



Oral Health in Ugandan Adolescents



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Dear Partner,

Welcome to the 8th issue of the Makerere University & Columbia University (MUCU) newsletter.

Our mission is to provide a forum to share member news, interesting program updates, clinical cases, and discuss the latest in "hot" adolescent topics

We are excited to update you on ***The Latest in Oral Health in Ugandan Adolescents*** and share some interesting news related to adolescent medicine in Uganda. We are delighted that you have continued interest in the care of the adolescent patient and encourage you to submit your work for publication in our May 2017 newsletter. Please send submissions to: sabribakitaka@yahoo.co.uk by March 31 2017.

The Society of Adolescent Health in Uganda, SAHU, was launched in November 2012, following a workshop in Kampala, Uganda, led by experts from Columbia & Makerere Universities & the Naguru Teenage Information & Health Centre. Uganda has a young population, with 52% of its population under the age of 15 yrs & 25% aged 10-19 yrs. **SAHU's** goal is to advocate for health, wellness & improved services for this age group

SAHU's Mission:

To promote comprehensive adolescent health, growth and development in Uganda through knowledge dissemination, research, advocacy and affiliation with other societies and bodies involved in adolescent health.

The Vision of SAHU:

Each and every adolescent will be provided the opportunity to access his or her potential and grow into a healthy, responsible and independent adult.

INTERESTED IN MEMBERSHIP?

ANNUAL MEMBERSHIP TO SAHU IS ONLY \$30 (ugx 90,000)

EXCITING NEWS!

We are opening up the website to active bloggers talking about Adolescent Health issues. **PLEASE VISIT OUR WEBSITE AND SUBMIT YOUR STORY:** www.sahu.ug

E-mail questions to: info@sahu.ug

Meet the Newsletter Editorial Board

Co-Editors in Chief



Sabrina Kitaka M.D., Senior Lecturer & Paediatric & Adolescent Health Specialist, Department of Paediatrics and Child Health, Makerere University College of Health and Sciences Kampala, Uganda. Dr. Kitaka is passionate about promoting adolescent health and medicine in East Africa. For the past 11 years, she has taught Adolescent Medicine at Makerere University College of Health Sciences. Since 2006, she has collaborated with Dr. Betsy Pfeffer and her colleagues at Columbia University, and since 2010, they have conducted three annual in-service adolescent health workshops for East African health providers and one scientific meeting. She is the director of the Adolescent Program at the Paediatrics Infectious Diseases Clinic at the Mulago National Referral Hospital.



Betsy Pfeffer, M.D., Associate Professor of Pediatrics at Columbia University Medical Center and New York Presbyterian Hospital, New York, U.S.A. Dr. Pfeffer is an adolescent medicine clinician who sees teens in an outpatient and inpatient setting, teaches medical students and residents and lectures internationally on multiple topics related to adolescent health care. She has been working together with Dr. Kitaka for over six years and is committed to their efforts to help improve health care delivery to teens in Uganda.

Editorial Team



Denis Lewis Bukenya BSWSA, MPA is a social worker and an Adolescent Health Training Specialist and the Training Manager at the Naguru Teenage Information and Health Centre, a pioneer Adolescent Sexual Reproductive Health and Rights program in Kampala, Uganda, that provides advocacy and youth-friendly reproductive health and related services. Denis has nine years of progressive involvement in Adolescent Sexual Reproductive health services' delivery and trainings, psychosocial and behavioural support for children and youth, specifically on Adolescent Sexual Reproductive Health and Rights and HIV/AIDS.



Godfrey Zari Rukundo M.D., Senior Lecturer, Mbarara University of Science and Technology; Child & Adolescent Psychiatrist, Mbarara Regional Referral Hospital Mbarara-Uganda.



Charles Emma Ofwono, SAHU Web Administrator and Network and Systems Administrator, the B.Sc. degree in Software Engineering from Makerere University, Kampala, in 2012, and currently is pursuing his M.Sc in Information Technology from Walden University, Minneapolis, USA. In 1997, he joined Naguru Teenage Information and Health Centre, as a peer leader in the Post Test Club, and in 2010 became the club coordinator. Since March 2013, he has been with the Department of Advocacy and Research, where he coordinates youth programs and ICT/Data.

“Reproductive freedom is critical to a whole range of issues. If we can’t take charge of this most personal aspect of our lives, we can’t take care of anything. It should not be seen as a privilege or as a benefit, but a fundamental human right.” Faye Wattleton

These and many other famous quotes were made by key leaders in the quest to advocate for the rights of humanity and the young people.

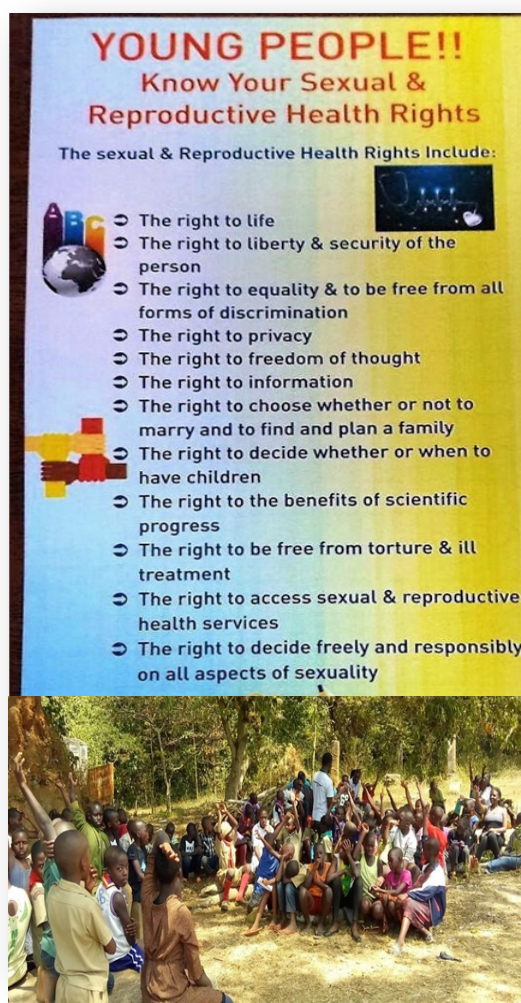
Advocacy is one of the three core areas of our business at Naguru Teenage Information and Health Center and we are engaging all stakeholders at all levels to promote and advocate for adolescent Sexual Reproductive Health and Rights (SRHRs). Mass forums are one of our approaches that bring large groups of young people together and allow us to teach adolescent SRHRs and help empower the attendees to exercise these rights.

