

## Research Article

# Prescription Opioid Pain Medication Use among Patients Attending a US Dental College Clinic: Prevalence and Implications

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## Abstract

**Purpose:** Due to the increased opioids abuse in US during the past several decades, efforts have been made to counter this trend through regulation of use of prescription opioid pain medications. This study assesses the use of these medications by adult dental patients attending a US dental college clinic during February 2017 to October 2021.

**Methods:** A self-administered anonymous questionnaire was used to gather data from patients on demographics and patterns of utilization of medications.

**Results:** Among the patients included in the study, the majority were 51 to 70 years of ages, females, Caucasians, and with minimum high school education. Nine prescription opioid medications were used, and of these, hydrocodone and oxycodone were more common. Most patients used single medications, of which the majority were utilized for a few days up to 4 weeks. Nearly all medications were prescribed by 10 different health profession specialists, and the majority comprised emergency medicine physicians, primary health care practitioners and dentists. Most patients used their medications as intended, without sharing with others, and also expressed their satisfactions with the medications they used.

**Conclusions:** The study suggests that the recently reported opioid epidemic in US is less related to use of prescription medication, but to other external factors, including the non-medical use of potent synthetic compounds, such as fentanyl, as widely reported in the literature. Such a recognition, while warranting further studies on the topic, provides additional justifications for enhanced focus on this aspect of opioid abuse.

**Keywords:** Opioid pain medications; Dental patients; Opioid prescriptions; Opioid abuse

## Abbreviations

WHO: World Health Organization; CDC: Center for Disease Control and Prevention; AMA: American Medical Association; ADA: American Dental Association.

## Introduction

Opioid analgesics are used primarily for the management of moderate to severe pain, either alone or in combination with nonopioid analgesics, such as ibuprofen or acetaminophen. However, the use of these analgesics is often associated with a number of adverse effects, particularly if inappropriately used. These adverse effects include respiratory depression, tolerance, dependence, and addiction, among others, which are usually linked to the misuse and abuse of the drugs [1-4]. Of particular concern in this regard is addiction due to the intensity of its negative consequences and expansive prevalence.

The WHO has recently reported that cases of serious opioid adverse consequences due to over dosage have increased globally over the past several decades, in part due to increased use of these drugs in the management of chronic pain and the growing use of highly potent synthetic opioids that appear in the illicit market [5]. In the US, fatality due to opioid over dosage has been observed to rise by about 120% between 2010 and 2018, and two-thirds of this involved fentanyl and its synthetic analogues [5,6]. Similar observations have been made in other studies conducted under different settings [7-9]. Because of these alarming situations, concerned organizations, professionals and other stakeholders have taken greater initiatives to control the rising opioid epidemic by whatever means possible [10-15]. These initiatives include the way information about opioid medications is appropriately disseminated, the implementation of proper diagnosis of conditions to be treated, and the treatment and monitoring of patients who are prescribed opioid medications. However, it is not yet clear whether or not the application of these efforts has any impact on the current situation of the opioid epidemic in the USA. Largely driven with this curiosity and to provide a possible answer, the aim of the present study was to conduct a questionnaire-based assessment of the utilization of prescription opioid medications by adult dental patients attending a US dental college clinic during the period of February 2017 to October 2021.

## Materials and Methods

A self-reporting anonymous questionnaire of two-pages was prepared to obtain data from adult dental patients attending the emergency clinic at the Dental College of Georgia at Augusta University regarding their demographic characteristics, use of prescription opioid analgesic medications and related information. The questionnaire and the method of its administration were approved by the Institutional Review Board of Augusta University. Demographic characteristics collected from a survey participant included data on age, gender, race/ethnicity and educational level. Regarding the use of medications, survey participants were asked to pick the prescription of opioids they used during the past 12 months from a list provided. Follow-up questions on medications were included to get additional insightful information. While the major portions of the questions in the questionnaire were closed-ended, other portions were left open-ended. The questionnaire was pre-evaluated to establish its utility by conducting a pilot study involving a small number of patients. From the feedback obtained, certain modifications were made on questionnaire to improve its utility.

