

# The impact of COVID-19 on oral health and oral self-care awareness

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## Abstract

**Objective:** To explore whether or not the COVID-19 pandemic had an impact on oral health and oral self-care awareness.

**Method:** From 16 March - 11 June 2020 the data for this study was collected in three different oral hygiene practices in Amsterdam and Groningen in The Netherlands, and in Willemstad on Curaçao. The studies used two simple questions for the visitors of the oral health practices, and observations and experiences of the oral hygienists who participated in various settings.

**Results:** The observations and experiences of the three dental hygienists and the self-perceived oral health of the patients, who were screened, monitored and treated in the different locations and clinical settings were relatively similar. Most people evaluated that their self-perceived oral health was 'pretty good' and about the same as usual.

**Conclusion:** These dental hygienists hope to contribute with this practice-based evidence on oral health from a patient perspective and themselves, to encourage and motivate colleague in oral care to make their best practices public and to share with relevant others.

## Introduction

What might be the effect of the COVID-19 -popularly called Corona- pandemic on oral health? According to a recent report 'The Mouth COVID Connection (MCC)' there may be a link between gum disease and SARS-CoV-2 [1,2]. It is striking to note that nowadays, in 2020, there is the Coronavirus, while hundred years ago, in 1920, the Spanish flu was still active, and another hundred years ago, in 1820, people suffered from the cholera outbreak. And in 1720, thus three centuries years ago, the world was suffering from the bubonic plague. During the COVID-19 pandemic, it is not only important to prevent becoming infected with the virus, but also to pay attention to daily personal hygiene activities, such as tooth brushing. And thus to focus on promoting optimal oral health and to raise oral (self) care awareness among the public by oral health professionals [3-5]. In the Netherlands the dental and oral hygiene practices were advised by the Alliance of Dental Associations to close the doors for dental services. This advice was not unanimously received by the oral care profession [6]. Nevertheless, since March 13<sup>th</sup> the practices only were opened for first aid care [7], and this lasted until the 21<sup>st</sup> of April. Through the Dutch Corona guidelines of the Alliance [8], which were tailored additionally to the regular guidelines for 'Infection Prevention in Oral Care Practices' and for 'Personal hygiene and protective equipment' in patient contact with a distance of less than 1.5 meters, the dental professions have been able to return to working with patients in their practices. Because of the national COVID-19 situation, including Governmental regulations, and because of the specific characteristics within the field of the oral care, the Alliance Committee considers it necessary to limit the use of a surgical mouth nose mask to use one per

each patient. At the start of the reopening of the dental services, only for families whose family members are seen directly after each other for periodical oral screening (PMO), professionals can use one and the same surgical mouth mask (without touching or taking it off) [6]. This is also in accordance with the Infection Prevention Directive in Oral Care Practices. And today, amid the COVID-19 pandemic, professionals' face-to-face contact with their patients and dental services are desired and needed more than ever.

Two exploratory studies were conducted, one in Groningen (The Netherlands), and one in Willemstad (Curaçao). The main study was conducted in Amsterdam (The Netherlands). In the Netherlands, the overall health care is well organized. Every Dutch citizen is obliged to take out health insurance; a basic insurance or health insurance policy, the coverage of which is determined by law. The insured individual pays a nominal premium for the basic insurance, which only reimburses dental care for persons under the age of 18 years [9]. On the island Curaçao, there are 41 dentists, who mostly work in private clinics. Around 16 of them work in relation to the national health insurance Social Security Bank (SVB) [Sociale Verzekerings Bank] or BZV [Basis Ziektekosten verzekering], which only approves paid dental care for individuals under the age of 18 years, and individuals over the age of 65 years. There are 18 dental hygienists, who mostly work in general

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dental clinics; however there are two independent dental hygiene practices. As a result of differences in lifestyle and risk factors that arise from environmental, economic, social and behavioral causes, such as poor living conditions and poor education, (Curaçao has 9.000 'drop-outs') as well as differences in traditions with regard to oral self-care, oral hygiene interventions currently need to be embedded within oral health systems that are financially fair for disadvantaged and poor population groups [10]. A description of the dental hygienists in their living and working situation is given in order to contextualize the situation.

