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The corona virus disease 2019 (Covid 19) pandemic has been the greatest public health crisis to affect the world in almost a century. The response from governments and international bodies has been unprecedented and has had widespread effects. The SARS-CoV-2 virus, the organism responsible for Covid 19^{1,2} attacks mostly the airways and can be spread by respiratory droplets expelled through forceful exhalation as seen in coughing, sneezing or labored breathing. Transmission indirectly by hand to mucous membranes from contaminated inert surfaces can also occur. The evidence for infection from fomites is mixed.

Dentists, auxiliary dental personnel and dental patients are exposed to high amounts of aerosols and potentially contaminated fomites³. Indeed, in a news report published in the New York Times, the profession was listed as among those with the highest risk for the disease⁴. The dental profession has to rethink modalities of treatment and activities in this pandemic to protect lives and the profession itself. The international dental federation in its advice to the profession suggested that dentists consult their national dental associations and governments to get guidelines that are applicable in their specific context⁵. In this regard, we present the latest (subject to update) guidelines by the Kenya Dental Association as a way to disseminate them to the dentists in Kenya.

Many countries have suspended routine dental care for patients as a way to mitigate the spread of Covid 19. This has had direct effects in delaying dental care for patients but has also severely impacted the income of all those who are in the dental treatment value chain. This value chain may include; Specialists dentists, general dental practitioners, dental office assistants and staff, dental technologists, dental equipment and material suppliers and their staff among others⁶. This is a significant industry that has to endure sustained loss of income with its secondary effects.

Different governments have developed economic stimulus packages and other ways to sustain livelihoods and their economies. Whether any country has had direct support from the government to the dental profession remains to be seen. But being classified as a small business, in many jurisdictions, may be an indirect way to access some

of these economic support measures⁷. In this issue, we review the financial impact in a Kenyan context and propose some fiscal policy responses that may help the profession stay afloat.

The efforts taken by the government in issuing shelter-in-place orders as well as quarantine and isolation based on exposure risk and test results may help mitigate the pandemic and protect the healthcare system from being overwhelmed. However, these measures cannot go on forever and a strategy on reopening has to be crafted⁸. The dental profession taking into accounts its unique risks, and its economic exposure has to think of a strategy to safely reopen.

This will help take care of patients, protect livelihoods and sustain the entire dentistry based value chain. Some of the proposed strategies for reopening dentistry include; validated rapid antigen based tests and screening tools with high sensitivity, robust use of personal protective equipment, major structural redesign of the typical dental office to filter and direct air and aerosols safely, use of modified suction systems and reimagining the dental appointment system⁹. Whether all these measures will work for all offices is doubtful, however, one thing we can count on is the practice of dentistry will undergo some change as a result of the Covid 19 pandemic.

In this regard, it behooves us to collect data, study different proposals and use the best scientific evidence available to safely reopen dentistry and provide care to patients whilst protecting the practitioner and others in the profession.

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Coronavirus Disease 2019 (COVID-19): Preventive measures, guidelines, and challenges for Dental practice in Kenya

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Abstract

The newly discovered corona virus (2019-nCoV) has caused an outbreak of pneumonia that is worse than that caused by other SARS strains. The pneumonia infection has spread globally with more than 24 countries reporting incidences leading to WHO declaring it an international emergency. There was evidence of human to human transmission and by February several medical care workers with the infection, had been reported. Human to human transmission routes of 2019-nCoV include direct transmission through droplets that contain the virus either from coughs and sneezes. Contact with the oral and nasal mucosa, saliva and fetal-oral routes were also cited as possible sources of contact transmission. Since, dentist operate around the mouth, nose and eye chances of transmission are very high and thus there is urgent need to come up with preventive guidelines to avert more infections especially in the developing countries in Sub-Saharan Africa. This review article has data from emerging guidelines during the pandemic but may change with time as new information emerge.

Introduction

In December 2019, an outbreak of pneumonia of unknown cause was reported in Wuhan city, Hubei province, China [1]. On 31st December 2019, a rapid response team was dispatched from the Chinese Centers for Disease Control and Prevention to investigate the outbreak. By 7th Jan 2020, this team of Chinese scientists had isolated a novel coronavirus Severe Acute Respiratory Syndrome Coronavirus 2 - SARS CoV2 from Wuhan patients [2]. Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome caused by Middle East Respiratory syndrome coronavirus, MERS-CoV and Severe Acute Respiratory Syndrome caused by Severe Acute Respiratory Syndrome coronavirus, SARS-CoV.

In February 2020, the disease caused by 2019-nCoV was renamed COVID-19 by the world health organization (WHO). On 11th February 2020 WHO declared COVID-19 a pandemic due to its rapid world-wide spread. As of 5th May 2020, there were 3,598,324 confirmed cases and 251, 832 deaths worldwide. There were 1, 180, 634 confirmed cases and 68, 934 deaths in the United States of America. In Africa, the Republic of South Africa had 7220 confirmed cases and 138 deaths. Kenya had 490 confirmed cases and 24 deaths [3].

Dental Practitioners must be aware of the challenge and concerns brought by COVID-19. Every effort should be given to understand and control the disease. Dental health care personnel (DHCP) have always been at high risk of exposure to cross-infection with blood-borne pathogens, such as hepatitis B virus, human immunodeficiency virus (HIV), *Mycobacterium tuberculosis*, and other viruses and bacteria that colonize the oral cavity and the respiratory tract [4]. Cross-infection is defined as the transfer of harmful microorganisms, usually bacteria and viruses that could occur between people, pieces of equipment, or within the body [5]. During the COVID-19 pandemic there is a real risk of cross-infection especially from asymptomatic COVID-19 patients or DHCP. In addition to standard precautions, COVID-19 transmission-based precautions need to be practiced by all DHCP. This article seeks to highlight relevant infection prevention guidelines and challenges facing dental healthcare personnel in Kenya during the COVID-19 pandemic.

Case Definition

The National Institute of Communicable Diseases (NICD, Republic of South Africa (RSA)) defined COVID-19 disease as a case where patients present with acute respiratory distress after expressing itchy sore throat, dry cough, fever [$\geq 38^{\circ}\text{C}$] and sometimes diarrhea and vomiting. Patient may also

report positive history of travel or contact with a person who had the disease [12].

On 25th March, Ministry of Health in Kenya modified this case definition to include suspected case, probable case, and confirmed case [15]. Suspected case is defined as: -

Any person with any acute respiratory illness (fever or cough or difficulty in breathing) AND at least one of the following:

- A history of travel in to the country 14 days prior to symptom onset, or
- Close contact with a confirmed or probable case of COVID-19 in the 14 days prior to illness onset, or
- Close contact with an individual with a history of respiratory illness and travel out of the country within the last 30 days, or
- Worked or attended a health care facility in the 14 days prior to onset of symptoms where patients with hospital-associated COVID-19 infections have been reported.

Probable case: A suspect case for whom testing for 2019-nCoV is inconclusive or for whom testing was positive on a pan-coronavirus assay.

Confirmed case: A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Clinical Characteristics

Patients with COVID-19 diseases presents to hospitals with varied signs and symptoms. In early asymptomatic stages, some patient report of having had bouts of gastrointestinal disturbance with loss of taste sensation. With time, they develop itchy sore throat with a mild cough. The symptoms change suddenly and most report episodes fever and dry cough and shortness of breath. Other symptoms, such as muscle pain, confusion, headache have been reported. On clinical examination, the temperature is high [$\geq 38^{\circ}\text{C}$], laboratory findings show features of lymphopenia, prolonged prothrombin time, and elevated lactate dehydrogenase. Chest radiographs are characterized by bilateral patchy infiltrates and chest CT scans demonstrate ground-glass infiltrates [6,7]. Some patients develop serious complications, such as acute respiratory distress syndrome,

arrhythmia, and shock and may require intensive care unit services [8-11].

Diagnosis

Combination of epidemiologic information such as a history of travel; clinical symptoms; CT imaging and laboratory tests will inform the basis for the diagnosis [12-15]. Reverse transcriptase chain reaction (RT-PCR) is the lab test that has been recommended by WHO although use of antibody detection using rapid test kits is under trial (WHO Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases; interim guidance; 2 March 2020).

Evaluation of patients should be done thoroughly to avoid missing early stages of infection where symptoms may be mild. The following recommendations have been suggested by various regulatory bodies and institutions including The Kenya Dental Association (KDA), Kenya Medical Association (KMA), Ministry of Health, Kenya (MOH) and Moi Teaching and Referral Hospital (MT&RH) [14-16].

Establishing precheck triage to measure and record temperatures of staff and patients. Questionnaire about health status, history of travel, high fever. Establishing designated areas to refer suspected cases for further screening.

Patient Evaluation

All patients and staff should have their temperature checked using a contact free forehead thermometer. The following are some of the questions that may guide in identifying suspected cases.

Do you have, or have you experienced, fever within the past 14 days?

Have you experienced a recent onset of respiratory problems such as cough or difficulty in breathing within the past 14 days?

Have you within the past 14 days travelled to an area with the pandemic?