Adult patients who came to the emergency clinic at the Dental College of Georgia at Augusta University during February 2017 to October 2021 were invited to voluntarily complete the questionnaire, as approved by the Institutional Review Board. Copies of the questionnaire were given to individual pa-

tients with appropriate explanations and instructions. Following receipt of responses from patients, the data from properly completed questionnaires were transferred to a database. The information thus collected was then compiled and analyzed systematically to examine the patterns and trends of utilization of prescription opioid medications, together with other relevant information included in the questionnaire.

## Results

From 227 copies of the questionnaire returned by the study subjects with responses, 213 were found good enough for further consideration. Analysis of the data demonstrated that of the 213 patients, 43% reported the use of one or more single item prescription opioid pain medications. Data regarding the demographic characteristics of medication users, the types and durations of the medications used, prescribers seen by patients, other sources of medications, possible non-medical uses of the medications, whether or not the medications are shared with others, and how effective the medications were for patients are presented in Tables 1-9.

### Demographic characteristics of opioid medication users

As displayed in Table 1, of 92 prescription opioid users, 27 (29%) were in the age group of 31-50 years, while 39 (42%) in the range of 51 and 70 years, comprising a total of 71% of the survey participants. This was followed by younger users that consisted of 19 (21%) individuals between the ages of 18 and 30 years. Seven (8%) patients were over the age of 71 years. Out of the 92 respondents, females were 53 (58%) and males 37 (42%). The majority (57%) of pain medication users were Caucasians followed by African Americans (36%), the remaining being only 8%. Whereas most medication users (72%) reported as having high school and some level of college education, the rest (28%) were college graduates (Table 1).

**Table 1:** Demographic Characteristics of Prescription Opioid Pain Medication Users.

| Characteristics                   | Number of patients | Percentages |
|-----------------------------------|--------------------|-------------|
| Age                               |                    |             |
| 18-30                             | 19                 | 20.7        |
| 31-50                             | 27                 | 29.3        |
| 51-70                             | 39                 | 42.4        |
| 71≥80                             | 7                  | 7.5         |
| Total                             | 92                 | 99.9        |
| Gender                            |                    |             |
| Male                              | 39                 | 42.4        |
| Female                            | 53                 | 57.6        |
| Total                             | 92                 | 100         |
| Race/ethnicity                    |                    |             |
| Caucasians                        | 52                 | 56.5        |
| African Americans/Blacks          | 33                 | 35.9        |
| Hispanic/Latino                   | 1                  | 1.1         |
| Native Americans/Alaska Natives   | 1                  | 1.1         |
| Native Hawaiian/pacific islanders | 1                  | 1.1         |
| Others                            | 4                  | 4.3         |
| Total                             | 92                 | 100         |
| Education                         |                    |             |
| High school                       | 34                 | 37          |
| Some college                      | 32                 | 34.8        |
| College graduate                  | 26                 | 28.3        |
| Total                             | 92                 | 100.1       |

### Use of opioid medications

As shown in Table 2, 9 different opioid pain medications were reported to have been used by the survey participants. Of these medications, hydrocodone (36%) and oxycodone (32%) consisted of nearly 68% of the reported drugs, followed by tramadol (9%), morphine (7%), codeine (3%) and meperidine (3%), among others (5%). It should be noted that while the overwhelming majority (93%) of the drug products used were single item compounds, some codeine (6%) and oxycodone (1%) containing products were formulated in combination with nonopioid analgesics (Table 2).

Sixty eight percent (68%) of patients disclosed that they used only 1 type of medication product at a time during the reporting period, and this was followed by 22%, 8% and 1% using 2, 3, and 4 and 5 different products, respectively (Table 3). While 35% of the survey participants documented taking their prescription medications for less than a week, an equal number (35%) of patients used for 1 to 4 weeks. Longer durations of drug use were reported by 13% of patients, ranging from 2 months up to more than a year. Seventeen percent (17%) of the respondents used their prescribed medications as needed (Table 4).