In Groningen, the capital of the province Groningen in the north of the Netherlands, the first author, a self-employed oral hygienist with 40 years of clinical experience, works in her private oral hygiene clinic [11]. The city has a population of about 203.000 inhabitants, including 32.700 students, which is more or less 15.9% of the total number of inhabitants [12]. The private clinic for oral hygiene exists since 1992 and has been located in various places in the city. Some patients have been visiting this dental hygienist since 1986. The clients and patients live in several cities or villages; from the east of the province Groningen to the west of the province Friesland, also in the north of the Netherlands. The population of the practice exists mostly of elderly people, between 50-80 years old. Many of them (about three-thirds) visit the dental hygienist 3 or 4 times a year. Another quarter visits the oral hygiene clinic 2 times a year or less [11].

In Amsterdam, the capital of the Netherlands, the second author, a self-employed oral hygienist with 30 years of clinical experience works in 'Oral-Vision', her private oral hygiene clinic, which is housed within a Fitness-Sports Center at the Olympic Stadium [13]. The port city, known for its canals, is located in the province of North Holland. The municipality of Amsterdam has 862.965 inhabitants, with the highest number of different nationalities in the world [14]. The Olympic Stadium -designed by the Voorburg architect Jan Wils- is located in the southern district of the city. While in 1928, this stadium was used for the Olympic Games [15], currently, the location is not only used for small and large events, but it also houses around thirty independent companies. Since 1988 the oral hygienist is working with several specialists and since 2014 she also works on improving the oral health of athletes. Based on research that suggests, that oral health in elite athletes is poor with possible negative consequences for their performance, recovery and injuries, the aim of Oral-Vision is raise the awareness of the importance of oral health and to promote oral self-care among athletes [13,16].

In Willemstad, the capital of Curaçao, the third author, an employed oral hygienist, with 30 years of clinical experience works in a private dental clinic [17]. Curaçao is an island in the Southern Caribbean Sea, which forms part of the Dutch Caribbean, and is a constituent country of the Kingdom of the Netherlands. Curaçao has a population of over 150,000 on an area of 444 km<sup>2</sup> (171 sq. mi) [18]. The Island has a variety of different cultures, immigrants from different countries, and although Dutch is the official language, Papiamentu as the native language is spoken by almost 80% as its mother tongue [17,19].

The purpose of these two exploratory studies and one main study is to learn more about how three Dutch dental hygienists, two self-employed dental hygienist from the North and West part of the Netherlands, and one employed dental hygienist on Curaçao all in their own work environment, are doing their part to provide oral health care and comfort to patients during the COVID -19 pandemic.

## Method

From 16 March -11 June 2020 during the Corona crisis in The Netherlands [6,20] and simultaneous on Curaçao, the visitors (patients) who visited these colleagues and oral-health professionals, were screened, monitored and treated. The oral hygienists who participated noted their impressions and expert opinions through observations and experiences. The data collection was based on two simple questions to visitors (patients) in the oral health practices. The first question was: "How do you estimate or do you evaluate your oral-health?" and the second question was: "Is your oral health currently better or worse than before the COVID-19 outbreaks, and how do you estimate it?." Both patients' perceived oral health were valued by themselves by using a number ranging from: "0 = very poor to 10 = extremely good perceived oral health" on a verbal 'Ladder Scale' as the Self-Anchoring Striving Scale [21]. All data were collected during the restarting working hours after the practices were closed for a period of about 6 weeks. The oral health professionals, who participated in this study, treated their patients on a recall-routine and provided them with tailored advices about their oral health. They did this based on their own professional daily practical experience, without mutual calibration. All data collections were carried out according to universal ethical principles. Participation was voluntary, patients were told what participation meant, and no pressure was exerted to participate in this observation and simple evaluation study. This pilot study was conducted in accordance with the Declaration of Helsinki, an extensive formal written informed consent was waived and only verbal informed consent was obtained.

## Results

### Exploratory studies

**Groningen:** In Groningen, the practice of the first author was, due to COVID-19, closed from 16<sup>th</sup> of March until 23<sup>rd</sup> of April 2020. Since the beginning of the COVID-19 pandemic, Groningen 373 cases have been diagnosed and 17 have died as a result of Corona since then. Until the 1st of June not everybody could be tested, so the real number may have been higher. Since the first of June until the 21<sup>st</sup> of July 12.130 thousand people have been tested on COVID-19 virus, of which 13 people (0.1%) tested positive [22]. Most of the 'older' patients were eager to come after the reopening of the practice. They were not afraid to visit the dental hygienist for monitoring and treatment.