Have you encountered a patient suspected or confirmed of having COVID 19 disease in the last 14 days?

Have you had disturbance in your digestive system such as diarrhea, vomiting?

Management of cases after triage

Dental treatment of cases will depend on the answers to the above questions.

No, to above questions and the temperature is below 37.3, the dentist can treat the patient and minimize aerosols [13-15].

Yes, to any of the above questions and her/his temperature is below 37.3 degrees Celsius defer treatment. Ask the patient to quarantine for 14 days.

Yes, to any of the above questions and temperature is above 37.3 degrees Celsius, isolate and issue him/her with a surgical or N95 mask.

Testing of suspected cases

Suspected cases have specimens taken from the naso-pharyngeal and oro-pharyngeal regions for laboratory diagnosis using reverse transcriptase PCR (RT-PCR). The specimens are transported in the same medium to a validated lab for diagnosis and confirmation of the cases.

Appropriate personal protective equipment (PPE) should be worn by all healthcare workers when obtaining specimens.

Infection Prevention

A dental clinic environment is a place where cross-infection can occur easily [16]. In December 2010, the National Infection Prevention and Control Guidelines for Health Care Services in Kenya were published [17]. The guidelines were issued jointly by the ministry of public health and sanitation and the ministry of medical services. Appendix 4 of these guidelines consists of infection prevention and control guidelines in Dentistry. Similarly, the Centers for Disease Control and Prevention (RSA) published a comprehensive document detailing 6 key elements required to prevent transmission of infectious agents in dental settings [18]. These elements include: 1. administrative measures such as provision of supplies, 2. Infection prevention education and

training, 3. Dental healthcare personnel safety, 4. Program evaluation including adherence to infection prevention practices, 5. Standard precautions such as hand hygiene and personal protective equipment, and 6. Monitoring dental unit water quality.

When Standard Precautions alone cannot prevent transmission, they are supplemented with Transmission-Based Precautions [19]. This second tier of infection prevention is used when patients have diseases that can spread through contact, droplet, or airborne routes (e.g., skin contact, sneezing, coughing) and are always used in addition to Standard Precautions. Transmission-based Precautions must be employed in dental settings when treating COVID-19 suspected or confirmed cases.

When dental healthcare personnel provides emergency dental care with a risk of aerosol generation in confirmed or suspected COVID-19 cases, the following personal protective equipment will be required: 1. Disposable surgical cap, 2. Medical protective mask such as surgical N95 respirator, 3. Work uniform (scrubs), 4. Disposable medical protective uniform, 5. Disposable latex gloves, 6. Full face respiratory protective devices or powered air-purifying respirator [19].

On 24th March 2020, the Ministry of Health in Kenya, in recognizing that dental professionals are uniquely exposed to COVID-19 due to regular contact with the oral mucosa, bodily fluids, saliva and blood, released new guidelines for a dental practice with respect to COVID-19 pandemic [20]. It was noted that dental procedures result in the production of droplets and aerosols that can remain suspended in the air for some time before being inhaled or settling on environmental surfaces. This poses a great risk of cross infection in dental settings. The following guidelines were given for all dental health care personnel in Kenya.

1. Routine dental procedures should be deferred pending direction from the ministry of health. Dental emergencies should be attended to non-invasively where applicable. Where procedures must be done, this must be done with the presumption of COVID-19 exposure and appropriate precautions taken. All clinics must have standard operating procedures in place

for handling patients potentially exposed to COVID-19. All stand-alone clinics should cease operations as the ministry of health assesses the situation. All emergency cases should be handled in designated hospitals.

2. Triage should be done via electronic means and telephone calls, and referrals made to the hospital. All patients should be treated as potentially COVID-19 infected and all necessary precautions are taken. Only emergency care should be provided.
3. Since a significant proportion of COVID-19 patients are asymptomatic, oral examination should only be done in designated hospitals with proper personal protective equipment and this should only be for dental emergencies.
4. All dental healthcare personnel working in designated hospitals providing emergency dental care must be provided with proper personal protective equipment including N95 mask, face shield, gown, surgical gloves, and headgear.
5. It is the responsibility of Dentists to ensure their safety, that of their staff, patients, and the public.

Dental Emergencies

Potentially life-threatening emergencies that require immediate treatment to stop ongoing tissue bleeding, alleviate severe pain or infection should be managed with utmost care. These include uncontrolled bleeding, acute pain that is not responding to analgesics and ill-fitting prosthesis or orthodontic appliance^[15-18].

The WHO^[19] has stated that all non-urgent dental appointments should be suspended until the COVID-19 crises is over and health officials indicate that its appropriate to resume safely. They recommended the use of PPE for treating patients; however the supplies of PPE in hospitals are critically low, therefore they recommended that PPEs should be used for emergency cases only.

The CDC guidance on optimization of PPE recommended: providing only urgent care, limiting people in facility, telemedicine, limiting procedures in length and in spread of oral fluids, a full list is on the CDC website.

Discussion

COVID 19 is a new phenomenon in our set up. There are challenges in our set up especially when it comes to case definition, clinical diagnosis, and infection control guidelines.

The given case definition is a challenge in asymptomatic patients who have no history of travel neither contact with an infected person. Dental treatment in such a case may spread the infections to other patients. Therefore, it might be safer to treat all cases as suspect unless confirmed by the tests.

Mass, targeted testing has been recommended by the ministry of health, but this again has faced several challenges. The stigma associated with the novel corona virus has made people not to go for voluntary testing. Lack of testing kits and the cost implications has also played a role in the slow pace of testing. Therefore, adopting the guidelines in a resource limited set up, might be difficult because of the limited supply of personal protective wear and our kind of treatment facilities. The recommended working environment for dentists may only be possible in referral hospitals (level 5 and 6). Patients may have to travel further even for emergency dental care. Use of the required protective devices like N95 masks routinely will be challenge because they are costly and not easily available especially in public hospitals. This will mean transferring the cost to the patients who are already strained economically.

Conclusion

Research in this area is still in the infant stages and guidelines keep on changing and there is need for continuous education.

Recommendation

1. For all basic health care facilities, if PPEs are not available, such dental clinics should close. All consultations should be by telephone and only emergencies to be referred to facilities recommended by the ministry of health. If PPEs are available filter the patients and limit treatment to dental emergencies only.
2. Water shortage. Facilities to improvise using portable water tanks, and washing soap.

3. Expectations from employers: DHCP to refer to MOH and WHO guidelines and advice their employers accordingly
4. Awareness: DHCP should attend COVID-19 trainings, get updates from official online websites, hospitals to avail circulars, updates, and guidelines on COVID-19 from the MOH
5. Community education through community health workers and community health volunteers who will then educate the masses
6. Socio-behavioral: Adherence to social distancing guidelines by the ministry of health with regards to the COVID-19 pandemic
7. Transport: adherence to the MOH guidelines including the usage of ambulances to transport suspected cases.

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Abstract

The Coronavirus Disease 2019 (COVID-19) is a respiratory illness caused by a novel coronavirus, namely severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), first detected in December 2019 in the city of Wuhan in Hubei province, China and later declared a global pandemic by WHO. Covid-19 has caused interruption of global trade and supply chains and depression of asset prices.

In Kenya, the pandemic has seen the government impose measures that have restricted movement and forced scaling down and closure of some businesses. So far, the covid-19 outbreak, and the counter measures put in place by the Kenyan government has had adverse effects on several industries. One of the most affected industries is the dental industry. The government of Kenya, through the ministry of health recommended that only dental emergencies should be treated in level five or six facilities with full personal protective equipment and that all stand-alone dental clinics should suspend operations. While these measures are commendable as they slow the spread of the virus, the negative financial impact due to this business interruption is a challenge the dentists will have to face in the months to come. Most dental clinics are currently suffering huge financial losses due to closure. The hard choices will be how to pay staff salaries, rent and meet their financial debt obligations including loans and credit owed to suppliers during this period. This paper discusses these challenges and makes recommendations on the way forward.

Introduction

The Coronavirus Disease 2019 (COVID-19) is a respiratory illness caused by a novel coronavirus, namely severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), first detected in December 2019 in the city of Wuhan in Hubei province, China. Symptoms range from fever, flu-like symptoms such as coughing, sore throat and fatigue, and shortness of breath ⁽¹⁾ to pneumonia, kidney failure and even death ⁽²⁾. According to Ayittei et al. ⁽³⁾ Covid-19 has caused interruption of global trade and supply chains and depression of asset prices. As a result, multinational companies have been forced to make hard business decisions with limited information.

According to The World Health Organization (WHO) situation report 67 on Covid-19 ⁽⁴⁾, many countries have implemented health measures that have had a significant negative impact on international traffic as defined under Article 43 of the International Health Regulations (2005). These health measures have also led to closure of businesses within these countries, disrupting entire industries and threatening the livelihoods of millions of employed workforce.

