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Original Article

Influence of the coronavirus pandemic on domiciliary dental care and associated problems in Japan -a questionnaire study

Hiroyasu Yasuda [a], Keisuke Seki [b], Daisuke Akita [a], Kenji Ito [a], Tetsuo Ohyama [a], Yoshiyuki Hagiwara [a*]

[a] *Department of Partial Denture Prosthodontics, Nihon University School of Dentistry, Tokyo, Japan*
[b] *Department of Comprehensive Dentistry and Clinical Education, Nihon University School of Dentistry, Tokyo, Japan*

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Abstract *Background/purpose:* The coronavirus disease (COVID-19) pandemic had a major impact on many patients receiving domiciliary dental care, and many services were suspended. This study aimed to assess the interruption of domiciliary dental care due to COVID-19 and the oral and general condition of patients whose care was interrupted.
Materials and methods: We randomly selected 1500 dentists providing domiciliary dental care in the Tokyo area and mailed them a questionnaire about the impact of COVID-19 on domiciliary dental care. The questionnaire investigated the level of interruption in care, infection prevention measures, oral care status, the motivation and psychological state of dental staff, and oral and general condition of patients after domiciliary care was resumed.
Results: We received 322 responses, a return rate of 21.4 %. Approximately one-third of domiciliary dental care was suspended during the pandemic. Overall, 20 %–35 % of patients (and their families) were infected with COVID-19, but infection among dental staff was very rare. Infection prevention was thorough when domiciliary dental care was provided, including the use of protective clothing and face shields. Approximately 4 % of respondents refrained from using turbine and ultrasonic scalers, which generate aerosols. About 40 % of respondents checked on patients' condition by phone or email.
Conclusion: The percentage of domiciliary dental care suspended was lower than expected. Providers implemented practices to prevent infection, resulting in significant expenditure. The interruption of domiciliary dental care may have had a negative impact on patients' oral and general health.

* Corresponding author. Department of Partial Denture Prosthodontics, Nihon University School of Dentistry, 1-8-13, Kanda-Surugadai, Chiyoda-ku, Tokyo, 101-8310, Japan.
E-mail address: hagiwara.yoshiyuki@nihon-u.ac.jp (Y. Hagiwara).

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic, which started in the spring of 2020, had serious effects on dental care facilities and provision, including home care.[1–6] The majority of patients who receive domiciliary dental care are older people, and there were many reports of home visits being cancelled during the pandemic.[7,8]

Domiciliary dental care (DDC) aims to treat caries and periodontal disease, adjust or repair prosthetics, help maintain oral function through oral hygiene management, improve eating and swallowing function, prevent aspiration pneumonia, and improve patient quality of life. For patients and their families who are unable to visit a dental clinic for care, interruption of domiciliary dental care is directly related to poorer oral environment, decline in nutrition and the ability to enjoy eating, worse physical and mental symptoms, an increased risk of aspiration pneumonia, and deterioration of systemic health status.[9–11] Several studies have reported the effects of COVID-19 on domiciliary dental care.[8,12–14] Clarifying specific problems, such as patients' oral environment, aspiration pneumonia, nutritional status, and mental impact associated with the reduction or interruption of domiciliary dental care visits, is clinically important and significant from a social dentistry perspective.

This study aimed to examine the extent to which domiciliary dental care was suspended during the COVID-19 pandemic and to clarify the oral and systemic conditions of patients whose care was suspended. The results of this survey provide a highly useful reference for revisiting the short-to medium-term trends in domiciliary dental care and for discussing what care should be provided during pandemics.

Materials and methods

A questionnaire was sent via mail to 1500 dentists who were providing domiciliary dental care within the Tokyo metropolitan area in 2021. The participants were randomly selected using a table of random numbers from among registered dentists who provide domiciliary dental care. The questionnaire contained six categories:

1. General information about domiciliary dental care;
2. Suspension and resumption of domiciliary dental care during the pandemic;
3. Measures taken to prevent COVID-19 infection;
4. Delivery of oral care (2021 situation compared to before the pandemic);
5. Motivation and psychological conditions for provision of domiciliary dental care (among dentists, dental hygienists, and patients); and
6. Changes in patients' oral and systemic conditions after domiciliary dental care was resumed.

