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Features of the Organization of Dental Care for Underage Patients in Tense Epidemiological Conditions

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

In modern conditions, dental care for children who need it from an early age is associated with a number of difficulties. The fear of catching a new coronavirus infection has led to a number of restrictions that negatively affect the practice of providing medical care to underage patients. For this reason, it is important to provide dental care to young patients, since the loss of teeth at an early age causes significant problems at an older age. The purpose of the work is to consider the features of the organization of dental care for underage patients in the tense epidemiological conditions associated with the spread of coronavirus infection on a global scale. In the conclusions

of the study, it was noted that taking into account the complex epidemiological conditions, approaches to providing dental care will change. Traditional approaches used to address oral health problems in children before the COVID-19 pandemic will need to be adapted to the new era. Minimal intervention methods that minimize or eliminate aerosol formation should be practiced, as well as comprehensive oral health prevention measures to ensure the safety of dental offices at this unprecedented time, to control disease and maintain oral health in the population.

Keywords: Coronavirus infection; dentistry; prevention; oral hygiene; medical manipulations.

1. INTRODUCTION

Since the beginning of last year, 2020, the new coronavirus infection has become a serious global public health problem. Due to the transmission of infection through saliva particles or droplets, the diagnosis and treatment of oral diseases are directly related to the risk of infection in a clinical setting. To prevent cross-infection and the spread of the epidemic, most dental clinics around the world have paused the operation of regular dental clinics. Therefore, it became necessary to develop protocols for the prevention of infections in children's dental offices of dental hospitals and universities during and after the outbreak of the COVID-19 pandemic [1].

Worldwide, approximately 45-50% of children under the age of six suffer from tooth decay, which is a serious public health problem. Due to the growing burden of disease and the closure of dental clinics, there is a high demand for resources for dental treatment. The fear of visiting a dental clinic during COVID-19 has led to an underestimation of the pain and suffering of children.

Approximately 80.9% of the children had no symptoms or had mild pneumonia. Most children act as carriers that pose a serious threat to the containment of the disease. The rate of asymptomatic carriers reaches 17.9%. Asymptomatic children can also transmit the disease and act as super-spreaders. Thus, physical (social) distancing was encouraged as the only major factor in smoothing the incidence curve.

Along with physical distancing, other measures must be taken to minimize the risk of transmission. Imperial London College has proposed home isolation of cases - (stay at home for seven days after the onset of symptoms), home quarantine (all family members with children with symptoms stay at home for 14 days after the onset of symptoms), physical distancing - (broader outlook). policies that reduce shared contacts made outside of the family, school, or workplace), as well as the closure of schools and universities. Moreover, the role of parents, the pediatric dentist, and their dental team requires specific direction to address dental problems in children during and after the COVID-19 pandemic outbreak.

The aim of the work is to consider the features of the organization of dental care for underage patients in tense epidemiological conditions associated with the spread of coronavirus infection on a global scale.

2. RESEARCH METHODS

In the process of writing the work, review of the literature and a comparative method were used.

3. RESULTS

The dental practice of pediatric patients aims to maintain the well-being and safety of children during this pandemic by redesigning, revising, and reviewing dental care practices and adhering to current evidence-based guidelines and recommendations for child oral care. Therefore, a risk assessment of this practice is needed to determine the measures needed to minimize the risk of COVID-19 transmission.

Coronavirus disease 2019 (COVID-19) is an infectious disease that occurs due to the development of the seventh detected strain of the coronavirus family. The COVID-19 epidemic was first reported in December 2019 in Wuhan, China, when a group of patients had SARS [2].

The virus quickly spread around the world. The World Health Organization (WHO) declared COVID-19 an international public health emergency (PHEIC) on January 30, 2020, and on March 11, 2020, characterized the outbreak as a global pandemic. By October 24, 2020,

SARS-CoV-2 had infected more than 42 million people, and more than 1.1 million people had died in more than 200 countries since its introduction. SARS-CoV-2 mutation, which increases infectivity, and repeated COVID-19 infection in healthy patients have been reported. This has raised concerns that COVID-19 may continue to circulate in the population and become another endemic virus in our communities.

The clinical signs and symptoms of COVID-19 are divided into asymptomatic, mild, severe, and critical. Most patients with COVID-19 are relatively mild cases. Patients may have fever, dry cough, sore throat, shortness of breath, or malaise. Many patients also reported a loss of sense of taste or smell. There may also be less common signs and symptoms, such as confusion, diarrhea, vomiting, headache, skin rashes, or discoloration of the fingers and toes. Between a quarter and one-third of patients with COVID-19 may develop serious complications, such as arrhythmia and shock [3].

Older people (over 65) and people with comorbidities, especially those with respiratory diseases, cancer, obesity, and a weakened immune system, are at higher risk and have a worse prognosis.

Although the symptoms of COVID-19 in adults are the same as in children; in children the disease is usually asymptomatic or with milder symptoms. Children have milder manifestations because they have fewer ACE2 receptors for SARS-CoV-2.

