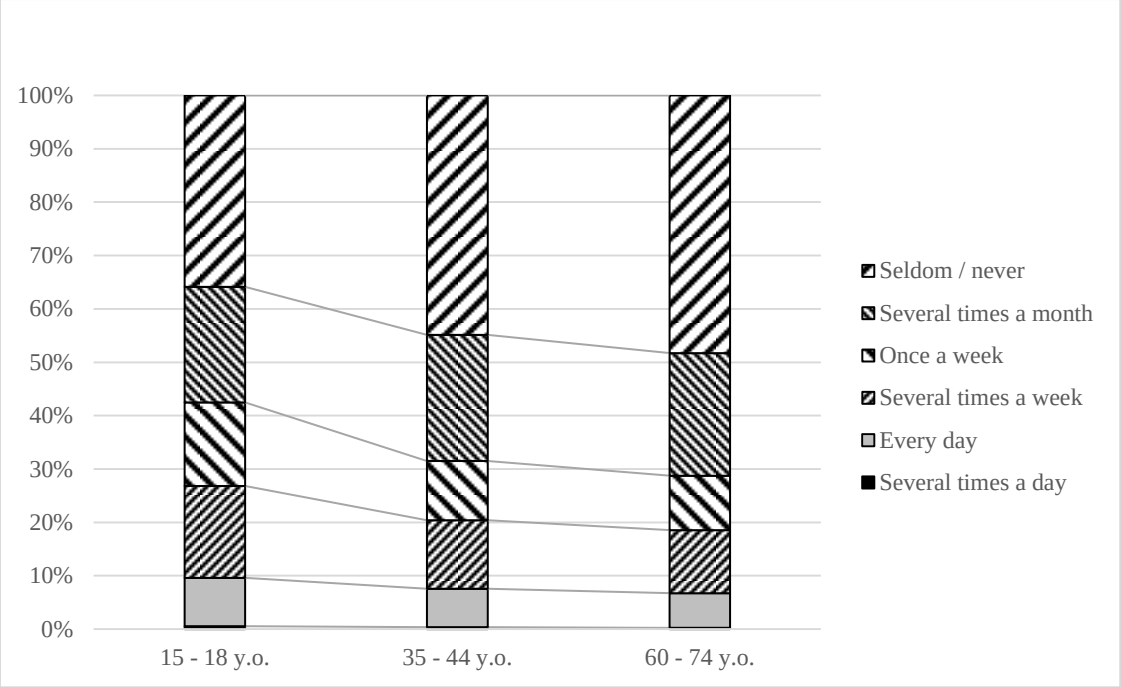


Figure 43. Sweet pie consumption frequency

5. SUMMARY

5.1. Dental caries

Dental caries on primary teeth

Only 15.8% of 6 years old group subjects were free of dental caries on their primary teeth. Most of the 6 years old group subjects (98.6%) and all of the mixed dentition age range have their carious primary teeth left untreated. Most of the primary teeth left within the mixed dentition age range were carious. The 12 years old subjects have caries on all of their primary central incisors. Only one child had a ft score of 3 in 6 years old, while no ft score was found in 12 years or 15-18 years old subjects.

Dental caries on mixed dentition

The 6 years old group subjects have the highest prevalence of caries (primary and permanent teeth). As early as the age of 6 years, the subjects have already got caries on their newly erupted permanent teeth, hence in the older age groups, they have double burden of caries on their primary as well as permanent teeth.

Dental caries on permanent teeth

More than 90% of all age groups have left their active carious permanent teeth caries untreated. The percentage of carious maxillary and mandibular anterior teeth was low, and conversely for posterior teeth. A higher percentage of caries experience was detected in left mandibular second premolar. First and second molar were found to have the highest percentage of caries experience.

The DMFT score of 6 years old group have a score of 0.14 and 0.11 for male and female respectively. The highest percentile for the age group of 6 years old was 8. There are also subjects from the age group of 6 years old who has an MT score of 2. Within the age group of 35-44 and 60-74 years old, there are some subjects who have maximum DMFT score and also maximum MT score (32 for the highest percentile). The proportion of missing (M) score was considerably higher than decayed (D) and filling (F) for adult age groups. The 60-74 years old group subjects have the highest prevalence of caries (93.6%) to be compared to the other age groups.

5.2. Periodontal status

Less than 50% of all of the subjects involved in this survey had a healthy gingival condition. The pattern between genders was almost similar within all of the age groups. The female subjects have a smaller proportion of periodontal disease than males.

The age group of 12 years old has the least severe periodontal condition while 60-74 years old was most severe. The proportion of teeth with shallow pocket was slightly lessened in younger age groups. It was found that 2.5% of the subjects were suffering from shallow pocket and gingival bleeding with the age group of 15-18 years old. The proportion pattern of subjects with shallow pocket and gingival bleeding between the age groups of 35-44 and 60-74 years old was similar. The highest percentage (77.2%) of gingival bleeding was found in the male subjects within the age group of 60-74 years old. The 60-74 years old group was the only age group which has some proportions of the subjects with deep pocket and gingival bleeding (4.1%). Within the age group of 60-74 years old, it was found that the highest proportion of teeth with shallow pocket (5.5%).

6. CONCLUSION AND RECOMMENDATIONS

This first National Oral Health Survey for Myanmar which was in urgent need while country is reforming and trying to get universal coverage in 2030 could provide oral health status of Myanmar population.

The study represented oral health status of the whole country drawing sample from all state and regions including urban and rural segments. The survey findings provided not only the update information on oral health statistics of Myanmar but also attention of other stakeholders including policy makers, health managers etc.

Further, it could also be a benchmark for future research in oral health. The data from this survey should be used for formulation of policy, strategic planning, and implementation of the both preventive and curative interventions. Then the ministry of health and other stakeholders should be involved to allocate limited resources of human, finance and infrastructure in an efficient and effective way.

Recommendations

- Regular monitoring or collecting data in various sectors with format dental examination record form
- National oral health database which can easily accessible in various ways
- Development of an appropriate oral health guidelines and policies for provision of oral health care services
- Oral diseases prevention and oral health promotion interventions into a comprehensive primary health care services
- Optimal level of resources including financial supports and formal dental workforce framework

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