The annual Kazi Scouts camp, which brings together over 8000 young people from the entire country, is such an opportunity that we are tapping into to promote adolescent health rights. Our staff and volunteers actively participated in the 2016 camp whose theme focused on empowering the scouts and their leaders on behavioral change and learning how to make informed decisions about their sexuality. It also focused on building a more conscientious, responsible and productive society. This was done through collaborating with key stakeholders who routinely provide key services during the camps. The camp was thus organized with a theme of

“Empowering scouts for sustainable development”.

The Naguru team employed *Youth Friendly* approaches to pass on Sexual Reproductive Health Rights information to the young people. Group discussions, role-plays and question and answer sessions were utilized appropriately. These sessions stimulated the young people to freely interact and open up to the Naguru team.

One of Young girls age 16 *confessed that her father aged 51 years was asking her for a sexual relationship. She disclosed this after learning about her sexual rights and support was provided accordingly.*



NEWSLETTER SUBMISSIONS

The next newsletter will focus on *THE USE OF TECHNOLOGY TO IMPROVE ADOLESCENT HEALTH OUTCOMES* and will be published in MAY 2017. SAHU members are encouraged to submit member news, program updates and interesting cases related to this newsletter topic with all patient identifiers removed. The editorial board will conduct a peer review process for all submissions. Submissions will be accepted from February 1st–March 31th, 2017. Please e-mail all submissions to: sabrinakitaka@yahoo.co.uk Thank you beforehand for your participation.

ADOLESCENT SPORTS GALA



A PLATFORM FOR BEHAVIORAL CHANGE COMMUNICATION AND ACCOUNTABILITY FOR DUTY BEARERS

Submitted by Mr. Emma Ofwono, Data Officer Naguru Teenage Information and Health Centre

Mobilizing and reaching the young people and adolescent reproductive health duty bearers has never been easy! However, creative strategies like Sports Galas have proven to be friendly approaches to bring these groups to one platform. As such the Naguru Teenage Information and Health Center and other partners including Reach out Mbuya, Naguru Teenage information and Health Center, Makerere University Joint AIDS program (MJAP), Straight Talk foundation, Marie stopes, Mild May Uganda, Marie stopes, DSW Uganda, Treasure Life center, Turckle Africa, Namugongo fund for special children and Naguru Health network and MUJHU conducted the **9th Annual Adolescent sports gala** on 17th September 2016 at Namboole Stadium. The Gala attracted 1021 (442 Females and 549 males) young people focused on:

“Equipping young people with knowledge and life skills through fun and experiential learning as means of supporting them to effectively make informed decisions concerning their sexuality, reproductive health and rights”.



The event was used as platform to hold the duty bearer accountable. The chief guest – Mayor Nakawa Division Eng. Balimwezo Ronald Nsubuga – highlighted the need to support the young people, reach them with

information and address their needs through sports and other youth friendly strategies.

He further said Uganda’s population is predominantly filled with young people:

52.4% are under 15 years

23.3% are adolescents (10-19 years)

37.4% are young people (10-24 years)

These statistics call for our urgent stakeholder support. He called upon all actors to invest in the young people and ensure effective service delivery to the age group

“My office shall continue to support the sports gala and all programs for the young people. I have also just procured an ambulance to support the young mothers” Nakawa Mayor.

Among the activities conducted was a press conference that attracted several media houses. The executive directors used the press conference to communicate the relevance of the Sports Gala to both the nation and adolescent health programming. They also called upon the government and other actors to take action on:

- Ensuring that all health facilities are providing youth-friendly services for the young people.
- Appreciating and embracing the role of sports and games in addressing stigma, encouraging positive behaviors and healthier living.
- The need to support Civil Society Organization efforts in addressing sexual reproductive health concerns/needs for adolescents and youth.
- Ensuring delivery of comprehensive, quality psychosocial services to Young Persons Living with HIV, affected households, and persons most vulnerable to exposure to HIV, with focus on

psychosocial support so as to avert stigma and discrimination.

- Considering empowerment of HIV-affected young people and their households with livelihood skills and opportunities to cope with socio-economic demands.
- Scaling up comprehensive social support and protection to the most vulnerable PLHIV and other affected groups, including specific promotion of stigma reduction, and ensures that HIV/AIDS workplace policies and programs are instituted in all workplaces.

The Sports Gala was also highlighted that young people are at the center of global HIV/AIDS pandemic. They are also the

world's greatest hope in the struggle against this fatal disease. An estimated 11.8 million young people aged 15 to 24 are living with HIV/AIDS and, each day, nearly 6,000 young people aged of 15 and 24 becoming infected with HIV but unfortunately, only a fraction of them know they are infected. The young people who participated were exposed to various activities which included a health walk with a brass band around Banda, Kireka, Kirinya, HIV counseling and testing, general medical services, edutertainment, games and sports, health talk sessions, and information, education & communication material distribution. These activities contributed towards equipping young people with knowledge and information.

Mbarara Epilepsy Project Update:

Training to Improve the Assessment and Treatment of Epilepsy in Children and Adolescents in South Western Uganda submitted by Dr. Godfrey Zari Rukundo

This project was established to build local capacity for the early assessment, recognition, treatment and referral of children and adolescents with epilepsy. This project is implemented by: Mbarara University of Science and Technology, Mbarara Regional Referral hospital and East London NHS Trust through funding from the Tropical Health Educational Trust (THET) in the UK.

The project has so far achieved the following:

Ten mental health workers at Mbarara Regional Referral Hospital and Mbarara district local government have been trained as trainers in two-week intensive training and follow up sessions. These trainers have already delivered trainings and supervision to other health workers in Mbarara Municipality.

Thirty-seven primary health care workers (PHWs) in Mbarara municipality have been trained in assessment, recognition and treatment of epilepsy. They have started working and have so far

assessed and treated more than 350 patients with epilepsy.

Eighty-eight Village Health Team (VHT) members have been sensitized about the presentation, risk factors and treatment of epilepsy. They are working with primary health care workers. The VHTs identify patients in need and then refer them to the PHWs for further assessment and treatment. In addition, they are providing more sensitization to their communities.

A successful stakeholders meeting has been held in Mbarara drawing stakeholders from the Ugandan ministry of health, Mbarara district local government leadership, Mbarara University and Mbarara Regional referral Hospital top leadership, PHWs, VHTs traditional healers and religious leaders. During the meeting, there was sensitization about epilepsy among children and adolescents and the way forward after the close of the project. The stakeholders promised support for the epilepsy work.

SAHU Announces the Seventh Annual Clinical & Scientific Adolescent Health Meeting in Kampala, Uganda



"Keeping our Adolescents Healthy Through Preventive Care"

DATES: March 28th & 29th, 2017

ACCEPTING ABSTRACT SUBMISSIONS NOW!