The most common symptoms in children include fever, cough, sore throat, followed by vomiting, diarrhea, and abdominal pain. A small number of infected children developed an inflammatory reaction similar to the rare childhood Kawasaki disease. Infants and children with comorbidities may be at a higher risk of serious complications. Deaths have been reported among children with COVID-19, but they have been extremely rare. Children make up a small fraction of the confirmed cases of COVID-19. Only 1-5% of reported infections in China, Italy, and the United States occur in people under the age of 18.

COVID-19 is transmitted through droplets, aerosol, direct or close physical contact. SARS-CoV-2 is most active in the nasopharynx and salivary secretions of infected people. When an infected person coughs, sneezes, or talks, these droplets can infect others through direct contact or aerosol formation.

Some patients with COVID-19 may exist as asymptomatic carriers or have mild symptoms of the disease, but they may still act as carriers, unintentionally spreading the virus to other members of the community. Children who don't usually get infections or have milder forms may unknowingly spread COVID-19. Infection can also occur by touching an infected surface and direct contact with the eyes, nose or mouth, on which the virus can persist from several hours to several days naturally. The virus has a long incubation period and can be detected on the surface from hours to days depending on the nature of the surface.

Dental practitioners, like all other healthcare professionals around the world, face challenges in providing care to patients following the COVID-19 outbreak. The special working conditions of dental practitioners, including proximity to patients, frequent handling of body fluids, and the use of aerosol-generating instruments, make dental clinics a potential area for COVID-19 transmission.

Most dental procedures involve the use of high-speed or low-speed hand-pieces, surgical hand-pieces, 3-in-1 spray (air/water syringes), ultrasonic scalers, air polishing devices, and lasers. These aerosol formation (AGP) procedures (using air, water, and cutting abrasives) produce large amounts of aerosol and spray from the patient's body fluids, including respiratory secretions, saliva, and blood. Aerosols can remain in the air for at least 30 minutes after a dental procedure and can be inhaled by people around them, despite the fact that dental vacuum equipment is used nearby. Air-borne pathogenic organisms, such as pneumonic plague, measles, tuberculosis, and influenza, can be carried and transmitted by aerosols. The study found that SARS-CoV-2 can remain viable in aerosols for up to 3 hours after it is sprayed, and lands on the surface for up to 72 hours. Thus, it is believed that COVID-19 can be stored in the air and transmitted by air [4].

SARS-CoV-2 is present in saliva, upper respiratory tract, and nasal samples from infected patients with symptoms or without symptoms. Dental AGP can form saliva in the form of an aerosol and lead to airborne infection with pathogens. The resulting aerosols and spray droplets can then quickly disperse in a clinical

setting. Contaminated SARS-CoV-2 aerosols can remain on surfaces such as dental chairs, dental light fixtures, spittoons, and dental instruments for hours or even days, particularly when proper disinfection measures are not in place. The use of large volume absorbing equipment and a room with negative pressure becomes important to eliminate polluted air while controlling the direction of the air flow.

Dentists are at increased risk of COVID-19 cross-infection not only because of aerosols generated during dental procedures. They work at a close distance from the patient (about 50 cm) and are exposed to nine times more drops and aerosols compared to the usual social distance of 1.5 m. The potential spread of infection from the dental office to the local community can also occur if materials infected by the patient or staff, such as contaminated waste, are handled incorrectly.

To minimize the risk of COVID-19 infection, in many parts of the world, only patients requiring urgent dental care were treated during the first few months of the pandemic. Planned and immediate dental treatment has only recently resumed in countries where COVID-19 is common [5].

The COVID-19 outbreak presents unprecedented challenges for pediatric dentists. The infectious status of children is difficult to establish. Infected children are mostly asymptomatic or have mild manifestations of COVID-19, and they can act as vectors of infection in society. Moreover, uncooperative children may cry or scream during treatment. This can lead to the formation of more natural aerosols compared to treatment in adults. Dental treatment under sedation or under general anesthesia in the operating room during a pandemic is also significantly reduced to ease the burden on the health care system.

In the context of COVID-19, ensuring safety in dental practice and protecting the health of practitioners, patients and the public is of paramount importance. All dental staff should be aware of the COVID-19 pandemic. In addition to standard universal precautions, strict and effective infection control measures should be constantly applied to minimize the risk of SARS-CoV-2 infection and cross-infection in dental practice. Practitioners should have sufficient personal protective equipment (PPE) to protect themselves and their patients. In order to maintain physical distance, it is necessary to make several changes to the scheme of their dental practice and treatment procedures.

4. DISCUSSION

A practicing dentist should contact the patients or their parents before visiting the dentist to understand the patients ' oral health problems and perform triage. Based on the main complaints of the patient, the needs for dental treatment can be divided into planned, immediate or urgent.

Traditional dental treatment of baby tooth caries involves the complete removal of caries, which requires the use of a high-speed hand-piece. This represents a high risk and should be minimized to maintain a healthy environment in the dental clinic for patients and dental staff during a pandemic. If possible, low-risk dental treatment with fewer aerosols should be performed.