The socio-economic impact of covid-19 on global economies may not be fully clear until after a few months to years, but studies of the socio-economic impact of previous widespread health disasters like the Ebola outbreak in West Africa and the Middle East Respiratory Syndrome (MERS) outbreak in the republic of Korea can point to how much public health emergencies of such magnitudes affect the economies of nations and the livelihood of the people. In his study to assess the socio-economic impacts of covid-19, Olaniyi (1) reviewed the impacts of previous health epidemics and noted that the Ebola virus of West Africa in 2013 to 2014 led to a significant decline in government revenue across board due to decline in direct and indirect taxes.

Additionally, decline in investors' confidence led to financing gaps of \$600 million over the two years. He further noted that the total global economic loss due to the SARS outbreak was estimated at \$40 billion, most of it attributed to consumer fears given the ease of transmissibility of the virus in public settings.

In the same fashion, covid-19 is already being projected to have a massive impact on the global

economy. A Bloomberg report⁽⁵⁾ has projected that the novel corona virus could cost the global economy an astonishing \$ 2.7 Trillion, which is equivalent to the entire GDP of the U.K. This economic fallout could include economic recessions in US, Europe, Japan and China. The African continent still accounts for relatively few cases of infections and deaths from the virus, but the numbers are steadily rising.

As of 8th of April 2020, there were 10,250 confirmed cases and 492 deaths reported by Africa news.⁽⁶⁾ against 1.4 million infections and over 85,000 deaths globally⁽⁷⁾. However, millions of livelihoods have already been disrupted in the continent with disproportionate impact on poor households and small and informal businesses. Data on the impact of covid-19 outbreak on the African economy has been slow to emerge, but the Economic Commission for Africa (ECA) reports that Africa may lose almost half of its gross domestic product (GDP) growth and its economy could shrink by up to 2.6%⁽⁸⁾.

In its report titled 'Covid-19 in Africa: Protecting Lives and Economies,' the ECA projects that the impact on African economies could slow growth by \$29-\$120 billion while imposing \$44-\$446 billion in additional health costs. McKinsey projects that the African economy will experience contraction in 2020 with its GDP falling by five to eight percentage points as a result of this global pandemic. This translates to a loss of \$ 90-\$200 million mainly driven by reduced household and business spending, travel bans, supply chain disruptions, and fall off in demand for Africa's non-oil exports⁽⁹⁾.

The Kenyan context.

In Kenya, the pandemic has seen the government impose measures that have restricted movement and forced scaling down and closure of some businesses. According to South Africa's Rand Merchant Bank⁽¹⁰⁾, Kenya's economy has the highest risk exposure in Africa in respect to the covid-19 pandemic. Kenya has the highest overall risk score of 27 points followed by Ghana on 24 and Egypt on 23. The report notes that the economic impact of the virus on Africa will depend on individual countries trade links with China in terms of imports and exports⁽¹¹⁾.

The Kenyan government, through the Central Bank, has indeed issued a warning of slowed economic

growth and downgraded its 2020 GDP growth projection from 6% to 3%⁽¹²⁾. McKinsey has a less optimistic view of the impact of the pandemic on the Kenyan economy. If Kenya manages to contain the outbreak, McKinsey projects that the GDP could decline from 5.2% to 1.9 % (a reduction of \$ 3 billion) after accounting for the 2020 locusts invasion⁽¹³⁾.

This will largely be due to reduction in household and business spending (about 50%), disruption to supply chains for key inputs (about 30%) and tourism (about 20%). However, if the outbreak is not contained the GDP could fall to -5%, representing a loss to GDP of \$ 10 billion. The biggest driver of this loss will be a reduction in consumer spending. So far, the covid-19 outbreak, and the counter measures put in place by the Kenyan government has had adverse effects on several industries. One of the most affected industries is the dental industry.

Impact of Covid-19 on the Dental Industry.

The dental industry is one of the industries that has been adversely affected by the covid-19 pandemic. Dentists work in close contact with their patients, and most dental procedures generate large amounts of aerosols. WHO has since established potential scenarios for transmission of the virus, which include contact with droplets from talking, coughing, sneezing, and aerosols generated during clinical procedures. Inhalation of airborne particles and aerosols produced during dental procedures on patients puts dentists at a very high risk of exposure to this virus⁽¹⁴⁾.

Due to this high risk of exposure, many health regulatory bodies globally including the American Dental Association, National Health Commission of China, Consejo General of Spain and the National Health Service (NHS) of the United Kingdom (U.K) have strongly advised their members to stop all routine dental procedures and only treat dental emergencies and patients requiring urgent dental treatment⁽¹⁵⁾. The government of Kenya, through the ministry of health, recommended that only dental emergencies should be treated in level five or six facilities with full personal protective equipment and that all stand-alone dental clinics should suspend operations⁽¹⁶⁾. While these measures are commendable as they slow the spread of the virus, the negative financial impact

due to this business interruption is a challenge the dentists will have to face in the months to come. Most dental clinics are currently suffering huge financial losses due to closure. The hard choices will be how to pay for staff salaries, rent and meet their financial debt obligations including loans and credit owed to suppliers during this period.

The governments in high income countries have understood the gravity of the situation and have offered support for dental clinics. According to Farooq and Ali ⁽²⁾, the Canadian government has set aside funds under an Economic Response Plan to cushion vulnerable businesses from the devastating financial impact of the Covid-19 outbreak. The dentists are eligible to apply for this fund to save their clinics from closure due to financial losses. The government of UK is also offering loan and credit facilities to businessmen to enable them pay salaries and supplies during this difficult time. Dental clinics under the umbrella of NHS are going to receive some of these funds to reimburse losses due to Covid-19 outbreak.

The Ireland Dental Association has indicated on their website that the Irish government will support businesses (including dental clinics) that have been affected by the pandemic and has set aside a Covid-19 business loan for this purpose. There is no data to suggest that middle and low income countries have any policies in place to support affected dental clinics during this difficult time. While there are several fiscal policy responses by these countries, most of the policies are geared towards offering liquidity support to businesses in the tourism and hospitality sector. According to an International Monetary Fund (IMF) report ⁽³⁾ titled 'Policy Responses to Covid-19' the various fiscal adjustments made by governments are as follows:

Government Grants

Most governments have allocated funds to help affected businesses meet their payroll obligations, especially businesses that have been closed down due to the governments' decisions. Others have prepared supplementary financial laws which include compensation measures for losses incurred by businesses that have been hit hard by the pandemic.

Tax relief

Some governments have allowed interest free deferral of tax payments, including social security contributions, for small companies for up to a period of six months. Others have postponed (indefinitely) declaration and payment of income tax for individuals and small enterprises, while also lowering taxes and import levies on essential medical equipment.

Loans

Governments have liaised with commercial banks to advance subsidized loans to business that have been adversely affected by the pandemic. These governments guarantee the loans and the affected businesses are given the funds to help pay for salaries in order to avoid laying off of workers, and also to meet other operational costs.

Prompt payment to suppliers

Some governments have opted to improve liquidity of businesses by settling supplier invoices promptly.

Rental Assistance programs

Some governments have put in place rental assistance programs to help vulnerable tenants meet their rent obligations. Other governments are offering a rent reduction of up to 30% on government owned commercial properties.

Kenyan Policy Response Proposals.

It was the right move by the government to restrict dental treatment to emergencies only, in a hospital setting (preferably level five or six) where provision of proper personal protective equipment (PPEs) can be assured and where screening and isolation areas can be availed. The government must therefore ensure that the earlier guidelines remain in force until the outbreak has been contained. However, the government must also be sensitive to the fact that the closure of the dental clinics across the country has threatened the livelihoods of not only the Proprietors of these clinics, but others who are also employed by these clinics directly and indirectly.

These include associate dentists, dental nurses, community oral health officers, receptionists, sales representatives, dental marketers, accountants

among others. Suppliers of dental consumables and non-pharmaceuticals, and the dental lab technicians are also affected by extension.

According to the Medical Practitioners and Dentists Council (MPDC) register, there are about 283 stand-alone private dental clinics licensed to practice in 2020. This number excludes the many other dental clinics attached to private medical hospitals. Most of these clinics are expected to remain closed. The few ones that remain open are experiencing a sharp increase in operational costs. Running a dental clinic is generally expensive, with high capital costs and recurrent expenditure. As a result, dental treatment is usually costly and few can afford. Dentists also use protective personal equipment (PPEs) in their day to day operations. Covid-19 has led to a sharp increase in the cost of PPEs, which are essential to dental practice.

The PPEs are also not readily available due to the very high demand arising from the pandemic. This, coupled with the strict disinfection and sterilization protocols necessitated by the corona virus outbreak, has led to an increase in the operational costs of the dental clinics that are still open. Due to the current economic uncertainty, it is expected that there will be a decrease in consumer spending as most people hold back and only spend money on the essential goods and services. This is expected to negatively affect the demand for dental services. Increased cost of operation and reduced demand in an already small market is not sustainable, and the few clinics still in operation will eventually be forced to close down.