This study was approved by the ethics committee of Nihon University School of Dentistry (No. 2016—18).

Results

General information about domiciliary dental care

In total, 322 dentists (21.4 %) responded to the questionnaire. The mean duration of their clinical experience was 27.5 years (median: 32.5 years), and the mean duration of their experience in providing domiciliary dental care was 13.3 years (median: 7.5 years).

Table 1 shows the types of places visited to provide domiciliary dental care and the number of patients treated. Six types of locations were visited: patients' homes, special nursing homes for older people, long-term care health facilities, daycare services for people with dementia, private nursing homes for older people, and others (e.g., hospitals).

Suspension and resumption of domiciliary dental care

Overall, 104 respondents said that they had interrupted or discontinued domiciliary dental care provision since spring

Table 1 Types of facilities visited for domiciliary dental care in the Tokyo metropolitan area and the number of patients in these facilities.

Type of facility	Number of facilities visited	Total number of patients
Patient's homes	801	788
Special nursing homes for the elderly	134	946
Long-term care health facilities	48	1374
Daycare services for people with dementia	19	159
Private nursing homes for the elderly	67	303
Others	62	580
Total	1131	4150

Table 2 Details on the suspension or discontinuation of domiciliary dental care due to the COVID-19 pandemic.

Item	Question details	Yes	No
1	Suspension or discontinuation was decided in conformance with the "declaration of state of emergency" or "semi-emergency coronavirus measures"	78	29
2	The main party that decided the suspension or discontinuation of DDC	Dentist: 30 Patient family/facility: 32 Mutual agreement between the two: 46	
3	Patients who contracted COVID-19	20	95
4	Patient family/facility staff who contracted COVID-19	37	78
5	Dentists and staff who contracted COVID-19 due to DDC	2	112

DDC: domiciliary dental care.

Table 3 Status related to resumption of domiciliary dental care suspended due to COVID-19 infection.

Item	Question	Yes	No
1	Resumption of DDC was decided in conformance to the "declaration of state of emergency" and "semi-emergency coronavirus measures"	52	31
2	The vaccination rate played a part in the decision to resume DDC	46	38
3	Care was resumed, but the number of patients visiting decreased after the pandemic	49	29
4	Resumption of DDC was welcomed by patients and families	72	5
5	Resumption of DDC was welcomed by dental clinic staff	52	23

DDC: domiciliary dental care.

2020, due to the COVID-19 pandemic, and 160 said that they had not done so. The 104 who responded "Yes" also provided detailed information on the suspension or discontinuation (Table 2). In total, by the end of May 2022, 85 respondents said that they had resumed or were planning to resume domiciliary dental care provision, and 71 said that they had not and were not. Table 3 shows the responses to the questions asked of the 85 respondents who had resumed domiciliary care provision.

Infection prevention for COVID-19

Overall, 203 respondents had implemented more advanced preventive measures against COVID-19 infection than standard (including the acquisition of protective equipment), and 65 had not. Table 4 shows the responses to the questions asked of the 203 respondents who had implemented extra protective measures.

Oral care provision pre- and during the pandemic

Overall, 259 respondents provided answers about the frequency of oral care and the sense of burden related to the COVID-19 pandemic. Changes in the frequency of oral care are shown in Fig. 1, and changes in the sense of burden related to oral care are in Fig. 2. A total of 204 respondents said that increasing the frequency or improving the quality of oral care was necessary as a COVID-19 infection prevention measure, and the remaining 45 respondents said that these measures were unnecessary.

Motivation and psychological conditions related to provision of domiciliary dental care among dentists, dental hygienists, and patients.

Questions and responses about motivation and psychological conditions related to domiciliary dental care provision are shown in Table 5.

Table 4 Conditions related to preventive measures.

Item	Question	Yes	No
1	Prevention of infection is the topmost priority in DDC	195	8
2	Disposable protective gowns and face shields were used	181	23
3	Purchased a new extra-oral vacuum aspirator for reduction of particles scattering dust and dental aerosols	63	143
4	Infection prevention measures a required longer-than-usual time for care	150	55
5	Preventive measures using mouthwashes (e.g., listerine) were implemented	135	71
6	There were limited treatments that involved dental dust particles (grinding of dental materials, denture adjustment, etc.)	38	168
7	There were limited treatments that involved dental aerosols (tooth preparation, ultrasonic scalers, etc.)	91	115
8	Expenditure related to preventive measures for infection were high	120	73

DDC: domiciliary dental care.