Minimal intervention methods that minimize or eliminate the formation of aerosols while controlling the development of caries have advantages in the era of COVID-19 [6].

Remote dentistry can reduce personal contact and help minimize the risk during the peak period of community transmission. Some oral health issues and follow-up care, such as dental development monitoring, oral hygiene instructions, and nutritional recommendations, can be addressed by teleconsultation or phone calls. Video technology can be used to conduct extra-oral and limited intraoral examinations of these patients. Pediatric dentists can solve these problems and provide the necessary advice and help with the help of teledentology.

There are also patients who need dental treatment, but not in an emergency. For such patients, an appointment should be made. Treatment may be provided in accordance with established guidelines. The use of hand tools should be considered to avoid the formation of droplets or aerosols. When treatment involves a high-speed hand-piece, the required protocol should be strictly followed.

In situations where emergency care is required, regardless of the risk of COVID-19, patients should be examined immediately and dental treatment should be performed as soon as possible. Dental conditions requiring emergency care include:

- uncontrolled bleeding. Immediate hemostatic measures should be taken to reduce and stop the bleeding.
- acute pulpitis. Severe and sharp pain may occur, which may last all the time. To relieve the pain, you should immediately start pulp therapy;
- trauma / fracture of teeth (primary dentition): serious tooth dislocation can affect the non-erupted rudiments of permanent teeth. This condition also requires urgent measures [7].

Special attention should be paid to preventive dental treatment in the era of the spread of COVID-19. To prevent oral diseases and improve oral health in children, three levels of preventive care should be used

.

Primary preventive care is provided at the individual level. Preventive measures, including dietary recommendations for reducing sugar intake and frequency of snacking, proper brushing habits, and the use of fluoridated toothpaste, should be presented to each patient. Individual oral health promotion helps to reduce the risk of caries and prevent the development of oral diseases.

Secondary preventive dental care is aimed at identifying oral health problems at an early stage and providing the necessary preventive care. Early detection of diseases is important, and subsequent preventive interventions help to stop the progression of problems. For example, children examined for white spots (the initial stage of caries) will need topical application of fluoride and increased proper brushing and dietary habits to prevent the progression of lesions. Other examples of secondary preventive treatment include applying fissure sealants on pits and cracks, and resin infiltration for incipient interdental carious lesions. Both interventions are intended for incipient non-cavitated carious lesions [8].

Tertiary prevention is focused on people who are already suffering from the disease. The goal of tertiary prevention is to treat oral diseases as early as possible to prevent possible complications and reduce the negative impact of diseases on oral function and quality of life. This is usually done by treating the disease and rehabilitating it, such as applying silver diamine fluoride, removing tartar, restorations, and treating the pulp.

For children with special needs, such as mental retardation, cerebral palsy, disability, visual and hearing impairments, and for children with a history of systemic diseases, oral care can be challenging, especially during the COVID-19 pandemic. They are at a higher risk of oral health problems.

Prevention is always better than treatment. Children with special needs should receive preventive treatment at three levels. You can prevent the development of oral health problems and reduce the need for dental treatment. In this regard, the parents of such children should be interviewed in detail and trained in the oral care skills of such children.

The rate of transmission of COVID-19 is different in each country. Regulations and policy responses to the pandemic depend on the level of transmission of the virus in the area. The World Health Organization constantly updates information about new cases around the world once a week. The transmission rate of COVID-19 can be divided into a low-risk zone (<100 new cases in the last seven days), a moderate-risk zone (~ 100-1000 new cases in the last seven days), and a high-risk zone (> 10.00 new cases in the last seven days).

In the high-risk area, forced social distancing or isolation will be applied to reduce the rate of infection. According to recommendations issued by many health authorities, aerosol formation procedures should be used for emergency and emergency procedures during a pandemic tide, scheduled dental visits should be postponed.

In a moderate-risk area, dental clinics or hospitals can reduce restrictions to some extent by following all preventive measures. Dentists are advised to follow the established guidelines for patient management [9].

Before visiting the clinic, parents should help their children independently assess the condition of their oral cavity. Before your visit to the dentist, you may be offered online oral health consultations or teleconsultations.

Parents and children should wear protective masks in dental clinics or hospitals, strictly observing social distancing. Protective measures and precautions must be strictly observed. Dental clinics or hospitals should follow the instructions developed by the local authorities [10].

6. CONCLUSION

SARS-CoV-2 is constantly mutating and becoming more and more transmissible. Sophisticated vaccines against COVID-19 have been developed, but long-term follow-up is needed to determine the effectiveness, duration of protection, and possible complications. For now, dentists should not let their guard down over the COVID-19 pandemic. Close attention to precautionary measures is the main approach to limiting the spread of the coronavirus. Accordingly, taking into account the complex epidemiological conditions, approaches to the provision of dental care will change. Traditional approaches used to address oral health problems in children before the COVID-19 pandemic will need to be adapted to the new era. Minimal intervention methods that minimize or eliminate aerosol formation should be practiced, as well as comprehensive oral health prevention measures to ensure the safety of dental offices at this unprecedented time, to control disease and maintain oral health in the population.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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