The government must therefore offer support to protect these dental clinics that have created employment for many Kenyans, from collapse as a result of the financial losses being incurred. The Kenyan government should urgently provide some form of relief to enable the clinics to meet their payroll obligations and avert layoff of employees. Government support will also alleviate the financial pressure and temptation to reopen the clinics before the outbreak is fully contained. Reopening of the clinics, which are high-risk exposure environments can easily lead to reinfections and a second wave of covid-19 outbreak within the country. Re-opening the clinics will also increase the demand on personal protective equipment (PPEs) which are already in short supply and are better left to health care workers

that are in the frontline. If the clinics remained closed, these dentists will also provide a pool of health care workers that can readily be redeployed should the situation escalate and there's need for already trained workforce. Dentists are already well trained on infection prevention and control and will easily fill in any human resource gaps with very minimal additional training. While coming up with these support measures, the government should concentrate on the few areas that will have the biggest relief.

Khairiya et al. in a study in Malaysia found out that rent, employee emoluments and benefits, and equipment maintenance costs were the biggest cost drivers in operating a dental clinic⁽¹³⁾. A similar study of several dental clinics across Europe concluded that labor, rent and utility bills were the biggest cost drivers⁽¹⁴⁾. It's therefore clear that any relief efforts should be aimed at the rental costs and salaries, as these have been found to constitute the largest percentage of operational costs. The government should consider supporting these dental clinics through the following ways.

Rental Assistance

The government can come up with ways to assist the dental clinics meet their rental obligations for the period in which they remain out of operations. These measures may include a directive for the landlords to reduce the rents charged by a given percentage, say 30%-50%, which the landlords can claim later from the government in form of tax relief.

Those who have rented commercial buildings owned by the government should have their rent charges completely waived.

Payroll Assistance

The government can offer liquidity support to the dental clinics by guaranteeing loans which the commercial banks can offer to the clinics to help them meet their payroll obligations and avoid laying off employees. These loans should have very low interest rates because they will be guaranteed by the government and therefore the risk of lending will be low. The government can also offer grants to enable the clinics, to cover in part the salaries of workers who are in danger of being laid off, and also take care of other operational costs.

Tax relief

Declaration and payment of income tax for the dental clinics and their employees should be postponed. Social security contributions should also be deferred, without any penalties. The government should lower the import levies charged on essential dental supplies for the rest of the year. This will make the supplies cheaper and readily available and make it easier for the clinics to resume operations once the outbreak has been contained.

Prompt settlement of invoices by third party payers
One way of immediately improving liquidity of the clinics is for the insurance companies and other third-party payers to clear outstanding balances. The government should direct all the third-party payers to settle all valid invoices that are more than 30 days outstanding. This will provide more cash flow to meet some operational expenses and help the clinics stay afloat.

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Recommended Guidelines for Re-Opening Dental practice in Kenya

Introduction:

On 31st December 2019, WHO was informed of a cluster of cases of pneumonia of unknown cause detected in Wuhan City, Hubei Province of China. Chinese authorities identified the SARS-CoV-2 as the causative virus. On 30th January 2020, WHO announced that the COVID-19 outbreak was a Public Health Emergency of International Concern and the disease was named "Coronavirus Disease 2019" (COVID-19) by WHO. The first COVID-19 case in Kenya was announced on 13th March 2020. Most people infected with the SARS-CoV-2 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

COVID-19 spreads primarily through droplets and fomites. The close working environment and the potential for aerosol spread of the virus through dental procedures, such as use of high and low-speed handpieces, ultra-sonic scalers, air/water syringes, intra-oral radiographs or an infected patient coughing, places dental health workers at an elevated risk of infection.

Dental services are significantly impacted by the COVID-19 pandemic. Almost all dental procedures carry a high infection risk for providers and patients due to spread of aerosols. As a consequence, national health agencies, and dental professional associations have issued guidelines for enhanced infection control, personal protection equipment and limiting care to urgent or emergency services.

SARS-CoV-2 disrupts health care and dentistry worldwide:

Health care services are adapting to the COVID-19 pandemic, yet oral health care and dentistry are particularly affected due to the proximity to the patient and the generation of aerosols through

common treatment procedures. The SARS-CoV-2 virus seriously disrupts routine dental procedures around the world. The reports, analyses and recommendations emerging with first-hand experience from dental settings in China are alarming. The risks of infection for oral health personnel, cross-infection between patients and anyone in the dental care setting are high.

The consequences of the COVID-19 pandemic on health systems and availability of dental care are unprecedented. For example, in the U.S., about 80% of practices offer only limited emergency services and 17% do not see patients at all. This impacts availability and patient access to essential services, while service limitations result in significant economic losses for the entire dental sector, including layoffs of dental teams and growing unemployment. In addition, the prospects of re-starting services remain bleak and uncertain for the months to come. The impact on dental services in low- and middle-income countries though not documented is very high considering the already limited resources and workforce, recommendations for service limitations to emergency care and increased precautions were issued in many countries including Kenya.

The infection risk from aerosols in dentistry:

Dental teams are generally used to high standards of infection control and personal protection measures, owing to the fact that dental personnel are among the most at risk for any kind of infection transmitted via contaminated aerosols and saliva, bodily fluids, blood or tissue particles.

Current evidence suggests three main pathways for virus transmission in dental settings: 1) direct transmission through inhalation of cough, sneeze, or droplets containing virus; 2) transmission via eye, nasal or oral mucous membranes; and 3) contact transmission through contaminated surfaces. All these transmission pathways are facilitated and possibly amplified by aerosols that are generated by most dental procedures.

In reaction to the COVID-19, governments have issued specific guidance for the control of SARS-CoV-2 in dental practice. These recommendations focus on three main areas where adaptation to the pandemic context is required to break potential transmission chains: 1) patient management and tele-dentistry to prevent sick or possibly infected patients from coming to the practice; 2) enhanced infection-control measures that include strict protocols for personal protective equipment (PPE), and 3) limitation of dental care to urgent and emergency procedures.

In the U.S., the Occupational Safety and Health Administration (OSHA) considers work environments where aerosols may occur, to be of high or very high infection risk for COVID-19. In Kenya, the Ministry of Health classified Dental procedures as one of the very high infection risk procedure for COVID-19 together with procedure such as intubation and ENT. In a specific update for dentistry, OSHA requires telephone triage, office engineering controls that include air circulation and patient isolation, universal precautions for airborne pathogens, the use of PPE appropriate for the pandemic, limiting care to urgent and emergency procedures that do not generate aerosols, and environmental cleaning post-care. The recommendation for airborne infection isolation rooms (AIIR) with negative pressure is in line with the U.S. Centres for Disease Control and Prevention's (CDC) existing guidance.

Such measures beyond the standard dental infection-control procedures are challenging due to limited or costly supplies of PPE, or would require significant infrastructure investments. Many of the requirements are even unrealistic to achieve in university dental college settings, at least in the short term. For many dental care contexts, such as mobile dental services for schools, remote communities, nursing homes, prisons, refugee camps, as well as dental services in low-resource settings where the shortage of supplies is a constant challenge, such enhanced protective measures are near to impossible.

The risks from infectious aerosols are central to all recommended alterations of current dental practice, yet uncertainties and open questions related to transmission details remain and oblige dental practitioners to assume they are operating under the highest possible infection risk and to act accordingly

with appropriate precautions. This may be the end of dentistry as we know it. At this point of the pandemic, dentistry needs a concept for continued dental services that avoids procedures generating infectious aerosols as much as possible.

Re-opening dental practice:

The COVID-19 pandemic has led to the closure of dental practices or a reduction of dental services all over the world. Some countries are currently reopening or planning to reopen dental services as part of an exit from the lockdown strategy or as the intense phase of the pandemic subsides.

Pandemic planning for dental services typically involves a step-down process, with cancellation of routine care first, then urgent care followed by the provision of emergency care only. In many countries, the move to emergency care provision was rapid. From the beginning of March 2020, many countries undertook these measures. In Kenya, the Director General for Health approved guidelines for Dental practice advising that only emergency care should be provided on 25th March 2020.

It is now time for Governments and health agencies to come up with recommendations or guidance for the re-opening/re-structuring of dental services.

Literature review of guidelines from eleven countries (Australia, Canada, USA (CDC & ADA), Malta, Denmark, Norway, Belgium, Switzerland, Portugal, Spain and France) that have re-opened dental practice identifies some common themes and relevant recommendations in the five domains.

The five domains identified were:

1. Practice preparation and patient considerations.
2. PPE for dental practice personnel.
3. Management of the clinical room.
4. Dental procedures.
5. Post-operative cleaning/disinfection/waste management.

These domains are supposed to help individual governments to come with tailor made guidelines that suite their needs for dental practice.

Below are recommendations for re-opening dental practice in Kenya based on the 5 domains above.