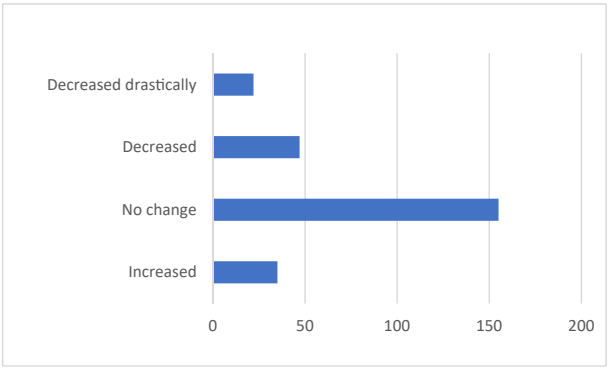

Figure 1 Changes in the frequency of provision of oral care during the pandemic.

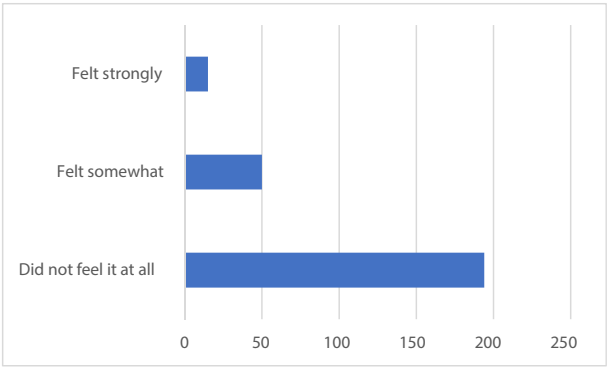

Figure 2 Changes in the sense of burden related to providing oral care during the pandemic.

Changes in patients' oral and systemic conditions after resumption of domiciliary dental care.

Questions and responses related to changes in patients' oral and systemic conditions after the resumption of domiciliary dental care are shown in Table 6.

Discussion

The purpose of this study was to examine the actual status of domiciliary dental care during the COVID-19 pandemic. If possible, it would be preferable to conduct an on-site survey at the actual domiciliary dental care. However, this is difficult to implement, so it had to rely on a questionnaire sent by mail. However, mail-distributed survey have limitations, and the success of a survey depends on the response rate. Furthermore, a well-designed questionnaire is necessary to ensure the quality of responses. Moreover, there are disadvantages such as the difficulty of delve deeper or collecting additional information about interesting responses. The response rate to this survey was 21.4 %, which is slightly lower than the response rate to a typical mail-distributed survey.[15] This could be explained by the lack of cooperation among dentists with little experience in domiciliary dental care, or small clinics. Assuming these biases, the state of domiciliary dental care during the COVID-19 pandemic might have been worse than the results of this survey suggest.

Dental care was provided in patients' homes to approximately 71 % of patients in this survey. The types and characteristics of other locations are:

Table 5 Motivation and psychological conditions for domiciliary dental care.

Item	Question	Yes	No
1	Reluctance to provide DDC out of concern related to COVID-19	91	160
2	Difficulty finding dental hygienists willing to cooperate and accompany for DDC	61	176
3	Reluctance of patients, families, and facility staff to cooperate with DDC	67	180
4	Concerns about oral and systemic conditions during the duration of suspended DDC	162	41
5	Telecare by phone or email to check patients' states during the duration of suspended DDC	79	123

DDC: domiciliary dental care.

Table 6 Changes in the patients' oral and systemic conditions after resuming domiciliary dental care.

Item	Question	Yes	No
1	Exacerbation of caries or periodontal disease	100	64
2	Breakage of dentures, bridges, or other dental prosthesis	94	70
3	Deterioration of oral hygiene conditions	119	44
4	Decline in eating and swallowing function	73	87
5	Deterioration of systemic health and nutrition status	64	97
6	Deterioration of oral and systemic conditions that could have been prevented if DDC had not been suspended	119	37
7	Death due to COVID-19 during the period of interruption	26	136

DDC: domiciliary dental care.