Send to sahu2017conference@gmail.com (deadline Jan 27th 2017)

REGISTRATION & MEETING DETAILS WILL BE AVAILABLE SOON

Conference fees per participant \$20/ugx 60,000

**WORLD ORAL
HEALTH DAY
2017**



World Oral Health day is celebrated on 20th March every year the world over and was started by the World Dental Federation (FDI). The theme for 2017 is *'Live Mouth Smart'* which builds on last year's message *'Healthy Mouth, Healthy Body'*. *'Live Mouth Smart'* echoes the statement by the WHO that: Oral health is integral to the general health and wellbeing, it is fundamental for the ability to breath, eat, swallow, speak or even smile. Impairment of functions related to oral health can seriously interfere with the ability to interact with others and to attend school and work. In the African region, poor oral health causes millions of people to suffer from severe pain, affects their quality of life and increases their out-of-pocket expenses.

This campaign places emphasis on the smart decisions that people can make about oral health so that they can enjoy healthy mouths throughout life, achieve good oral hygiene, learn oral disease risk factors such as smoking, alcohol, sugar etc, many of which can lead to oral health problems that are identical to the problems that occur with non-

communicable diseases such as diabetes or cardiovascular diseases. The campaign also advocates for regular dental checkups when possible.

The Uganda Dental Association (UDA), being a member of the FDI, has a date to execute this campaign. We set apart a week for these activities, which we call the *Oral Health Week*. Ours is to disseminate information to the general public about prevention of oral diseases, manifestations of disease and to describe treatment options. We usually couple this with free check-ups and minor treatment where possible.

Any partnership that offers us a platform to change attitudes and save lives from oral disease is of great value to us, and this is why we are especially interested in participating at the 2017 Adolescent Health Conference in Kampala sponsored by SAHU and The Makerere University-Columbia University (MUCU) Collaboration. The theme *"Keeping our Adolescents Healthy Through Preventive Care"* resonates well with our core activities. This particular target group is more predisposed to the oral disease factors mentioned above, and I foresee great impact when given an opportunity to educate them.



Dr Jacqueline Nambatya
Uganda Dental Association

ORAL HEALTH CASE:

A 13-year-old adolescent with pain and swelling in her right jaw

Submitted by Dr. Aisha Bataringaya-Sekalala, Orthodontist Kampala, Uganda

RB was a thirteen-year-old schoolgirl in Senior One who attended a boarding school near Mukono Town, 20Km from Kampala City. At the beginning of term, she noticed that she had some pain on the right side of her mouth when she drank cold soda, but did not pay much attention to it as she was busy with the new school year. A few weeks later, RB began to feel that she had a constant pain in her lower right jaw. The pain was throbbing in nature and kept her awake at night. Since she was in the middle of her mid-term exams, RB tried to ignore the pain and resorted to painkillers instead, hoping that the pain would eventually subside. When the pain became worse, RB called her mother, who suggested she go to the school nurse.

The nurse examined RB's mouth and noted that RB's breath smelled bad, and instructed her to brush her teeth better and also at night. When the nurse looked in her notes, the mandatory general checkup from her pediatrician at the start of the school year indicated that RB had no medical conditions that were of concern. The nurse gave RB more painkillers and sent her back to class. A week later, RB woke up with a headache and high fever. Her friends noticed that her right jaw was swollen. The school nurse examined RB again and noted swelling and pus on the affected side and a distinct odour in her mouth. The nurse called the school's pediatrician and took RB to see him. On the ride to the doctor's office, RB told the nurse that the school food was rather bland, so her mother sent her packaged juices and sweet snacks that she ate whenever she felt hungry. RB added that although she had shared snacks and tried to be friendly, the girls had lately been unkind, and one had even commented that '*her breath smelt like rotten eggs*'. The school's contracted pediatrician, Dr. DM conducted a review of systems, and noted the following:

Review of Systems

General: Complaining of fever. Denies abnormal weight loss.

CV: Denies cyanosis, chest pain, or syncope

Pulmonary: Denies SOB, respiratory distress

GI: Denies nausea, vomiting or diarrhea. Denies abdominal pain

GU: Denies urinary symptoms

Skin: Denies rashes

Musculoskeletal: Denies joint swelling or tenderness

Neuro: Complaining of pain in the jaw, Denies seizures, headaches or visual changes

Psychiatric: Appropriate affect

Endocrine: Denies hormonal problems

Hematology: Denies bleeding or bruising

Immunology: Denies autoimmune problems or allergies

ENT: Complaining of bad breath, denies sore throat, congestion

Eyes: Denies discharge, pain, or change in vision

Physical exam

Vitals: Temp: 39.0, HR 120, BP 110/80, RR: 20, SaO₂% 98%

General Appearance: Patient appeared to be in pain.

Alert, active and well developed.

Skin: Without lesion

Eyes: Extraocular movements, pupils reactive, lids within normal limits bilaterally

Ears: Auditory canal clear, tympanic membrane clear, good light reflex

Nose/Throat: Swelling of gums noted posterior right mandible with associated drainage, Nares patent and without discharge, pharynx clear

Dentition: Poor oral hygiene, **Signs of cavitation on right posterior molar with notable discoloration**

Head/Neck: Normo cephalic, atraumatic, neck supple

Nodes: Submandibular lymphadenopathy noted on right side

Lungs: No retractions, normal respiratory excursions, clear to auscultation bilaterally

CV: Tachycardic, normal rhythm, normal S1/S2, no rubs, no Gallops

Abdomen: Normal bowel sounds, soft, non-tender, non-distended, no hepatosplenomegaly

Neuro: Grossly intact

Since RB'S chief complaint was pain in the mouth and a fever, Dr. DM assessed the symmetry of her face, and then examined her mouth using a tongue blade and a penlight. He visually inspected the lips, hard and soft palates, and the dorsal and ventral

aspects of buccal mucosa respectively. Dr. DM then examined the teeth systematically, starting with the upper right second molar and making his way to the lower right second molar. Finally, Dr. DM examined RB's lymph nodes in the head and neck area.

Based on his exam, Dr. DM diagnosed RB with an infected lymph node, dental caries, draining abscess and poor oral hygiene. He decided to place RB on oral Amoxicillin 500mg three times a day for five days, oral Metronidazole 400mg once a day for five days, and Paracetamol 1gm, three times a day for five days, and told RB to continue to brush her teeth. He asked her to come back and see him

in two weeks, when he would decide the next course of action. When RB told the doctor that she could not brush her lower teeth in the right quadrant, he advised that she should rinse her mouth with a warm saline solution after every meal and to brush her teeth gently in order to prevent more problems.

RB returned to school on antibiotics and painkillers. Although RB improved while on antibiotics, after she completed the course, her symptoms returned. At her two-week follow-up, Dr. DM referred RB to the dentist who extracted the tooth because a root canal treatment, which would have been required to save the tooth, was too costly for RB's family to afford.