Recommendations related to practice preparation and patient considerations

Theme	Recommendations
Re-opening tasks	How to reduce risk of contamination e.g. staff training and machine and equipment maintenance, assessment of the space (adequate ventilation)
Supply chain	Confirming the sources, availability and authenticity of supplies including PPE.
Staff advice and screening	Advice or training in revised protocols including checking that staff are free of COVID-19 symptoms. Daily screening of temperature.
Patient triage	Information on how to group patients mainly by telephone to include risk assessment of potential COVID-19 status (e.g. COVID-19 positive, suspected COVID-19, asymptomatic, special need/shielding). Temperature screening at reception.
Patient advice	Type of advice to provide to patients attending the surgery (e.g. social distancing, wearing mask, hand hygiene)
Patient scheduling	Clear scheduling of patients based on triage with special consideration to the vulnerable or/and special needs: to avoid contact with higher risk patients. Appointments should be spread between 20-30 minutes to allow for enough time to disinfect all areas and avoid cross infection between patients in waiting rooms.
Waiting area reception	Social distancing, rearrangement of furniture, patient information posters, wearing of masks, hand sanitiser, removal of magazines/toys and other unnecessary items.
Toilets	Remove hand drying towel and air dryers and replace with paper towels. Display proper hand hygiene posters, running water and soap.
Patient discovered COVID-19 positive after treatment	Contact tracing and isolation of close contacts (i.e. dental staff providing treatment).
Indemnity/insurance	Clinicians should discuss with their indemnity provider (or equivalent) regarding obtaining consent from patients and legal implications.

Recommendations for PPE for dental practice personnel

Theme	Recommendations
All staff	All staff should wear a face mask, wear eye protection, wear work uniforms or gown to be laundered on site or by laundry service.
Unsuspected COVID-19 patients	Eye protection (glasses/goggles, face shields) and single use gloves, FFP2 mask or equivalent, surgical hat or equivalent.
Unsuspected COVID-19 patients undergoing AGPs	Disposable surgical gown, FFP2 mask or equivalent (changed after each patient), surgical hat or equivalent in addition to the recommendation for the unsuspected COVID-19 patients
Confirmed COVID19 patients	Eye protection (glasses/goggles, face shields); single use of gloves and disposable surgical gown. Double gloving depending on the procedure. FFP2 mask or equivalent. Surgical hat or equivalent
Confirmed COVID19 patients undergoing AGPs	FFP2 mask or equivalent (changed after each patient). FFP3 masks or equivalent, if available.

Recommendations for management of the clinical room

Theme	Recommendations
Use of spittoon	Avoid or minimize use of spittoon in the dental unit
Clear work surfaces, minimise equipment and cross infection procedures	Limiting paperwork, covering notes with a barrier and removal of artwork and posters. Ensuring all equipment in sight are minimised to only that which is strictly necessary to avoid viral cross-contamination. All required equipment/materials should be prepared in advance. Common contact areas such as the chair lamp, handles and keyboard should be covered with a barrier (e.g. plastic film or aluminum foil). Practice 4 or more hands dentistry at all times. (work with an assistant)
From waiting area to treatment room	Switching between different treatment rooms if possible, especially following AGPs. Information on COVID-19 should be posted on the entrance of the clinic. No handshaking or contact with patients. Minimum staff to be allowed entry into the surgery/treatment area. Staff should have all the PPE on before they go into a treatment room.
Suspected/confirmed COVID-19 patients	Suspected or confirmed COVID-19 patients should be directed to the treatment room and should not be allowed to wait in the waiting area. Patient treatment should be undertaken in an isolation room with negative pressure or properly ventilated room.
Home visits	All patients should be asked about symptoms of COVID-19 and social distancing and appropriate cross infection control should be adhered. This includes cleaning of contact surfaces in the patient's home and contact surfaces in the dentist's car
Air quality	Importance of ventilation/air renovation with at least 15 minutes is required after each patient for ventilation. Air conditioning in extraction mode only (never in recirculation mode). HEPA filter (level 13 or higher) should be used for the suction system where available. Door of the surgery must remain closed to prevent viral spread and all drawers and cabinets should also remain closed.
Patient hygiene	Provide information on general patient hygiene in the clinic. For example, patients are requested to disinfect their hands at arrival, should be supplied with appropriate protection and must perform hand hygiene on completion of treatment and leave the room as soon as possible.
Post-treatment	Dental staff should leave the treatment room and then remove their visor, eye protection and masks. Disposal of surgical gowns and aprons into a sealed plastic bag or with highly contaminated materials.

Recommendations for dental procedures

Theme	Recommendations
Reduction of AGPs	Reduce or avoid AGPs. Avoiding using the air-water (3-in-1) syringe where an alternative method is available.
Risk reduction interventions	Employ all measures that reduce the risk of transmission. Use rubber dam and high-volume suction. Use of pre-operative mouthwashes.
High volume suction	To specifically decrease viral load generated by aerosols. Aspirator tip should be covered with a disposable cover.
List of recommended operative procedures	Minimally invasive procedures. Endeavour to practice SAFE dentistry (Safe Aerosol-Free Emergent Dentistry)
Tailored advice for patient groups	Provide specific advice for different patient groups e.g. COVID-19 asymptomatic; shielded/vulnerable groups; suspected or confirmed COVID-19 positive patients. It would help to have this in writing.

Recommendations related to post-operative cleaning/disinfection/ waste management

Theme	Recommendations
Cleaning and disinfection procedures	Cleaning and disinfection of all surfaces following every patient contact. Cleaning and disinfection of all non-clinical areas (reception, waiting area, toilets) including door handles, chairs, and surfaces. Clinical floor cleaning as often as is necessary depending of levels of contamination.
PPE during decontamination	Staff should wear eye protection, gloves and mask when performing decontamination/disinfection procedures. Washing of garments at the highest possible temperature.
Clinical waste disposal	Waste to be disposed of as per regulations and guidelines of local system. PPE and other disposable contaminated material should be placed in a plastic bag in a pedal-operated, hard-lid container.
Disinfection products	Hypochlorite/chlorine-based solution for disinfection. Routine cleaning and disinfection of room surfaces (e.g. cleaners and water to clean surfaces before applying a disinfectant). Use of alcohol (60-70% ethanol) for disinfection.
Existing policies on decontamination	International and national policies guidelines for disinfection and decontamination should be followed.
Hand washing	Hand hygiene following doffing of PPE/decontamination of environment. Hand washing with alcohol (60-95%) based hand rub or soap and water for at least 20 seconds.

PRACTICE PREPARATION AND PATIENT CONSIDERATION

Reopening surgery:

- Clinical staff health status needs to be checked and staff to receive appropriate training on protocols, procedures, and materials.
- If possible, do a simulation prior to the arrival of patients.

Reception area:

- Cleaning/disinfection of shoes.
- Visible line to indicate a security distance of approximately 1.5 Meters from reception desk.
- Person at the reception should wear a surgical mask and, if possible, protective glasses.

Waiting room:

- Remove all unnecessary items such as decorations, coffee makers, magazines, books, toys etc.
- Chairs arranged in way to respect social distancing and at least 1.5 metres apart.

Toilets:

- Remove bathroom towels or hand dryers and replace with paper towels.
- Provide instructions on proper hand washing.

Patient advice:

- With the exception of children and persons in need of assistance, patients should come alone.
- Avoid wearing jewellery or accessories.
- Mobile phones must be stored and not used in the dental practice.
- A distance of at least 1.5 meters must be observed if another patient is present in the dental practice.
- Payment should be arranged preferably by cards or mobile money transfer.

Patient scheduling:

- Patient temperature should be taken at arrival and invited to Wash or sanitize hands.
- Patients should come wearing or be offered a surgical mask on arrival.
- If children and adults need to be seen it is advisable to schedule them at different times.
- Ensure that patients waiting time does not exceed 15 minutes.
- Use an appropriate booking system to minimise the number of patients in the waiting room.
- Patients should not wander around in or out of the clinic.

Postoperative instructions to patient:

- Explain to the patients that elective procedures may be deferred or reassessed.
- Avoid shaking hands and un-necessary delay with the patient.
- Patient should leave the treatment area as soon as the treatment is completed.

PPE FOR DENTAL PRACTICE PERSONNEL

All staff including disinfecting treatment rooms:

- Level 1 mask as a minimum
- Eye protection
- Gloves
- Scrubs /gown
- Maintain social distancing
- Avoid wearing rings, bracelets, pendants, watches, or other accessories
- Hand hygiene (for at least 20 seconds)
- Avoid touching your face and surrounding surfaces while wearing PPE

Non-AGPs:

- Level 2 or 3 mask
- Eye protection (glasses, goggles or face shield)
- Scrubs/gown
- Gloves
- Lab coat or gown if patient contact

Intermediate risk AGPs with dental dam:

- N95 or K95 respirator (fitted)
- Face shield or goggles
- Cap/surgical bonnet
- Gown/lab coat (with cuff)
- Gloves

High risk AGPs without rubber dam:

- N95 or K95 respirator (fitted)
- Face shield
- Cap/surgical bonnet
- Gown/lab coat (with cuff) – Gloves

Note: All confirmed coronavirus cases will only have dental treatment as in-patient or within a hospital setting by appropriately trained dental personnel.

