Correspondence

The application of Taiwan National Health Insurance PharmaCloud system for improving the dental patients' medical safety

In Taiwan, a cloud data system named the National Health Insurance (NHI) PharmaCloud System has enabled the medical professionals to access the prescription information since 2013.[1] However, one of the biggest challenges for the dentists is the unfamiliarity with the out-of-institution medical data of their dental patients and the application of this system for improving the patients' medical safety. A medical safety program was implemented for the patients with the specific diseases in the NHI dental outpatient clinics in April 2024. This program established a set of clinical guidelines to let the dentists know how to use the PharmaCloud System to promote the medical safety of their patients. This article briefly reported the process and connotation of executing this program among the dentists under the Taiwan NHI system.

According to the definition of this program, the patients with the specific diseases refer to those with (1) diabetes mellitus, (2) hypertension, (3) osteoporosis (including those who are about to use the anti-osteoporotic drugs), (4) cardiovascular disease, (5) cancer, (6) hemodialysis and peritoneal dialysis, (7) organ transplantation, (8) mental illness, or (9) other unspecified diseases (Table 1). Except for the specialists in oral and maxillofacial surgery, oral pathology, and special needs dentistry, and the dentists

working in the teaching hospitals, all participating dentists, must receive the relevant education and training, before they implement this program. Before the participating dentists implement this program for the first time every year, they must fill in the self-assessment form for the patients with the specific diseases to confirm the medications, precautions, and reference matters for each specific disease. When performing this program during a consultation, the dentist needs to query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.

During the dental procedure, the dentist should inform his or her patient about the effects and associated risks of using the relevant medications. Moreover, when it is discovered that the patient's physical condition or related examination results are not satisfactory, the dentist should carefully evaluate whether to postpone the invasive treatment and provide the patient with a more appropriate medical arrangement (such as consulting the patient's original attending physician) and other suggestions. If the above items are completed, the National Health Insurance

Table 1 The precautions for the dentists who need to do in the medical safety program for the patients with the specific diseases in the National Health Insurance (NHI) dental outpatient clinics.

The precautions for the dentists who need to do

1. For the patients with diabetes mellitus

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To understand the patient's blood sugar monitoring status, such as AC sugar within three months or the latest medical record of HbA1c. The HbA1c value of <7 % means that the patient's blood sugar level is well controlled.
(4) To know the patient's medications for the first three months of dental treatment, including the medications for diabetes mellitus, cardiovascular disease, kidney disease, and eye disease.
(5) To understand and inquire about the patient's medication and the meal status on the day of dental treatment.
(6) To prepare candy or sugary drinks for the patient taking insulin to prevent hypoglycemia due to the faster reduction in blood sugar.
(7) The preoperative prophylactic medication (depending on the condition).

2. For the patients with hypertension

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To understand the patient's blood pressure monitoring status within the three months.
(4) To know the patient's medications for the first three months of dental treatment, including the cardiovascular medication, anticoagulant medication, and systemic condition tracking.
(5) To understand and inquire about the patient's medication status for the hypertension on the day of dental treatment.
(6) To monitor the postoperative bleeding condition.

3. For the patients with osteoporosis (including those who are about to use anti-osteoporotic drugs)

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the possible effects and associated risks of using the anti-osteoporotic drugs.
(3) To follow the prescribing physician's precautions and instructions for the dental visit, and use a consultation sheet when necessary. For example, the invasive dental treatment is not recommended within the three months of the monoclonal antibody injection.
4. If the invasive dental treatment is to be performed within the three months of bisphosphonates taking, the evaluation should be carefully conducted.
5. To monitor the postoperative bleeding conditions.

4. For the patients with cardiovascular disease

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To monitor for the general patient taking the anticoagulants.
(4) To seek advice from the physician and use a consultation sheet when necessary for the special patient taking the anticoagulants (such as those with embolism or stent surgery).

5. For the patients with cancer

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.

Table 1 (*continued*)

The precautions for the dentists who need to do

6. For the patients with hemodialysis and peritoneal dialysis (A) Hemodialysis

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To carefully evaluated the preoperative prophylactic medication to avoid increasing the burden on the renal function.
(4) In principle, the dental treatment is performed on the non-dialysis days. It is not recommended to perform invasive procedures on the kidney dialysis days.

(B) Peritoneal dialysis

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To carefully evaluated the preoperative prophylactic medication to avoid increasing the burden on the renal function.
(4) Due to the patient's susceptibility to infection, to minimize the scope of the wound and pay attention to it after the surgery.

7. For the patients with organ transplantation

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To evaluate and track the status of the patient taking the anti-rejection drugs, the immunosuppressants, and the anticoagulants within one year.
(4) To evaluate and track the patient's internal medicine, the systemic medication, and the physical condition within six months.
(5) The preoperative prophylactic medication.
(6) To monitor the postoperative bleeding condition.

8. For the patients with mental illness

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.

9. For the patients with other unspecified diseases

(1) To query the patient's information through the PharmaCloud System, inquire about the patient's medication (medical history taking), and record the patient's specific disease name, the medication status, or the recent relevant examination results in the medical chart.
(2) To inform the patient about the effects and associated risks of using the relevant medications.
(3) To follow the medical instructions prescribed by the original physician.

Administration (NHIA) will pay an additional 100 NHI points to the participating dentists for each dental visit. The budget of this program is settled quarterly, and the payment amount per NHI point shall not be higher than one New Taiwan dollar.

Taiwan implemented the NHI system since March 1995. In order to improve the quality of people's medical treatment and medication, the NHIA combined the cloud technology in July 2013 to build a patient-centered PharmaCloud System, which integrated the patients' medical information among different medical institutions into the same platform and provided the clinicians (including the dentists) from all medical institutions can check their patients' recent medical treatment and the medication records online during clinical treatment to ensure the patients' medical safety.[2] The dental profession took the lead in proposing a clinical program under the NHI system for improving the dental patients' medical safety through the use of the PharmaCloud System. This program brings the satisfactory and expected benefits, such as (1) reducing the risk of wound infection in patients with diabetes mellitus after the dental treatment; (2) reducing the risk of

osteonecrosis of the jaw in patients using the anti-osteoporosis drugs after the dental treatment; and (3) reducing the rate of dental treatment-related bleeding in the patients using the anticoagulants who visit the hospital for emergency management within 24 h after the dental treatment.

In addition to the medical safety, the PharmaCloud System also plays a role in ensuring the safety of the dentists and their colleagues in their practice. As we have previously reported, the PharmaCloud System can be used to confirm the status of the patients with the infectious diseases (such as medication and blood test results for the HIV-infected patients) to ensure that the dentists implement the effective infection control strategies in their practice.[3] In view of the multiple effects brought about by using the PharmaCloud System, the NHI system should continue to promote the application of the PharmaCloud System among the clinicians and track the benefits of its use for a long period of time.

Declaration of competing interest

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

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None.

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