CASE REFLECTION:

QUESTIONS TO CONSIDER WHEN THINKING ABOUT THIS CASE

Dr. Aisha Bataringaya-Sekalala BDS, MChD (Ortho), Kavita P. Ahluwalia, DDS, MPH Associate Professor of Dental Medicine at CUMC, Dana Sirota MD MPH, Assistant Professor Pediatrics at CUMC and New York Presbyterian Hospital, Dr. Sabrina Kitaka

1. How might have RB's dental problems been avoided?

RB's dental problems could have been prevented by good daily oral care including brushing after meals, as well as regular dental checkups for early detection and treatment of dental disease. In addition, a diet that restricts processed foods, in particular, sugars and carbohydrates, is important in the prevention of dental caries (tooth decay).

Dr. DM told RB to continue brushing without determining if she was brushing properly, how often, and with what. It is important to ask if patients have a toothbrush and toothpaste. Toothbrushes should be replaced at regular intervals, particularly when the bristles are frayed, as they are ineffective when overused.

An immediate referral to the dentist was not made despite Dr. DM noting RB's tooth decay. **This demonstrates that a closer collaboration between medical and dental**



practitioners is vital. Given the high costs both in morbidity and quality of life, associated with dental diseases, prevention and management of early disease is key. While the primary responsibility for oral health promotion and disease prevention rests with dentists, in Uganda however, access to dental care is complicated by a number of factors including the small number of dental practitioners, distance from dental clinics, and costs associated with dental care.

Since dental health is central to eating, speaking and esthetics, and since these domains in turn impact nutrition, learning, socialization and self-esteem, it is within the physicians' purview to address oral health. This is especially true in instances when referral to a dental provider is not feasible. Physicians can routinely provide advice to adolescents and families on daily oral care, diet, tobacco prevention and safe sex, all of which impact oral health. Special attention should be paid to the role of the physician in addressing oral health in children at risk for diabetes and HIV infection.

2. What can schools do to reinforce the importance of good oral health?

Schools can support the school nurse with basic training in oral examination, diagnosis, and oral health promotion/disease prevention. This can be done through support from the public health dental officer at district hospitals. The Uganda Dental Association can equip the school nurse with the knowledge and skills to make accurate diagnoses and appropriate referral for treatment. Given the growing number of children who are enrolled in boarding schools, and the reliance on nurses for primary health care in much of the country, it may be prudent for policymakers to consider improvements in oral health related training directed at nurses in practice and training. Such an approach may help realize health savings in the long run.

Nurse and physician training and/or sensitization to oral health problems that are typically encountered by adolescents may be instituted, and routine oral examinations to assess for and manage early signs of oral disease could be performed by these individuals. Training school nurses to provide fluoride varnishes in high-risk children and adolescents is an intervention that may prevent future morbidity and also encourage good daily oral care among young people.

Since the children spend a large proportion of their time at school, oral health awareness should be an integral part of any school health program in order to encourage good daily oral care and dietary practices from an early age. While supervised tooth-brushing in day schools may not be feasible due to high demands on time during the school day, daily oral care and oral disease prevention through good diet and restriction of tobacco and alcohol can be reinforced through the health or science curriculum offered to students. Education officials should consider policies that encourage mandatory or supervised tooth-brushing at least twice a day in school premises.

Diet plays an important role in the aetiology and progression of dental caries. School menus should limit refined and processed foods, particularly sugars and carbohydrates. Similarly, school policies should discourage access to processed foods such as biscuits, cakes and juices either from cafeterias, "dukas" or home, and parents should be educated about the importance of a diet rich in natural foods, that includes proteins, fruits and vegetables as mainstays. In addition, sodas and fruit juices, which are acidic and can promote dental decay, should be discouraged, while water is promoted both for oral health and hydration. Not only will such diets promote oral health, but they will also promote heart health and wellness in general.

Traumatic injuries may result from activities at home, school, sports and social events. These injuries can have a negative impact on oral health. Although dental trauma from injuries that occur during football, rugby, netball and hockey is not uncommon, there is no official mouth guard policy for children playing contact sports in schools in Uganda. Oral and dental injuries can be significantly reduced through school policies that require the use of mouth guards to be worn during sporting activities. Clinicians have the opportunity to present this advice to parents at the mandatory annual medical checkup that is required by most boarding schools.

Tobacco and alcohol use are primary risk factors for oral cancer, which is normally seen in adults. School officials should actively discourage the use of alcohol and tobacco. Recent data suggest that the Human Papilloma Virus (HPV) may be etiologic for some oral cancers, which are increasingly emerging in young people. The disease is asymptomatic in the early stages – schools can play an active role in bringing visibility to oral cancer, encouraging students to look out for early signs and symptoms, while discouraging risky behaviors, including unprotected sexual behaviors.

Schools can also hire dental practitioners to make regular visits to examine the children. In high-risk children, dentists can consider placing dental sealants on molars to prevent future dental caries. Parental consent to such school initiatives and their participation in school oral health activities also helps to reinforce the message of good oral health practices.

3. How should oral hygiene be taught to parents, children, and adolescents?

Good oral hygiene and prevention of oral disease begins at home. It starts as soon as the child develops teeth and continues until the child is able to maintain a clean mouth on their own. It is important that good daily oral care is introduced in infancy and monitored by parents as children grow.

Since physicians work with expectant and young mothers on a regular basis, they are ideally situated to provide oral health education and guidance to parents and caregivers. Similarly, nurses, who may see children more regularly in rural areas, can also reinforce daily oral care, as can school teachers, especially health and science teachers. During the adolescent period when children get busier with school and other activities, and as parental supervision becomes less, they may need a reinforcement of skills.

Sometimes adolescents may avoid dental care and place a low priority on maintaining good daily oral hygiene especially if they had a traumatic previous dental experience. Some dental concerns may not be obvious to the layperson; therefore, it is important that parents schedule routine dental visits or speak with their child's health care provider about their concerns. In this way, children will undergo a complete examination to detect and diagnose any unknown dental concerns rather than wait until dental disease is in its advanced stages.

In areas where potable water may be limited, or access to toothbrush and toothpaste is difficult, children and caregivers should be encouraged to clean their mouths with dental sticks commonly known as *Miswaki*. In Buganda, these sticks are mostly gotten from the stems of a plant called *Kayuki-yuki* (*Lantana trifolia*). Cleaning with *Miswaki* may help prevent build-up of bacterial plaque that contains bacteria that promote dental caries and periodontal diseases.

It is important to bear in mind that the etiologic agents associated with dental caries are Strep bacteria and sugars. As such, education that promotes healthy eating and daily oral care for the entire family is important for the prevention of oral diseases. Parents and schools should limit the intake of sweets and provide healthy dietary alternatives. Sweetened beverages,

especially soda, can damage the teeth and interfere with proper calcium absorption.