1. Special nursing homes for older people: Permanent residences for people who need constant care that is difficult to provide at home or for people with relatively severe conditions, such as being bedridden or suffering from dementia.
2. Long-term care health facilities: Temporary residences for older adults who need long-term care, medical care, or rehabilitation to prepare them to return home.
3. Day care services for people with dementia: Daycare facilities for people with dementia who receive care at home and visit during the day for daily living and functional training care.
4. Private nursing homes for older people: Fully self-paid residential facilities that mainly provide services needed in everyday life, such as nursing care services (bathing, toileting, meals), housework assistance (laundry, cleaning), and health and medical management.

Domiciliary dental care provision was discontinued by approximately 40 % of respondents, and the decision to discontinue was usually made through mutual agreement between the physician and the patient (family/facility), not by one party alone. Around 20 %–35 % of patients, families, and staff contracted COVID-19, but the rate of infections among medical staff was extremely low.

Domiciliary dental care was generally resumed upon observing a decrease in number of infected patients, when the state of emergency and semi-emergency coronavirus measures were lifted, or because of the vaccination status. Its resumption was welcomed by both patients and dental staff, suggesting that the needs for domiciliary care were widely recognized. However, the number of requests for domiciliary dental care tended to be lower after resumption than before the pandemic.[13]

Preventing infection was an important priority in domiciliary dental care during the pandemic, and protective equipment and face shields played an important role. Listerine and other antibacterial mouthwashes were actively used by patients. Approximately 30 % of respondents said that they had acquired extra-oral vacuum aspirators, and many said that the increased time and money spent on infection prevention measures were a major burden. Approximately 44 % of respondents said that they refrained from aerosol-generating procedures (tooth preparation, ultrasonic scalers, polishing of dental materials, and denture adjustments) to prevent airborne infections.[16,17]

Oral care provision during domiciliary dental care plays an important role in maintaining patient oral hygiene. Many respondents to this survey mentioned that the frequency of oral care did not change during the COVID-19 pandemic, but approximately 27 % said that the frequency of oral care provision decreased or decreased drastically. This is probably a result of the difficulty in providing domiciliary dental care under COVID-19 restrictions. About 25 % of the respondents said that oral care provision was a burden. However, about 80 % said that oral care was particularly important during the COVID-19 pandemic, showing dentists' keen awareness of the crucial role of oral care in health management during the pandemic.

About 25 % of respondents answered that dentists, dental hygienists, and patients who received domiciliary dental care were less motivated and willing to cooperate during the pandemic. Approximately 80 % of dental care providers said that they were concerned about patients' oral and systemic conditions while domiciliary care was suspended. However, only 40 % actually contacted any patients by phone or email to check on their condition.[18–20]

Changes in the systemic conditions of patients due to the suspension of domiciliary dental care were not as drastic as expected. However, 70 % of respondents indicated that they had seen a deterioration in oral hygiene conditions. It is positive that many older adults' hygiene, nutrition, and health were managed adequately by family members or facility caregivers despite the spread of COVID-19. Nonetheless, many people's oral hygiene status depends heavily on the provision of domiciliary dental care. Any deterioration observed was considered likely to be directly linked to the suspension of domiciliary dental care. Deterioration of caries and periodontal disease was most observable. In general, patients' ability to eat and swallow did not drastically decrease. Many dentists commented that "it was possible to prevent deterioration of oral hygiene and general condition by continuing to provide domiciliary dental care". Respondents reported 26 deaths during the period of suspension of domiciliary dental care. This is a considerable number.

In conclusion, a questionnaire survey was used to collect data on the effects of the COVID-19 pandemic on the provision of domiciliary dental care. Around one-third of respondents suspended or discontinued domiciliary care provision, which was lower than anticipated. Dentists implemented additional measures to prevent infection and assure the safety of both clinic staff and patients. This added considerably to expenditure related to infection precautions. Some deterioration in oral hygiene condition and progression of caries and periodontal disease were observed during the period while domiciliary dental care was suspended. This suggests that suspension of domiciliary dental care may have adversely affected patients' oral and systemic conditions.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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