MANAGEMENT OF THE CLINICAL ROOM

Minimise equipment:

Before the patient enters:

- Organise the strictly necessary material and instruments, and PPE.
- Avoid viral cross contamination by placing unnecessary material or instruments out of sight.
- The placement of plastic or aluminium film in certain areas (those considered to be at greater risk of splashing or aerosols) can be useful.
- All common contact areas of the equipment (e.g. chair lamp handle, etc.) should be covered with plastic film (or aluminium foil) between patients visits.

Patient preparation:

Before starting any procedure:

- patients should disinfect their hands
- for those interventions that generate aerosols eye protection is necessary.
- Use only disposable cups.

DENTAL PROCEDURES

Non-AGPs:

- Avoid aerosol generating procedures (including dental hand pieces, air-water syringe and ultrasonic scaler) Priority should be given for minimally invasive/atraumatic restorative techniques.
 - Use professional judgement to employ lowest aerosol generating technique for restorative/hygiene care (hand scaling).
 - Use high speed evacuation where possible.
 - Extraoral radiographs recommended (minimise use of intraoral radiographs)
 - Utilise hand instruments only
 - Utilise four-handed dentistry
 - Do not use air water syringes
 - Do not use ultrasonic instruments
 - Do not use high-speed rotary hand pieces or electric low-speed hand pieces with air and water
- Provision of dental treatments that are unlikely to generate aerosols or where aerosols generated have the presence of minimal saliva/blood due to the use of rubber dam:

This includes:

- Examinations
- Simple non-invasive fillings without use of high-speed handpieces

- Restorative procedures using high speed handpieces only provided with the use of rubber dam
- Non-surgical extractions
- Hand scaling (no use of ultrasonic scalers)
- Medical management of soft tissue presentations (such as ulcers)
- Temporomandibular dysfunction management
- Denture procedures
- Preventative procedures such as the application of topical remineralising agents e.g. fluoride
- Orthodontic treatment that does not require bonding of brackets.

Aerosol Generating Procedures (AGPs):

All procedures that generate aerosols are considered high risk, including root canal treatments and all activities using rotating instruments (polishing included) or an air-water syringe.

During the appointment:

- Avoid, whenever possible, aerosol generating procedures.
 - Instruct the patients, before any procedure, to mouth wash for 30 seconds with a hydrogen peroxide solution 1% or iodopovidone 0.2%.
 - Use surgical high-volume suction to decrease aerosol generation.
 - Use rubber dam when appropriate.
 - Prioritise extraoral radiographs compared with intraoral.
 - Prioritise re-absorbable sutures after extractions
- Patient suspected or confirmed COVID-19:
- Only emergency treatment that cannot be postponed.
 - Treatment must take place in a 'COVID-19 treatment room' set apart.
 - No contact with other patients in the practice should happen.
 - Patient must wear a surgical mask when he arrives.
 - Dental team must wear FFP2/N95 during and 30 minutes after the end of AGP and as long as the patient is in the treatment room.

This patient group are better referred to a hospital setting or dedicated emergency centre for COVID-19.

Note: No treatment should be provided without adequate PPE

TREATMENT TYPES:

Emergency treatment

- Oral infection with facial swelling and general symptoms
- Oral-facial bleeding
- Dental and facial trauma
- Severe pain not controlled with analgesia
- Oral-facial cancers

Urgent/Required treatment:

- Oral infection not controlled following antibiotics course
- Oral pain difficult to control with analgesia
- Treatment following dental trauma (RCT, removal of splint)
- Completion of RCT
- Follow up of implant case or transplantation
- Dental fracture or loose filling
- Fit of prosthesis
- Denture control
- Orthodontic maintenance (de-bonded bracket, broken arch wire...)
- Follow up of patients with severe periodontal disease
- TMJ dislocation

Routine treatment:

- All other dental treatments
- Patients should use mouthwash 1%Hydrogen peroxide solution or Povidone Iodine 1% solution for one minute before spitting
- Limit use of intra oral radiographs
- Limit use of 3-in-1 syringe
- Use of rubber dam when possible including any tooth preparation. Placed prior to start AGP
- Use large and high-volume suction tip

Note: Four handed dentistry should be performed at all times.

Other recommendations:

- In the case of tooth extraction, do the procedure in a supine position to prevent from operating in line with the patient's respiratory tract.
- During removable partial or complete denture procedures, stop touching other items in the dental workplace after contacting the saliva of the patient.
- All prosthodontics material such as bite registration and whatever is removed from

the patient's mouth (e.g., dental prosthesis, impressions, etc.) should be completely disinfected by an intermediate-level disinfectant.

- Salivary suction should be carefully carried out to prevent gag reflex.
- Choose and modify trays to have the proper size for doing the impression to prevent coughing.
- Using oral mucosa anesthesia to the throat before performing the impression is a good option for extremely sensitive patients

POST-OPERATIVE CLEANING/ DISINFECTION/WASTE MANAGEMENT

Cleaning and disinfection procedures:

- Surfaces must be disinfected before and after each procedure or patient contact.
- All instruments should be sterilised according to standard protocol.
- Clinical areas need to be disinfected with Sodium Hypochlorite.
- Hand washing with alcohol (70-95%) based hand rub or soap and water for at least 20 seconds.
- Routine cleaning and disinfection of room surfaces (e.g. cleaners and water to clean surfaces before applying a hospital grade disinfectant)
- Clean and disinfect all reusable dental equipment according to manufacturer's instructions

Clinical waste disposal:

Manage laundry and medical waste in accordance with routine procedures and IPC regulations.

Donning and doffing procedures and clinical waste disposal:

- PPE must be doffed in the decontamination side-room
- Doffing station includes: laundry receptacle with lid, garbage receptacle with lid, eye protection disinfection receptacle with lid
- Leaving the room: with gloved hands, remove the gown or lab coat and gloves with gloved hands only touch the outside of the gown, grasp the gown and pull away from the body without rapid movements, roll gown/coat inside out into a bundle, simultaneously remove gloves inside out. Discard gown and gloves immediately. Lab coats should be transferred to the laundry receptacle avoiding contact with "clean" surfaces. Perform hand hygiene

- Remove eye protection at sides with the hands without touching facial skin and place in the disinfection or garbage receptacle
- Remove cap or bonnet by grasping at the rear and pulling forward off the head and place in the laundry or garbage receptacle
- Remove N95 respirator without touching the front of the mask and discard garbage receptacle or stored in a sealed labelled receptacle for possible future decontamination - Perform hand hygiene
- Put on a clean surgical mask

Introducing Safe Aerosol-free Emergent (SAFE) Dentistry:

The risks from infectious aerosols are central to all recommended alterations of current dental practice, yet uncertainties and open questions related to transmission details remain and oblige dental practitioners to assume they are operating under the highest possible infection risk and to act accordingly with appropriate precautions.

This may be the end of dentistry as we know it. At this point of the pandemic, dentistry needs a concept for continued dental services that avoids procedures generating infectious aerosols as much as possible. With aerosol-generating procedures being at the core of the current challenge for dental services, interventions that avoid aerosol generation may become the interventions of choice. Such procedures exist and may replace possibly "hazardous" standard therapies in an emergency context related to airborne pathogens such as SARS-CoV-2.

The concept of Safe Aerosol-free Emergent Dentistry (SAFE Dentistry) builds on a prioritization of the most common patient needs, and systematically selects packages of effective, evidence-based, and value-based care that do not require aerosol-generating procedures.

Focusing on emergency and urgent dental services, SAFE Dentistry addresses common care scenarios with a set of bundled interventions.

These procedures comprise:

1. Examination/diagnosis via tele-dentistry or in-person. When performed in-person: Antiseptic mouth-rinse, visual and/or tactile inspection without intraoral radiography for diagnosis.

2. Acute pain, swelling or infection: Depending on diagnosis, pulp devitalization/temporary filling (pulpitis), antibiotic therapy (cellulitis) and/or local anaesthesia and tooth extraction.
3. Toothache due to caries without pulpal involvement: Silver-diamine-fluoride application (SDF), glass-ionomer sealants/Atraumatic Restorative Treatment (ART), fluoride varnish/gel and/or toothbrushing with high fluoride-containing toothpaste (HFT, 5000ppm fluoride).
4. Acute periodontitis: Hand scaling and metronidazole/amoxicillin combination for one week.
5. Denture repair/reline, lost crown or orthodontic bracket, or orthodontic wire: Denture repair with soft re-line, crown and bracket re-cementation, and wire adjustment or repair, removal of stitches from previous surgery.

The interventions of SAFE Dentistry are safe, effective and realistic, even in limited resource settings like ours. SAFE dentistry needs to be prioritized to help respond to the pandemic and post pandemic context where the risk of disease transmission remains high or might be intermittently increasing or decreasing. This approach will ensure that dental service can continue during the pandemic.

SAFE Dentistry, together with general measures to mitigate risk in dental settings, is an adaptation to a pandemic emergency, and a pandemic recovery process by avoiding infectious aerosols. It is also a first step towards oral health care that does not require complex technology.

Below are some of the suggested SAFE Dentistry packages but the list is not exhaustive.