4. How may poor oral hygiene impact self-esteem during adolescence?

The mouth plays a central role in quality of life. Untreated oral diseases can result in tooth-loss, which can impact facial esthetics, ability to eat, talk, sing and kiss, which may impact social connections and self-confidence, which are vital to adolescent wellness.

Halitosis, associated with advanced dental caries, periodontal disease and poor oral hygiene can be a cause of social distress and low self-esteem. In many cases, a simple change in the child's personal oral hygiene habits can freshen the mouth. Special attention should be paid to brushing the tongue since bacterial colonies on the tongue are primarily responsible for halitosis.

Esthetics, especially staining secondary to fluorosis, is prevalent in many parts of East Africa. This is seen in areas fed by waters from the Rift Valley. This condition, which can range from "undetectable" to enamel staining and pitting can erode self-esteem among adolescents. In severe cases, the condition cannot be masked by bleaching techniques and may require costly esthetic restorations. It is important for organized dentistry and policy makers to develop a map detailing the fluoride content of drinking water, while promoting bottled drinking water in fluorosis-endemic areas.

5. What role does diet play in oral health?

Frequent snacking on refined carbohydrates and acid-containing beverages such as sodas and juices, combined with Strep-bacteria found in dental plaque, increases susceptibility to tooth decay. Not only does diet play a major role in tooth decay, but a diet that restricts refined carbohydrates and sugary drinks is important in promoting healthy weight and preventing diabetes. Nutrition is central to health and wellness,

especially in HIV positive individuals. The physician and nurse can play an important role in encouraging a good diet for families.

6. What role do oral diseases play in diabetes?

Diabetic patients whose blood sugar levels that are poorly controlled are at higher risk for periodontal (gum) diseases because they are generally more susceptible to bacterial infection, and have decreased ability to fight the bacteria that are associated with periodontal diseases. Furthermore, it is difficult to control blood sugar levels in patients with untreated dental infections.

It is important to note that while gingivitis, which is a superficial inflammation of the gingivae, is reversible with good daily oral care, periodontitis, which is inflammation of the supporting tissues of the teeth, is not reversible. Professional dental cleaning can arrest periodontitis, which is a leading cause of tooth loss in adult populations. Dental plaque contains the bacteria associated with gingivitis and periodontitis. It is therefore important that dental plaque be removed on a daily basis through tooth brushing. Plaque that is not removed from the tooth surfaces can eventually harden into calculus or tartar. Calculus is difficult to remove through tooth-brushing alone; a dental professional, using specialized instruments, must remove sub-gingival calculus.

Other oral problems associated with diabetes include oral thrush/candidiasis, delayed healing, taste impairment, dry mouth due to diminished salivary flow, which can increase the risk for dental caries. Diminished salivary flow may also impede swallowing, and result in difficulty speaking. The diabetic patient should see the dentist or speak to their health care provider if the following are observed:

- Gums that bleed easily
- Red, swollen or tender gums
- Gums that have pulled away from the teeth

- Pus between the teeth and gums when the gums are pressed
- Persistent bad breath or bad taste in the mouth
- Permanent teeth that are loose or separating and forming spaces between them
- Any change in the way the teeth fit together when biting

- Canker sores
- Dental Caries
- Gum diseases (periodontitis and gingivitis). Many HIV positive individuals who are poorly managed suffer from Acute Necrotizing Ulcerative Gingivitis (ANUG)

These problems can be prevented with well-controlled blood glucose levels, good oral hygiene and surveillance through regular dental checkups. Any non-emergency dental procedures should be deferred until the blood sugar is in good control, once again highlighting the importance of collaboration between the dentist and medical provider. In instances where access to dental care is difficult, physicians can monitor oral needs through a simple oral examination and by asking prudent questions of diabetic patients.

In addition, bacterial infections that begin in the mouth, such as tooth decay, can become more serious and, if not treated, spread into the bloodstream and harm the heart and other organs. This is particularly dangerous for people living with HIV/AIDS who may have compromised immune systems.

All diabetic patients should be counseled on performing impeccable daily oral care and receiving routine dental care as possible; they should also be educated about oral signs and symptoms of diabetes and the impact of medications on oral health and nutrition. Physicians and nurses who may be seeing patients more regularly than the dentist can play this important role, especially those who are helping patients manage their diabetes.

People with HIV/AIDS may also experience dry mouth, which increases the risk of tooth decay and can make chewing, eating, swallowing, and even speech difficult.

The best way to avoid these problems is to maintain good oral hygiene, have regular dental check-ups, ensure that all HIV medications are taken on schedule thus protecting the immune system and preventing oral opportunistic infections. Physicians should be aware of the oral manifestations of HIV and counsel patients about oral health and the importance of maintaining a healthy mouth.

7. What role do oral diseases play in HIV?

The mouth may be the first part of the body to show signs of HIV infection. Oral opportunistic infections, such as *candidiasis*, are sometimes the first indicator that your immune system is not working properly – and as such, oral health can be an important indicator of the severity of HIV.

All diabetic patients should be counseled on performing impeccable daily oral care and receiving routine dental care as possible; they should also be educated about oral signs and symptoms of diabetes and the impact of medications on oral health and nutrition. Physicians and nurses who may be seeing patients more regularly than the dentist can play this important role, especially those who are helping patients manage their diabetes.

Anyone can have oral health problems, but HIV disease can make one more susceptible to:

8. What role does fluoride play in the prevention and management of dental diseases?

Fluoride reduces the incidence of dental decay and slows or reverses the progression of existing lesions (i.e., prevents cavities). It can be obtained through optimally

- Oral warts
- Fever blisters
- *Oral hairy leukoplakia*
- Thrush/oral candidiasis

fluoridated water, fluoridated toothpaste, professional application and home-applied prescription strength toothpaste and rinses. In the United States, pediatricians are being asked to include Fluoride Varnish (available as 5% sodium fluoride in a colophony/resin base application) as part of the preventative well child visit for children from the time of first tooth eruption through 5 years of age. While Fluoride Varnish application during routine visits is not advocated for adolescent patients, it is important that pediatricians are knowledgeable about the positive effects of Fluoride.

9. What is the role of the pediatrician in the management of dental diseases in Uganda?

Uganda has a population of 37.4 million people. With the 473 dentists on the register, the current dentist-to-population ratio in Uganda is 1:80,000; a far cry from the WHO recommended 1:7,500. On the other hand, there are 300 pediatricians for the 17 million children in Uganda. In order to manage the burden of oral health care, a close collaboration between these healthcare providers is vital.

