

## The impact of the 2019-nCoV infection spread on the management of dental clinics and treatment decision-making- An international questionnaire-based research at the pandemic's early stages

### Research article

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### Abstract

**Objective:** Since its outbreak, the novel  $\beta$ -coronavirus had caused major concern in the global population due to its rapid spreading and its ability to cause life-threatening pneumonia. Transmission routes include direct contact or contact with the body fluids. Dental professionals are at high risk of exposure due to the contact with patients and the risk of exposure to their body fluids.

The current study aimed to investigate the impact of the 2019-nCoV infection spread on the management of dental clinics and the decision-making.

**Materials and Methods:** a 10-question multiple-choice anonymously questionnaire was uploaded to the www.surveymonkey.com website and links were sent through the social networks. Data were analyzed by the chi-square test and significance was set at  $p=0.05$ .

**Results:** 2028 participants completed the questionnaire. 84.1% ( $n = 1705$ ) from the Former Union of Soviet Socialist Republics (USSR), 13.7% ( $n = 271$ ) from Israel. Israeli responders reported significantly higher rates of patient cancellations and staff concern compared to the Former USSR responders (35.1% vs. 9.5% and 62.4% vs. 30.8% respectively,  $p<0.001$ ), increased rates in the ordering of supplies and equipment (38.4% vs. 16.8% respectively,  $p<0.001$ ) and shortage of different supplies and equipment (20.8-82.4% vs. 6.4-63.3% respectively,  $p<0.001$ ). The impact on treatment decision-making and general concern was significantly higher among the Israeli responders versus the Former USSR responders (17.8% vs. 2.7% and 53.4% vs. 36.8%,  $p<0.001$ ).

**Conclusion:** The novel  $\beta$ -coronavirus's may impact the management of dental clinics and treatment decision-making internationally. The Israeli dental clinicians who responded to the questionnaire are more affected than the responders from the Former USSR counterparts.

**Key words:** Decision-making; Novel  $\beta$ -coronavirus; Pandemic; Questionnaire

## Introduction

The novel  $\beta$ -coronavirus named the 2019-nCoV (or SARS-CoV-2) virus was originated in Wuhan city in the Hubei province in China. It had led the World health organization (WHO) to declare a global viral pandemic named the "Corona Virus Disease (COVID19)" in March 2020 (<https://www.who.int>). The pandemic caused major concern in the global population due to its rapid spreading ability and the increasing rates of deaths.

Avoiding handshakes, a recommendation to maintain a high level of personal hygiene are some of the main messages of health organizations worldwide. Along those regularly well-known recommendations, further drastic actions had been taken by some governments to prevent the pandemic from spreading. Those actions include home confinement after exposure to infected individuals, limit international flights to endemic regions, borders closure, quarantine of infected areas and civilian curfew. Since the outbreak, many countries experienced a lack of both civil commodities such as food, cleaning materials and medical equipment such as masks, gloves and disinfectants.

The 2019-nCoV causes clusters of severe respiratory illness. The most common symptoms are cough, fever, myalgia, fatigue with an abnormal chest CT (usually presenting ground-glass opacity) [1-3]. Severe illness is more likely in older males with comorbidities and can result in severe and even fatal respiratory diseases such as acute respiratory distress syndrome [4]. Notably, children are less prone to infection by the virus.

Transmission routes include direct contact or contact with body fluids such as saliva, mucus, droplet inhalation, etc. Dental professionals are at high risk of exposure due to the intimate contact with the patient's oral mucous membrane and their saliva or blood. The 2019-nCoV can pass during dental procedures to both dental professionals and patients via direct contact, droplets and aerosols but also indirectly through contaminated surfaces. Dental professionals should be avoided from treatment suspected patients in the acute febrile phase [5].

This study aims to evaluate the worldwide dental operators' attitudes towards the changes in the management of dental clinics and treatment decision-making in the light of the recent 2019-nCoV global pandemic.