The observations of this experienced dental hygienist strongly resembled her observations before the COVID-19 crisis. Almost all of the 199 -in that period monitored- patients' oral health was pretty good, averaging 7.5. Often the patients experienced a similar feeling, so no worse or better between the period before and after the Corona crisis. Only a few rated their oral health worse for various reasons, such as being completely confused by Corona crisis, and for instance, there was an adolescent who had a loose mouth splint. Some wished that it would have been possible to come earlier and others thought the time between recall treatments was long. Patients that considered themselves to be in the vulnerable group mostly postponed their scheduled treatments to a later date. The planned opening hours were completed with patients who had an appointment during the lockdown period. All patients were informed via social media and messaging about additional measures taken before, during and after treatments. However, a relatively small number of people did not come because of the COVID-19 crisis.

**Curaçao:** To this date July 2020, Curaçao only has had 29 cases of COVID-19, all of which were imported. There has been no local

outbreak. The island had closed its borders mid-March and recently the island reopened only for tourists of specific European countries. From March 18<sup>th</sup> till April 28<sup>th</sup> the dental office where the third author works was closed. Emergency patients were referred to the dentist on call during that period. During the lockdown there was a curfew on Curaçao and citizens were only allowed to make use of their vehicles twice a week based on the license plate number. The Curaçao Dental Society as well as the Curaçao Vereniging van Mondhygiënisten (CVM, Curaçao Dental Hygienist Association) followed the advice of the local epidemiologist of the 'Geneeskundige en Gezondheidsdienst' ('Medical and Health Service'), and the guidelines of the Dutch Alliance [6-8]. In the period from April 29<sup>th</sup> to June 11<sup>th</sup>, 229 patients were seen by the employed dental hygienist. Some patients, who considered themselves as too vulnerable, mostly postponed their scheduled treatments to a later date. Scheduled opening hours were completed with patients from the lockdown period. On the island, the dental services informed their patients through social media and messaging services about extra measures being taken before during and after treatments. Patients who visited the dental office were not hesitant to come in, because there has been no local outbreak on the island. In practice, before screening or treatment, patients were asked how they experienced the lockdown period, and how they experience their oral health. Most of the patients –in that period monitored and treated– indicated that their oral and dental care is 'the same as always'. Patients who perceived their oral health status as being 'worse than normal' quoted for instance, "I think my oral health status is worse because, normally, I use the toothpicks in my car, and of course I barely / hardly drove a car during lockdown". Another quote was "I think my oral health is worse because my appointment was postponed due to earlier absence / illness of the dental hygienist, and then again postponed because of Corona". Other patients mentioned: "Worse, because I only brushed once a day, but used daily interdental". Some patients mentioned; "My oral health is better, because I had more time to clean my teeth". Or: "I experience my oral health situation to be good, as usual, because I took good care of my mouth during the lockdown. But my overall health situation is worse because I ate a lot and gained 11 kilos. I don't feel well physically. Turns out I've got diabetes and high blood pressure. I am now losing weight, working on my general health, and that is going well. I regulate my diabetes with tablets". Recently, the office has experienced an even larger demand for treatment by the dental hygienist. Borders are open and tourists are allowed to visit the island. It is widely assumed that the COVID-19 virus might be reintroduced and the patients wish to have their treatments before that might happen.

## Main study

### Amsterdam

Since the Corona outbreak, in Amsterdam, the private clinic of the second author was closed for almost two months. After the clinic reopened, the self-employed dental hygienist noticed that a few patients or visitors were anxious to come for face to face visit. Reasons for this perceived fear in the COVID-19 period were fear of travelling by public transport, fear of the presence of too many people/ athletes and contact moments with less than 1.5 meters when you pass each other in this Fitness Sport Center. Apart from the established protocol, a few people worked from home and postponed treatment until they were able to combine a visit to the dental hygienist and/or sports with their work activities again. Postponement of a visit may have to do with commuting and because they do not live in the area. In total 108 patients (53 female and 55 male) with an age between 23- 65 year old have been seen by the dental hygienist. About the half (N=53) valued