Because dental caries is one of the most common childhood diseases from age 6-19 years, pediatricians can play a major role in prevention and oral health education for their patients long before the onset of dental disease as they are the first health care practitioner in contact with the child. Pediatricians have a unique and important role in protecting the oral health of pediatric patients because children visit pediatricians earlier and more frequently than dentists. Oral diseases can have a major impact on children's lives resulting in pain, disfigurement, and difficulty chewing to name a few. Pediatricians can contribute to improving oral health by integrating a comprehensive review of systems, risk assessment, oral exam, counseling, and anticipatory guidance into routine healthcare visits. This practice should begin in early infancy and continue through adolescence.

An adolescent risk assessment should include questions related to oral hygiene practices, access to fluoride, sugary food intake, previous caries, and frequency of dental care. A review of systems should include questions related to tooth pain or sensitivity, oral lesions and masses. There is a growing movement to modify how medical schools teach the Head, Ears, Eyes, Nose & Throat (HEENT) exam and instead modify it to be a HEENOT exam ("O" for the oral cavity). Pediatricians should be trained to look in the oral cavity for evidence of gingivitis, ulcers or abscesses, caries, masses, defects in the enamel, malocclusion or misalignment and evidence of trauma. In addition, as discussed previously, signs and symptoms in the oral cavity can be indicative of HIV disease. Patients with cleft lip and palates are of special concern as they are more challenged in the maintenance of good oral hygiene. Close collaboration between the primary care pediatrician, oromaxillofacial surgeon, otolaryngologist and dentist is central to the management of such patients. Finally, when teeth are misaligned, crowded or missing they make it difficult for children to keep clean. Other problems can occur, such as gum disease, complications with speech and chewing, tooth decay, abnormal wear of tooth enamel and jaw problems. With a good oral examination the pediatrician can observe these problems and refer the patient to an orthodontist who specializes in preventing, detecting and treating dental irregularities to determine the best treatment for them. Braces or orthodontic appliances can then be fabricated to straighten the teeth.

Beginning in infancy, pediatricians should instruct parents to brush their teeth and gingivitis among teens than pre-pubertal children or adults. This increase is associated with an increased gingival response to dental plaque caused by an increase in sex hormones during puberty. Generally, the body responds to bacterial plaque surrounding the teeth with an inflammatory response. The gum tissues often become red, inflamed and bleed on

brushing or irritation. This gingivitis is reversible with proper brushing and oral health education.

There are also other, more age-specific conditions that occur during adolescence. Because hormonal changes affect periodontal tissue, periodontal disease becomes a more common diagnosis in children around the time of puberty. In addition to age, risk factors include tobacco and marijuana use in addition to systemic conditions such as immunodeficiencies, oncological processes, and metabolic diseases such as diabetes. Periodontal diseases are preventable with good oral hygiene, regular dental visits and abstaining from smoking. In addition to periodontal diseases, tobacco has other unappealing consequences specific to adolescents including brown staining and discoloration, halitosis, not to mention, the risk of cancer. As pediatricians we have an important role in regularly counseling adolescents about the dangers of smoking and provide support for those ready to quit. While smoking remains one of the most common causes of oral cancer globally, Human Papillomavirus (HPV) is emerging as a significant cause of oral cancer.

Pediatricians have an important role in the prevention of HPV through the administration of the HPV vaccine to both males and females beginning at age 9.

As pediatricians we have many responsibilities to our patients and limited time and resources to address them. Nonetheless, it remains our goal to consider our patients globally and do our best to prevent and actively limit disease. Unfortunately, though oral disease is a frequent problem for children, dental care is not accessible to all of our patients, and when it is accessed it is often at a time when disease has already begun. Starting in early infancy through childhood and adolescence, we have the opportunity to positively impact our patients' lives and prevent disease.

The pediatrician is uniquely positioned to play a major role in the detection and early recognition of oral diseases and conditions. As we move towards the collaborative model of delivering health services, both the pediatrician and the dentist can synergistically work together to deliver a coordinated and consistent message to parents and children regarding proper oral hygiene and nutrition.

Resources

1. Protecting All Children's Teeth (PACT): A Pediatric Oral Health Training Program, American Academy of Pediatrics <http://www2.aap.org/oralhealth/pact>
2. American Academy of Pediatric Dentistry, Resources for Adolescents <http://www.mychildrensteeth.org/education/adolescents/>
3. Periodontal Diseases in Children and Adolescents, American Academy of Pediatric Dentistry, 2004 http://www.mychildrensteeth.org/assets/2/7/E_PeriodontalDisease.pdf
4. Oral Cancer Facts, The Oral Cancer Foundation. <http://www.oralcancerfoundation.org/facts/>
5. http://www.aapd.org/media/policies_guidelines/e_periodontaldisease.pdf

LATEST IN UGANDAN ADOLESCENT ORAL HEALTH

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The last national oral health survey in Uganda was completed in 1987, and focuses primarily on dental caries. Regardless, the data available, mostly from smaller studies that seek to describe oral disease and oral health needs in specific target populations, provide important insight about oral health needs in Uganda. Data describing dental diseases in adolescents in Uganda are summarized below. In instances where specific data on adolescents is not available, this is stated, and inferences are made if appropriate.

1. Dental Caries:

Five studies that assessed dental caries in children between the ages of 10 and 14 suggest that the prevalence of dental caries varies from 33% to 40%.^{1,2,3,4,5} Although the prevalence of dental caries is high among adolescents, the mean number of teeth infected per child is between 0.7 and 0.9 (i.e. while 40% of children have dental caries, on the average, each child has approximately one infected tooth).^{1,2,3,4,5,6} The data suggest that the burden of disease is increasing and that there are rural-urban disparities with urban children having greater burden of disease.^{1,2} The increase in disease prevalence and the rural/urban disparity is thought to be due to increased access to sugary and processed foods, indicating the need to educate children, parents and caregivers about the role of diet in dental caries etiology.⁷ More worrying however, is that most of the disease burden comprises untreated dental caries, indicating that access to dental care is limited; poor access to dental services and increased access to processed foods suggests that the dental caries disease burden will increase in coming years. Adult dental caries data from Uganda shows that there is a trend towards increasing dental caries with age and is associated with residence in Urban areas.⁷ This information is corroborated by the World Health Organization, which states:

In the African Region, DMFT (mean number of dental caries/person) levels vary widely, ranging from less than 1.0 in Ghana and Guinea-Bissau to over 4.0 in Gabon and Mauritius. Moreover, local studies indicate a rapidly rising disease burden among both urban and rural populations. Most tooth decay remains untreated.⁸

2. Periodontal Diseases:

The two primary conditions that comprise periodontal or gum diseases are gingivitis, a superficial inflammation of the gum tissue, and periodontitis, inflammation of the supporting structures of the tooth. Periodontal diseases are associated with poor oral hygiene/daily oral care, immune

suppression, diabetes and tooth loss.⁹ There are few studies that have assessed the prevalence of periodontal diseases in Ugandan adolescents. These studies suggest that between 47% and 59% of Ugandan children and adolescents suffer from periodontal diseases.^{2,5,10}

3. Oral Health Related Quality of Life (OHQoL):

Oral diseases can compromise a number of quality of life related domains through impacts on pain, ability to eat/chew, facial esthetics, halitosis, and ability to talk, smile and communicate.⁹ These declines further impact learning, nutrition, socialization and self-esteem.⁹

3a. Oral Pain:

Two studies suggest that the prevalence of pain among Ugandan adolescents is high and ranges between 37% and 48%.^{3,4} Oral pain is most frequently reported by adolescents who have untreated dental caries, those dissatisfied with their oral health, and those who have frequent dental visits most likely for symptomatic care. These data once again suggest that access to dental services is low and that integration of oral health in other health systems that are more frequently accessed is vital.