**Table 1:** Positive answers to questions regarding the daily management of dental clinics

No.	Question	Former USSR (n=1705)	Israel (n=271)	Total (n=1976)	
1	Have you witnessed a decline in the number of patients at your clinic?	12.3% <sup>a</sup> (211)	38.7% <sup>a</sup> (108)	16% (319)	
2	Was there a rise in appointment cancelations?	.95% <sup>b</sup> (164)	35.1% <sup>b</sup> (98)	13.12% (262)	
3	Has your staff expressed any concerns regarding the spread of Coronavirus in your office?	30.8% <sup>c</sup> (528)	62.4% <sup>c</sup> (174)	35% (702)	
4	Since the report on the spread of the corona virus- Is there a difficulty in purchasing the following supplies and equipment for the clinic?	Masks	63.3% <sup>d</sup> (1078)	82.4% <sup>d</sup> (230)	65.5% (1308)
		Gloves	6.4% <sup>e</sup> (110)	20.8% <sup>e</sup> (60)	8.5% (170)
		Disinfectants	7% <sup>f</sup> (127)	20.1% <sup>f</sup> (56)	9% (183)
5	Have you ordered supplies and equipment beyond your actual needs?	16.8% <sup>g</sup> (287)	38.4% <sup>g</sup> (107)	19.7% (394)	
6	If yes, what did you order?	Masks	95.8% (275)	95.3% (102)	95.6% (377)
		Medical gowns	11.5% (33)	14.7% (19)	13.2% (52)

The same superscript letter represents a significant difference ( $p < 0.001$ ).

**Table 2:** Positive answers to questions regarding the influence on the clinicians' treatment decision-making

No.	Question	Former USSR (n=1705)	Israel (n=271)	Total (n=1976)
7	Is the coronavirus epidemic a factor in your dental decisions?	2.7% <sup>a</sup> (52)	17.8% <sup>a</sup> (50)	5.11% (102)
8	Does the Corona virus spread influence your decision to perform one- visit root canal therapy (rather than multiple-visits treatment)?	1.6% <sup>b</sup> (29)	8.6% <sup>b</sup> (26)	2.75% (55)
9	Do you feel that Coronavirus poses a real threat?	36.8% <sup>c</sup> (628)	53.4% <sup>c</sup> (151)	39% (779)
10	Do you feel that the information supplied by the government/ministry of health is sufficient and clear?	22.6% <sup>d</sup> (390)	51.6% <sup>d</sup> (146)	27% (536)

The same superscript letter represents a significant difference ( $p < 0.001$ ).

## Materials and Methods

This study was reviewed and declared exempt by the institutional review board. An online 10 multiple-choice anonymously questionnaire in English, Hebrew and Russian was uploaded onto the [www.surveymonkey.com](http://www.surveymonkey.com) website and was sent through the social networks over 7 days (from the 3rd of March to the 10th). Data were collected in an Excel file (Microsoft Corp., Redmond, WA, USA) and analyzed using the chi-square test. The significance level was set at  $p=0.05$ .

## Results

In total, 2028 clinicians from 14 countries completed the questionnaire and were eligible for analysis. The largest number of respondents were from the Former Union of Soviet Socialist Republics (USSR)- Russia, Ukraine, Kazakhstan, Georgia, Armenia and Azerbaijan (84.1%,  $n = 1705$ ), followed by Israel (13.7%,  $n = 271$ ). 2.2% ( $n=52$ ) responders from other countries worldwide (Spain, Germany, Italy, South Korea, India, Brazil, etc.) were dropped out of the statistical analysis, due to their sample size.

Tables 1 and 2 display the questions and answers to the questionnaire.

## Discussion

The 2019-nCoV virus is the 7th member of the human infecting coronavirus family [6]. The coronaviruses have an unusually large RNA genome and characteristic with a club like spikes that project from their surface [7]. It uses the same cell entry receptor-angiotensin converting enzyme II (ACE2) as the SARS-CoV virus that caused a large scale pandemic at the beginning of the century. The Incubation period is usually between 1-14 days, but might reach to 24 days. The virus is also contagious in asymptomatic patients.

Contamination is via person to person transformation; however, 2019-nCoV can persist on inanimate surfaces for up to 9 days. Many airborne viruses that are produced during a dental procedure and transmitted by aerosols and droplets containing blood can be protected against by simple means such as gloves, masks and pre-procedural rinses [8]. 2019-nCoV can be efficiently inactivated by surface disinfection procedures with 62-71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite within 1 minute [9]. Furthermore, the uses of a rubber dam and a high-power suction device have been proven to reduce the inhalation of infective aerosols by dental

personnel, especially when using high-speed handpieces and ultrasonic devices [10,11].