	Package	Intervention options without aerosol Risk	Conventional options with Aerosol Risk
1	Examination	<ul style="list-style-type: none"> • Tele-dentistry – remote triage, examination and counselling • Pre-examination antiseptic mouth-rinse • Visual examination • Examination with instruments <ul style="list-style-type: none"> o Probing, percussion test o Pulp vitality testing (ice pellet/ heated gutta-percha/ electric testing) • Extraoral X-ray if available and required (OPG) 	<ul style="list-style-type: none"> • Intraoral x-ray (risk of avulsion & coughing) • Temperature test with cold air blow (saliva splatter) • Tactile examination/ palpation
2	Pain: Swelling & infection	<ul style="list-style-type: none"> • Local anaesthesia • Incision of abscess & drainage • Or/and antibiotic therapy • Or tooth extraction (avoiding surgical separation or drilling) 	
3	Pain: Toothache & pulpitis	<ul style="list-style-type: none"> • Local anaesthesia • Opening of pulp chamber with hand instrument (excavator), extirpation & disinfection of root canal, temporary filling • Or tooth extraction (avoiding surgical separation or drilling) 	<ul style="list-style-type: none"> • Trepanation with drill & spray • Machine preparation and cleaning of root canals
4	Toothache & caries Caries prevention	<ul style="list-style-type: none"> • Silver diamine fluoride (SDF) • Glass ionomer sealants • Atraumatic Restorative Treatment (ART) with glass ionomer • Fluoride varnish • Fluoride gel / 5000 ppm F toothpaste 	<ul style="list-style-type: none"> • Caries excavation & traditional restorative care (drilling & filling)
5	Acute periodontitis/ pericoronitis	<ul style="list-style-type: none"> • Cleaning and scaling with hand instruments • Antibiotic therapy (if indicated) • Antiseptic mouth-rinse/gel (i.e. CHX) 	Ultrasonic scaling and machine polishing
6	Broken denture Orthodontic emergency & post-surgery care	<ul style="list-style-type: none"> • Direct reline/rebase • Removal/adjustment of broken orthodontic wire causing serious irritation • Removal of stitches from previous surgery 	Indirect repair with impression/ laboratory technician (risk of avulsion & coughing)

Conclusion:

The dangers of the crisis are clear. Continuation of dentistry as usual during the COVID-19 pandemic will result in vast risks for patients and providers. It is however important to note that complete shutdown of oral health care will lead to deterioration of health and wellbeing of our population and loss of livelihood for the Dental fraternity. Let us therefore embrace the recommendations stipulated including the practice of SAFE Dentistry.

It is also important to note that this are general guidelines and that individuals and different settings (like dental schools) should customize the guidelines to suit their situation without compromising the safety of the health providers and the patient. These guidelines may also change as the pandemic situation evolves and as we conduct research on what works best in our setting.

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KENYA DENTAL ASSOCIATION STATEMENT ON CORONA VIRUS IN THE DENTAL PRACTICE

Kenya Dental Association the premier dental association in the region has been keenly following the unprecedented and extraordinary circumstances dentists, community oral health officers, dental assistants, technicians, cleaners and other support staff are working under in view of COVID-19(SARS Cov-2 Virus).

As leaders in the healthcare profession, we must be proactive to limit the spread of this virus and do all we can to flatten the curve of spread. This is to aid in reducing the burden on our healthcare system and other colleagues who have been at the forefront of this war. Dentists are in one of the highest risk categories for transmission and contraction of the virus, with many routine dental procedures potentially transmitting the virus via aerosolization of fluids.

KDA is in active communication with the Ministry of Health. As of this statement, there are no National or County directives mandating dental office closures. However, it is the strong opinion of this Association that ALL ROUTINE AND ELECTIVE DENTAL VISITS SHOULD BE DEFERRED, PENDING ADVISORIES FROM THE MINISTRY OF HEALTH FOR THE NEXT 14 DAYS.

All professionals should be well versed with the country case definition for COVID-19 infection which may be amended from time to time as the situation evolves.

Evaluation of Patients

Where possible, patient triaging over the telephone should be done prior to arrival at the clinic. Patients with symptoms of respiratory tract infection should be advised to stay home until the condition resolves.

Where additional history reveals recent travel from a country with confirmed COVID-19 cases or contact with such individuals should be advised to call the national hotline 719 for further evaluation. Follow-up on compliance of the advisory to use the hotline should be done.

Where telephone triaging is not possible, dental clinics are recommended to establish pre-check triages to measure and record the temperature of every staff and patient as a routine procedure. A contact free thermometer is strongly recommended. Pre-check staff should ask patients questions about their health status and history of contact or travel. Patients who have a presentation and/or travel or contact history suggestive of COVID-19 exposure should be registered and transferred to designated hospitals screening COVID-19 cases, or if the clinic is within a hospital, the designated COVID-19 screening site. For patient transfer, calling the national hotline 719 will avail a rapid response team who will come to evaluate and evacuate the patient. Following the MOH advisory, patients who have been to epidemic regions within the past 14 days, will be quarantined for at least 14 days. Such patients should only be seen to address dental emergencies.

Oral Examination

The current literature suggests that a significant proportion of people infected with COVID-19 are asymptomatic. Preoperative antimicrobial mouth rinse could reduce the number of microbes in the oral cavity. Chlorhexidine mouthwash has been found to have poor virucidal activity against coronavirus. A pre-procedure mouth rinse with oxidative agents such as 1% hydrogen peroxide or 0.2% povidone is recommended. Intraoral x-ray examination is the most common radiographic technique in dental imaging; however, it can stimulate saliva secretion and coughing. Therefore, extraoral dental radiographies, such as panoramic radiography is advised.

Provision of dental care for confirmed COVID-19 infected patients.

Provision of care for confirmed cases of covid-19 infection should be restricted to dental emergencies. Appropriate precautions should be taken to protect the patient and all staff in the operator and minimize risk of contamination. Strict personal protection measures should be in place. All personnel should endure hand washing before and after examination, procedures, leaving the patient surroundings and after handling tissue, bodily fluids or contaminated material. Care should be taken by staff to avoid touching their own eyes, mouth and nose.

PPE for all staff in the operator should include: hair net, disposable gown, face masks and goggles/face shields, surgical gloves and waterproof footwear are recommended. Face shields and goggles are essential with use of high or low-speed drilling with water spray

Care should be taken to avoid or minimize operations that can produce droplets of aerosols. Procedures that are likely to induce coughing should be avoided (if possible) or performed cautiously (WHO 2020a). Aerosol-generating procedures, such as the use of a 3-way syringe, should be minimized as much as possible. The 4-handed technique is beneficial for controlling infection. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols. Rubber dams and high-volume saliva ejectors can help minimize aerosol or spatter in dental procedures.

If a carious tooth is diagnosed with symptomatic irreversible pulpitis not controlled by medication, pulp exposure could be made with chemo mechanical caries removal under rubber dam isolation and a high-volume saliva ejector after local anesthesia; then, pulp devitalization can be performed to reduce the pain. The filling material can be replaced gently without a devitalizing agent later according to the manufacturer's recommendation. Where use of high-speed handpiece is unavoidable it recommended to schedule the procedure as the last patient in the day to decrease the risk of nosocomial infection. After treatment, environmental cleaning and disinfection procedures should be followed. Alternatively, patients could be treated in an isolated and well-ventilated designated treatment room, or negatively pressured rooms if available.

The treatment planning of tooth fracture, luxation, or avulsion is dependent on the age, the traumatic severity of dental tissue, the development of the apex, and the duration of tooth avulsion. If the tooth needs to be extracted, if suturing is needed, absorbable suture is preferred. For patients with facial soft tissue confusion, debridement and suturing should be performed. It is recommended to rinse the wound slowly and use the saliva ejector to avoid spraying. Life-threatening cases with oral and maxillofacial compound injuries or infections should be admitted to the hospital immediately, and chest imaging should be prescribed if available to exclude suspected infection because of the turnaround time for receiving COVID-19 test results. RT-PCR test, besides being time-consuming, needs a laboratory with pan-coronavirus or specific SARS-CoV-2 detection capacity.

Recommendations for Dental Education

It is worth advocating to encourage all dental professionals to engage in self-learning, make full use of online resources, and learn about the latest academic developments. With the increased knowledge of viral features, epidemiologic characteristics, clinical spectrum, and treatment, strategies to prevent, control, and stop the spread of COVID-19 will continue to be developed.

Conclusion

In light of this we recommend THAT

1. Procedures must be on pre-screened clients, through prior telephone interviews and they MUST NOT exhibit symptoms of COVID-19.
2. Vulnerable groups appointments, not limited to ASA 2 onward, the elderly, the pregnant, those with underlying conditions must be cancelled unless in the case of a verifiable emergency.
3. Only EMERGENCY treatment is offered, guidelines for which are very clear. Non Invasive options must be considered first with the presumption of COVID-19 exposure. Emergencies being
 - a. Uncontrolled bleeding from the mouth and orofacial region
 - b. Cellulitis and intraoral/ extraoral soft tissue infections that can compromise the airway
 - c. Trauma involving facial bones that potentially compromises the airway
 - d. Cancer patients in need of urgent care.