3b. Facial Esthetics:

Fluorosis, which is staining of teeth due to *excess* fluoride in the drinking water, is a social problem in East Africa due to the high mineral content of Rift Valley waters that are often the source of drinking water in Uganda. Two studies report that fluorosis prevalence is between 16% and 23% depending on geographic location.^{2,6} Western Uganda is one part of the country where high prevalence of fluorosis has been observed.¹¹ Altitude and age have been associated with fluorosis in high fluoride areas.^{12,13}

3c. Oro-facial Trauma from Accidents/Violence:

Oro-facial trauma can result from sports, traffic accidents and violence and can impact facial

esthetics, self-esteem and socialization. There are no specific Ugandan data on oro-facial trauma secondary to accidents or violence, but oro-facial trauma is prevalent in Africa. According to the WHO, oro-facial injuries affect 20% of children, and the prevalence ranges between 9.8% and 19.1% in 11-13 year old children in the WHO Africa region.^{8, 14}

4. Oral Cancer:

Oral Cancer is primarily seen in adults and is associated with tobacco and alcohol use. More recently, however, Human Papilloma Virus (HPV) has emerged as a risk factor for oropharyngeal cancer in younger age groups, including adolescents, and is linked to sexual practices, specifically oral sexual practices.¹⁶ In particular, HPV16 is associated with tonsil, lingual and other oropharyngeal cancers.^{15,16} If caught early, survival and associated morbidity from oral cancer is low, but early lesions are asymptomatic.¹⁷ Pediatricians and Adolescent Medicine specialists are well-positioned to perform routine oral examinations for the detection of pre-cancerous lesions. They can also provide guidance on tobacco use, sexual practices and HPV vaccination. This would be particularly important in high-risk patients and those with poor access to dental providers. See Table 1.

5. Oral Manifestations of HIV/AIDS:

Almost half of HIV-positive individuals exhibit oral fungal, bacterial or viral infections expressed in the oral soft tissue, especially in the early stages.⁸ The most common oral manifestations of HIV include pseudo-membranous oral candidiasis, oral hairy leukoplakia, HIV-related gingivitis and periodontitis, Kaposi's sarcoma, and non-Hodgkin's lymphoma¹⁸, all of which can have significant impacts on pain and cause discomfort and difficulty eating⁸, resulting in nutritional declines. In addition, Anti-retroviral Therapy (ART) can result in Xerostomia which increases the risk for dental caries and also makes swallowing, chewing and tasting food difficult.⁸ Diagnosis and monitoring of the oral manifestations of HIV can be used to

estimate disease progression and assessment of the patient's response to antiretroviral therapy.⁸

6. Oral Health Promoting Behaviors:

The most common oral diseases, dental caries and periodontal diseases can be prevented through good daily oral care (toothbrushing) and limiting sugars and processed carbohydrates.⁹ In addition, daily oral care can mitigate morbidity associated with early disease and prevent progression of disease⁹, especially in areas where access to dental services is poor.

6a. Daily Oral Care:

Optimal daily oral care includes toothbrushing with a fluoridated toothpaste and soft toothbrush at least twice a day. Recent data suggest that an increasing proportion of the Ugandan population is using toothbrushes and fluoridated toothpaste for daily oral care, but chewing sticks are still commonly used in rural areas.¹⁷ Chewing sticks, which have been shown to be effective at inhibiting the growth of bacteria responsible for caries and periodontal diseases are to be encouraged in areas where there is poor access to dental services, toothbrushes/toothpaste and potable water.^{8, 19, 20}

6b. Diet:

A diet low in sugar and processed carbohydrates is optimal for prevention of dental caries. While traditional Ugandan diets do not have high prevalence of sugars and processed carbohydrates, commercially processed sweets, candies, sodas, cakes, cookies, biscuits and other high carbohydrate foods are increasingly available in the African Region according to the World Health Organization.⁸

6c. Potable Water:

Clean drinking water is important for health and wellness. Potable water is important for prevention of dental caries, as water washes away bacteria and other debris that play a role in the etiology of dental caries. In addition, water is required to brush the teeth, wet the

toothbrush and to rinse the mouth to remove the foam from the toothbrush.

As described earlier, excess fluoride in drinking water may result in dental fluorosis, a brown staining and pitting of the teeth, which can pose serious esthetic concerns, especially among adolescents. While the concentration of fluorides is high in East Africa due to the mineral content of water sources from the Rift Valley, there are no national surveys assessing fluoride concentration in drinking water, and drinking water sources vary from area to area. A few studies indicate that the fluoride concentration varies between 0.5 and 2.5 mg/L.¹¹ The desired amount of fluoride in the United States is 0.7 parts per million. Even though the amount of fluoride in the water in Uganda varies, adolescents should use fluoridated paste. Fluorosis results from ingestion of fluoride; adolescents can spit and therefore do not ingest the fluoride in the paste. The primary cariostatic effect of fluoride is topical, therefore paste is recommended especially in high-risk populations.

Summary:

Evidence shows that dental disease in Uganda is on the increase amongst adolescents in the urban areas as well as rural school children that have access to sugary snacks. The situation is further exacerbated by a limited oral health education, inadequate access to dental treatment and a near negligible dental component of the national health budget. As health care providers, we must place emphasis on oral health education and prevention and advocate for these services. The Uganda Dental Association is currently providing this through outreach programs. This, however, is not enough. The dental teams in the district hospitals and health centres need to be vigilant in community and school oral health drives to address the current national oral health burden.