their perceived their oral health before COVID-19 situation as 'more than sufficient' (value of 7) and almost 15% (N=16) as 'good', with a value of 8. A quarter (25%; N=27) valued their personal oral health with the number 6 which means 'sufficient', and 8 visitors/patients as 'inadequate', with a value of 5. In addition to regular care, one patient reported for a pain consultation, one came for the first time (new patient) and an intake interview took place. After COVID-19 situation, 4.6% (N=58) valued their personal oral health as 'more than sufficient' and 25 visitors/ patients (23%) as 'good', about 16% (N=17) as 'sufficient', and only 2.8% (N=3) as 'inadequate'. One patient came because of a periodontal abscess and one had started her orthodontic treatment. 30% (N=33) reported that they had spent more time on oral self-care, because of 'having more time' (N=17) and 'having less stress' (N=4). 18% (N=19) reported no reason, but a few reported 'more stress' or 'less time'. Others (N=4) reported not to use additional aids, such as toothpicks or interdental brushes. About the half (N=54) reported to do the same oral self-care as usual, and about a quarter (N=26) were satisfied. 5.5% (N=6) reported reasons, such as 'less smoking', 'medical condition', 'using a new powered toothbrush', and 'a broken molar'.

## Discussion

The aim of these exploratory studies and main study was to observe and to investigate how patients who visit their dental hygienist on a regular basis reacted to the actual COVID-19 situation; a new health problem, which occurred very sudden and may be related to their perceived oral health. In general, for the dental hygienist, the 'normal daily work was suddenly stopped by COVID-19, and later less or more affected by the necessary and prescribed measures [6-8,20]. The observations and experiences of the dental hygienists and the self-perceived oral health of the patients who were screened, monitored and treated in the three different locations and clinical settings were relatively similar. Most people evaluated that their self-perceived oral health was 'pretty good' and about the same as usual. Just a few reported that their oral health was worse than before COVID-19. Patients also wanted their visits to the dental hygienist, including their regular treatments, to continue as usual. If regular treatment was delayed, it was mainly due to other health problems. It was remarkable for the people of Groningen that there were little or no COVID-19 infections in the province and that the corona crisis probably had little influence on visiting the dental hygienist.

Although all the measures taken seemed to reduce the number of infections and hospital admissions in the Netherlands, recently the number of infections appears to be increasing in certain regions, and especially in large cities such as Amsterdam and Rotterdam. Currently, the advice is to stay at home in case of mild complaints and to get tested [23]. A recently published international call from the World Health Organization (WHO) to delay non-essential dental visits for a while has not only confused the public and visitors (patients), but also the Dutch oral health professionals [24]. Many countries do not have guidelines like the Corona guidelines of the Dutch Alliance of oral health professionals [8] and actually the WHO referred to follow the evidence-based Dutch Corona guidelines [6,8]. In the meanwhile, adaptations about family member's treatments were made in the triage schedule and Guideline Corona Oral Care version 4.01 [6,25].

On Curaçao, the Governmental regulations were almost the same as the in the Netherlands. Instead of 1.5 meters, 2 meters was used for social distancing, but the Curaçaoan people reacted almost the same to the COVID-19 crisis as the Dutch. These findings were based on patients' experiences and present dental hygienists' observations, not

on the overall actual oral care data. For instance, in a newspaper article, it was assumed that by wearing facemasks people are more confronted with the smell of their own breath, and might be inclined to look for solutions to improve their breath and thus their oral health [26]. Further research in patients who are aware of their own breathing and additional self-care and oral care measures, including professional oral care, may be helpful in understanding their health knowledge, habits and oral self-care that are necessary for designing future oral health care interventions [17,27-29].

In this 'new' situation that has captivated the entire world, we need to be aware of overall health and consider whether more information should be provided on the impact of COVID-19 or other new diseases related to oral health, and for example, to investigate whether the general oral health of the population improved after COVID-19 [30]. In the Netherlands, a study was conducted on 8 July by ACTA (Academic Center for Dentistry Amsterdam), Radboudumc, the UMCG and the Royal Dutch Dental Association [31]. It is not yet known when the research results of this national data collection using the WHO questionnaire will be known. Until then, however, these clinical dental hygienists hope to encourage and motivate future 'leaders' and colleague in oral health care to make their best practices public and to share with relevant others.

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