Overviewing the collective data from the present study provides a perspective on the main global concern through the standpoint of the dental practitioners at the early stages of the 2019-nCoV spread.

To begin with, Israeli responders reported significantly higher rates of a decline in the number of patients compared to the Former USSR responders (38.7% vs. 12.3% respectively) and a significant rise in the appointment cancelations (35.1% vs. 9.5%). Also, 62.4% of the Israeli responders reported having concerned staff members in their clinic, in comparison with 30.8% in the Former USSR countries ( $p < 0.001$ ).

16.8% of the Former USSR responders reported that they ordered supplies and equipment beyond their actual needs, a statistically significant lower percentage than the Israeli responders (38.4%). Both groups reported masks as the main product being ordered in access (without a statistically significant difference between the groups). It is therefore not surprising that a greater difficulty in purchasing masks, gloves and disinfectants were among the Israeli responders. Masks were the main product that was difficult to obtain (82.4% in Israel, 63.3% in the Former USSR), then gloves (20.8% vs. 6.4%) and disinfectants (20.1% vs. 7%) ( $p < 0.001$ ). We can observe a kind of 'chicken and egg' scenario as many dentists report both a shortage of supplies and equipment but also ordering in access.

53.4% of the Israeli responders believe that the 2019-nCoV infection poses a real threat while only 36.8% of Former USSR responders believe so ( $p < 0.001$ ).

In both groups, the influence on dental decision-making was lower than the influence on logistical considerations. In Israel, 17.8% of the responders claimed that the threat of 2019-nCoV was a factor in their dental decisions, and 8.6% positively answered that it prompted them to complete a root canal treatments in one visit rather than multiple visits (presumably because of the uncertainty of the second visit). Very few responders from the Former USSR group reported those influence- 2.7% and 1.6% respectively ( $p < 0.001$ ).

Finally, 51.6% of Israeli responders and 22.6% of former USSR responders feel that the information supplied by the government/ministry of health regarding the

COVID19s spread is sufficient and clear. Hence, it might be speculated that a lack of official information may influence dental professionals and patients.

The current findings indicate that although the dental professionals from Israel are more concerned about implications of the 2019-nCoV virus than their counterparts in the Former USSR countries; in the Former USSR countries as well as in Israel, the influence on dental decision-making was lower than the influence on logistical considerations.

The major limitation of the present study is the relatively early stage of the outbreak in which the questionnaire was distributed. It reflects a limited period while the pandemic spread became more and more prominent as the days passes. It is very probable to receive different responses in the months to come. Other shortcomings are the relatively modest representation of dental clinicians out of the overall population of dentists and the lack of responders from other regions worldwide (other than Israel and the Former USSR). The responders to the questionnaire are only the dentists who are linked with social media; this might be a relative factor in their practical attitude and even influence their clinical decision-making process. Further questionnaires and surveys are needed to determine the exact influence of the pandemic on the dental filed.

## Conclusion

The early stage of the novel  $\beta$ -coronavirus pandemic may impact the management of dental clinics and clinical treatment decision-making internationally. The Israeli dental clinicians who responded to the questionnaire are more affected than the responders from the Former USSR counterparts.

## Contributors list

Dr. Dan Henry Levy- Writing the article, designing and analyzing the questionnaire, statistical analysis

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The authors deny any conflicts of interest.

## References

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497-506.
2. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020. doi: 10.1056/NEJMoa2002032.
3. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med*. 2020. doi: 10.1056/NEJMoa2001316.
4. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395:507-513.
5. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Inter J Oral Sci*. 2020;12:1-6.
6. Zhou P, Yang XL, Wang XG, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 2020;1-4.
7. Fehr AR, Perlman S. Coronaviruses: an overview of their replication and pathogenesis. *Methods Mol Biol*. 2015; 1-23.
8. Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. *J Am Dent Assoc*. 2004;135:429-37.
9. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect*. 2020.
10. Samaranayake LP, Peiris M. Severe acute respiratory syndrome and dentistry: a retrospective view. *J Am Dent Assoc*. 2004;135:1292-302.
11. Samaranayake LP, Reid J, Evans D. The efficacy of rubber dam isolation in reducing atmospheric bacterial contamination. *ASDC J Dent Child*. 1989;56: 442-444.