Citations

1. Kutesa, A., Kasangaki, A., Nkamba, M., Muwazi, L., Okullo, I., & Rwenyonyi, C. M. (2015). Prevalence and factors associated with dental caries among children and adults in selected districts in Uganda. *African health sciences*, 15(4), 1302-1307.
2. Wandera, M., & Twa-Twa, J. (2003). Baseline survey of oral health of primary and secondary school pupils in Uganda. *African health sciences*, 3(1), 19-22.
3. Nalweyiso, N., Busingye, J., Whitworth, J., & Robinson, P. G. (2004). Dental treatment needs of children in a rural subcounty of Uganda. *International Journal of Paediatric Dentistry*, 14(1), 27-33.
4. Kiwanuka, S. N., & Åström, A. N. (2005). Self-reported dental pain and associated factors in Ugandan schoolchildren. *Norsk Epidemiologi*, 15(2).
5. Muwazi, L. M., Rwenyonyi, C. M., Tirwomwe, F. J., Ssali, C., Kasangaki, A., Nkamba, M. E., & Ekwaru, P. (2005). Prevalence of oral diseases/conditions in Uganda. *African health sciences*, 5(3), 227-233.
6. Robinson, P. G., Nalweyiso, N., Busingye, J., & Whitworth, J. (2005). Subjective impacts of dental caries and fluorosis in rural Ugandan children. *Community dental health*, 22(4), 231-236.
7. Rwenyonyi, C. M., Muwazi, L. M., & Buwembo, W. (2011). Assessment of factors associated with dental caries in rural communities in Rakai District, Uganda. *Clinical oral investigations*, 15(1), 75-80.
8. WHO Regional Office for Africa. (2016). Promoting Oral Health in Africa: Prevention and control of oral diseases and noma as part of essential noncommunicable disease interventions. Retrieved on 21 October 2016 from: <http://apps.who.int/iris/bitstream/10665/205886/1/9789290232971.pdf?ua=1&ua=1&ua=1>
9. Scully, C. (2000). Oral health in America: a report of the Surgeon General.
10. Okeigbemen, S. A., Nnawuihe, U. C., & Osemwegie, C. (2015). Dental caries experience and oral health behavior among 7-15 years old children attending military and paramilitary schools in Benin City. *Savannah Journal of Medical Research and Practice*, 4(1), 15-20.
11. Fawell, J. K., & Bailey, K. (2006). Fluoride in drinking-water. *World Health Organization*.
12. Rwenyonyi, C., Bjorvatn, K., Birkeland, J., & Haugejorden, O. (1999). Altitude as a risk indicator of dental fluorosis in children residing in areas with 0.5 and 2.5 mg fluoride per litre in drinking water. *Caries Research*, 33(4), 267-274.

14. Rwenyonyi, C. M., Birkeland, J. M., Haugejorden, O., & Bjorvatn, K. (2000). Age as a determinant of severity of dental fluorosis in children residing in areas with 0.5 and 2.5 mg fluoride per liter in drinking water. *Clinical oral investigations*, 4(3), 157-161.
15. Glendor, U., & Andersson, L. (2007). Public health aspects of oral diseases and disorders: dental trauma. *Community oral health*. London: Quintessence, 203-14.
16. Chaturvedi, A. K., Engels, E. A., Pfeiffer, R. M., Hernandez, B. Y., Xiao, W., Kim, E. & Liu, L. (2011). Human papillomavirus and rising oropharyngeal cancer incidence in the United States. *Journal of Clinical Oncology*, 29(32), 4294-4301.
17. Smith, E. M., Ritchie, J. M., Summersgill, K. F., Klussmann, J. P., Lee, J. H., Wang, D. & Turek, L. P. (2004). Age, sexual behavior and human papillomavirus infection in oral cavity and oropharyngeal cancers. *International journal of cancer*, 108(5), 766-772.
18. Silverman, S. (2001). Demographics and occurrence of oral and pharyngeal cancers: the outcomes, the trends, the challenge. *The Journal of the American Dental Association*, 132, 7S-11S.
19. Coogan, M. M., & Sweet, S. P. (2002). Oral manifestations of HIV in the developing and developed world. *Oral Diseases*, 8, 5-190.
20. Sukkarwalla A, Ali SM, Lundberg P, Tanwir F. Efficacy of miswak on oral pathogens. *Dent Res J (Isfahan)*. 2013;10(3):314-20.
21. Ocheng, F., Bwanga, F., Joloba, M., Softrata, A., Azeem, M., Pütsep, K. & Gustafsson, A. (2015). Essential oils from Ugandan aromatic medicinal plants: chemical composition and growth inhibitory effects on oral pathogens. *Evidence-Based Complementary and Alternative Medicine*, 2015.

RESOURCES:

An excellent site for medical personnel training modules on oral health are available at: <http://www.smilesforlifeoralhealth.org/>

Parent and patient education materials, articles and other useful materials can also be found at: <http://www2.aap.org/commpeds/dochs/oralhealth/index.html>

TABLE 1

3.3.1 Pharyngeal cancer (excluding nasopharynx)

Table 12: Incidence and mortality of cancer of the pharynx (excluding nasopharynx) by sex in Uganda, Eastern Africa and the World (estimations for 2012). Includes ICD-10 codes: C09-10,C12-14

Indicator	MALE			FEMALE		
	Uganda	Eastern Africa	World	Uganda	Eastern Africa	World
INCIDENCE						
Annual number of new cancer cases	75	906	115,131	39	567	27,256
Crude incidence rate ^a	0.4	0.5	3.2	0.2	0.3	0.8
Age-standardized incidence rate ^a	1.1	1.0	3.2	0.5	0.6	0.7
Cumulative risk (%) at 75 years old ^b	0.1	0.1	0.4	0.1	0.1	0.1
MORTALITY						
Annual number of deaths	71	786	77,585	34	496	18,505
Crude mortality rate ^a	0.4	0.4	2.2	0.2	0.3	0.5
Age-standardized mortality rate ^a	1.1	0.9	2.2	0.5	0.5	0.5
Cumulative risk (%) at 75 years old ^c	0.1	0.1	0.3	0.1	0.1	0.1

Data accessed on 15 Nov 2015.

Incidence data is available from high quality regional (coverage lower than 10%). Data is included in Cancer incidence in Five Continents (CIS) volume IX and/or X. Incidence rates were estimated using one cancer registry covering part of a country as representative of the country profile. For more detailed methods of estimation please refer to <http://globocan.iarc.fr/old/method/method.asp?country=800>

^a Male: Rates per 100,000 men per year. Female: Rates per 100,000 women per year.

^b Cumulative risk (incidence) is the probability or risk of individuals getting from the disease during ages 0-74 years. For cancer, it is expressed as the % of new born children who would be expected to develop from a particular cancer before the age of 75 if they had the rates of cancer observed in the period in the absence of competing causes.

^c Cumulative risk (mortality) is the probability or risk of individuals dying from the disease during ages 0-74 years. For cancer, it is expressed as the % of new born children who would be expected to die from a particular cancer before the age of 75 if they had the rates of cancer observed in the period in the absence of competing causes.

Data sources:

Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray F. GLOBOCAN 2012 v1.2, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>