4. All dental personnel MUST have proper PPE, it is MANDATORY to have, N95 mask, face shield, gloves, disposable gown, disposable head caps. Employers must ensure that the above are provided as single use items.
5. It is preferable such treatment happens in hospital setting, Level 5 facilities and above, with capacity to provide PPEs. In the absence of proper PPE for all patient handling staff- Dentist, Dental assistants, Community Oral Health Officers, Dental Nurses and hygienists as prescribed in the text above should desist from handling patients.
6. Forthwith stand-alone clinics refer to above such facilities
7. All employers of dental care professionals MUST provide the needed PPEs WITHOUT VICTIMISATION.
8. Treatment MUST BE DONE UNDER A RUBBER DAM to prevent nosocomial infections
9. Rigorous equipment disinfection with not less than 95% alcohol disinfectant, clinic decontamination (Waiting area, operatory area and any other areas exposed to contact) between patients MUST be done and proper instrument sterilization be done.
10. To all our clients, ensure that the dental clinic has taken adequate measures to protect you and themselves. All dentist should act responsibly as members of society and follow all precautionary measures here in. we are part of a society in imminent risk and we should do all we must to end any potential spread and any risk associated in our line of work

Dentist exhibiting symptoms consistent with COVID-19 should seek immediate care, follow guidelines issued by Ministry of Health and must be accorded necessary support.

NO dentist should be victimized for wanting to follow proper protocols. Any victimized individual should write to the Kenya Dental Association reporting the same where KDA shall act as a responsible corporate citizen. ALL correspondence will be protected.

We are aware of the financial implications of such measures on running costs and financial stability of business we are in talks with the taskforce on this issue.

The virus doesn't spread itself people spread it
The Kenya Dental Association shall continue to issue frequent briefs as will be necessary.
NATIONAL HOTLINE 719

**UPDATE OF GUIDELINES TO PREVENT
SPREAD OF COVID-19 IN THE
MANAGEMENT OF PATIENTS REQUIRING
DENTAL AND ORALMAXILLOFACIAL
SERVICES.**

INTRODUCTION.

The update of the guidelines of dental practice with respect to the Covid 19 pandemic are aimed at encouraging a consistent approach to management of acute dental conditions while recognizing the challenges the pandemic presents for provision of dental care.

1. Definition of Dental Emergencies.

Every patient is a potential Covid-19 exposure. In the dental environment, the generation of Aerosols from most clinical procedures puts at high risk patients, clinicians and all support staff. Therefore, only emergency and urgent cases shall be seen.

Emergencies are conditions that require immediate dental attention while urgent cases are severe or uncontrolled symptoms that cannot be managed by the patient and require the patient to be seen by a dentist or dental specialist in a designated facility. These emergencies and urgent clinical cases are:

1. Uncontrolled Bleeding in the mouth and orofacial region.
2. Cellulitis and soft tissue infections intraorally or extra orally that can potentially compromise the airway.
3. Trauma involving facial bones that potentially compromises the airway.
4. Dental pain not amenable to pharmacotherapy.
5. Dental trauma resulting in avulsion of anterior permanent dentition.
6. Cancer patients and patients with compromised immune systems in need of urgent care.

**NO ELECTIVE PROCEDURES SHOULD BE
PERFORMED**

2. Where the patients will be seen.

The facilities that patients will be attended to for emergency and urgent care have to be able to provide personal protective equipment listed below and meet the World health organization standard of infection prevention and control with regards to Covid 19.

3. Personal Protective Equipment.

All dental practitioners, dental specialists and their chairside assistants attending to patients in any facility need to have the following personal protective equipment to protect themselves and the patient:

1. Disposable gowns. Single use
2. N 95 Masks. Single Use.
3. Goggles
4. Face shield. Single use.
5. Disposable head caps. Single use

Given the global shortages of PPEs and supply chain interruption, it is emphasized that rational use of PPEs by clinicians is critical hence use should be limited to emergency cases.

4. Performance of clinical procedures.

Initial assessment/ triage of the patient should be done over the telephone before arrival at the facility. Where this is not possible, risk assessment including temperature checks with a contact free thermometer is strongly recommended.

Upon arrival at the facility reception, have the patient use an alcohol-based hand sanitizer and rub their hands for 20 seconds.

When entering the surgery ask the patient to wash their hands in the surgery hand washing sink, prior to sitting on the dental chair.

While the efficacy of this approach cannot be guaranteed to have a significant effect on viral load in a patient with COVID-19, we recommend that prior to commencing treatment all patients should be asked to undertake a 20-30 second pre-procedural mouth rinse with either:

- 1% hydrogen peroxide
- 0.2% povidone iodine
- 0.2% chlorhexidine rinse (alcohol free)

All procedures should be performed where both high volume and low volume suction is available. Rubber dam use is indicated for all endodontic procedures.

5. Decontamination.

Regularly wipe down surfaces with >60% alcohol-based wipes or 0.1% sodium hypochlorite solution, including door handles, reception desks, phones.

Standard infection control practices of the dental unit in line with the CDC guidelines of dental chair decontaminants are applicable.

Consider longer appointments to allow enough time between treatments to enable additional infection control measures including environmental cleaning.

6. Dental Education.

All dentists and dental specialists are encouraged to engage in self-learning and make full use of online resources on Covid 19. With the increased knowledge of viral features, epidemiologic characteristics, clinical spectrum, and treatment, strategies to prevent, control, and stop the spread of COVID-19 will continue to be developed.

INFORMATION FOR CONTRIBUTORS

The Journal of Kenya Dental Association (JKDA) is a quarterly publication that provides a forum for publication of original scientific articles, reviews, clinical case reports and opinion pieces concerning the dental sciences and oral healthcare.

1. The JKDA Editorial Process

All the manuscripts submitted to the JKDA are peer reviewed, and every submission will be acknowledged by email within a week. The first stage of review examines the originality of the material presented, scientific relevance and statistical consistency.

The manuscripts are then further reviewed by at least two external referees before evaluation at an editorial conference.

A final decision on publication will be communicated to the submitting/corresponding author within 3 months of manuscript submission. Proofs will be sent to authors for final publication approval (except in the case of letters to the editor and obituaries).

Manuscript Submission

1.1 Type of Manuscript

Articles should report data from original research that is relevant for the provision of oral health care in developing countries. Reviews must be objective, comprehensive analyses of the subject matter, giving a current and balanced view of the issues discussed. Case reports must be authentic, appropriately illustrated and of critical significance to the practice of dentistry. Letters to the editor should not be more than 500 words and should contain only one illustration and not more than 7 references. Priority shall be given to letters responding to articles published in the journal in the last four months.

Obituaries are usually commissioned, but unsolicited communications of up to 1,000 words are welcome. These will also be subjected to a peer review process. Obituaries which are of interest to the JKDA readership may also be submitted. The funeral obituary should contain the following information: full names, date and place of birth, education history, degrees and qualifications, year and place of qualification, recent appointments and achievements, family members and date and cause of death.

1.2 JKDA Policy and Ethics

We only accept manuscripts not already published elsewhere or under consideration by any other journal or publication.

The submission should include signed consent for publication from all authors. Each author's contribution to the paper should also be indicated. An accompanying letter should indicate each author's name, degree and professional titles. It should also include the work affiliation, and complete address, as well as telephone number and email address.

Manuscripts resulting from clinical research work should include proof of ethical approval to conduct the study, and are expected to have adhered to the Helsinki declaration. Authors are encouraged to write their reports using STROBE checklist for observational studies and CONSORT checklist for clinical trials. Clinical trials must also be registered, with published protocols. Systematic reviews and meta-analyses should preferably be reported using PRISMA checklist.

Manuscripts containing clinical photography should include signed consent for publication from patients. In addition, the photographs should be adequately de-identified so that the patient is not identifiable.

Written permission from original author for registered tables or figures should be included.

Conflict of interest should be stated. Source of funding should be included.

The role of the funding entity in the entire research and publication process should be stated clearly. Possible sources of conflict include Direct funding for the research or publication; Funding you have received from any organization involved in this or similar research; Any position you hold in an organization that is involved in this or similar research.

The JKDA holds all submissions in confidence, and this extends to the reviewers. Our reviewers are normally blind to the authors to enhance impartiality in the review process.

1.3 Format and Style

The manuscript should be submitted through email as a Word document. All images should be copied onto a Word document.

Artwork guidelines: Illustrations, pictures and graphs, should be supplied in the highest quality and in an electronic format that helps us to publish your article in the best way possible. Please follow the guidelines below to enable us to prepare your artwork for the printed issue as well as the online version.

Format: TIFF, EPS: Common format for pictures containing text or graphs; EPS: Preferred format for graphs and line art (prints quality when enlarging/zooming in).

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4. Awago DO, Ojunga FF. Oral Verminous Carcinoma: Report of two cases and review of literature. East Afr Med J. 1993; 70:336–338.

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