**Table 2:** Opioid Pain Medications Used by Dental Patients.

| Opioid pain medications | Number of patients | Percentages |
|-------------------------|--------------------|-------------|
| Hydrocodone             | 45                 | 38.5        |
| Oxycodone               | 39                 | 33.3        |
| Tramadol                | 11                 | 9.4         |
| Morphine                | 8                  | 6.8         |
| Meperidine              | 4                  | 3.4         |
| Codeine                 | 4                  | 3.4         |
| Hydromorphone           | 3                  | 2.6         |
| Fentanyl                | 2                  | 1.7         |
| Methadone               | 1                  | 0.9         |
| Total                   | 117                | 100         |

**Table 3:** Number of Opioid Pain Medications Used by Dental Patients.

| Number of drugs used | Number of patients | Percentages |
|----------------------|--------------------|-------------|
| 1 drug               | 60                 | 68.2        |
| 2 drugs              | 18                 | 20.5        |
| 3 drugs              | 8                  | 9.1         |
| 4 drugs              | 1                  | 1.1         |
| 5 drugs              | 1                  | 1.1         |
| Total                | 88                 | 100         |

**Table 4:** Durations of Use of Opioid Pain Medications by Dental Patients.

| Durations     | Number of patients | Percentages |
|---------------|--------------------|-------------|
| <1 week       | 27                 | 35.1        |
| 1-4 weeks     | 27                 | 35.1        |
| 2 mo-8 months | 4                  | 5.2         |
| >1 year       | 6                  | 7.8         |
| As needed     | 13                 | 16.9        |
| Total         | 77                 | 100.1       |

**Table 5:** Prescribers of Opioid Pain Medications Used by Dental Patients.

| Prescribers            | Number of patients | Percentages |
|------------------------|--------------------|-------------|
| ER specialist          | 25                 | 29.8        |
| Primary care physician | 18                 | 21.4        |
| Dentist                | 18                 | 21.4        |
| Surgeon                | 8                  | 9.6         |
| Orthopedic specialist  | 3                  | 3.6         |
| Neurologist            | 3                  | 3.6         |
| Pain specialist        | 2                  | 2.4         |
| Gynecologist           | 2                  | 2.4         |
| Physician assistant    | 2                  | 2.4         |
| Others                 | 3                  | 3.6         |
| Total                  | 84                 | 100.2       |

The study participants also noted obtaining their pain medication prescriptions from more than 10 different specialists of health providers (Table 5). Out of these specialists, the majority (72%) consisted of emergency medicine physicians (30%), primary health care physicians (21%) and dentists (21%). Surgeons constituted about 10%, whereas of the remaining 18% included more than 5 different specialists. Regarding sources of drugs used, 91% of the patients reported getting them with prescriptions, while the rest (9%) without prescriptions (Table 6). Almost all respondents (99%) conveyed using their prescribed medicines only for the intended purpose of treating pain without sharing them with any other person (Tables 7 & 8). The majority (74%) the patients interviewed expressed that they were satisfied with the effectiveness of the medications they used as pain relievers (Table 9).

**Table 6:** Medications Obtained from Other Sources (Non-professional) by Dental Patients.

| Responses | Number of patients | Percentages |
|-----------|--------------------|-------------|
| Yes       | 8                  | 9.1         |
| No        | 80                 | 90.9        |
| Total     | 88                 | 100         |

**Table 7:** Medications Used for Non-medical Purposes by Dental Patients.

| Non-medical use | Number of patients | Percentages |
|-----------------|--------------------|-------------|
| Yes             | 1                  | 1.1         |
| No              | 87                 | 99          |
| Total           | 88                 | 100.1       |

**Table 8:** Medications Shared with Other Users by Dental Patients.

| Sharing with others | Number of patients | Percentages |
|---------------------|--------------------|-------------|
| Yes                 | 1                  | 1.1         |
| No                  | 87                 | 99          |
| Total               | 88                 | 100.1       |

**Table 9:** Ratings of effectiveness of opioid pain medications used by dental patients.

| Ratings <sup>a</sup> | Number of patients | Percentages |
|----------------------|--------------------|-------------|
| 1                    | 4                  | 4.6         |
| 2                    | 6                  | 6.9         |
| 3                    | 12                 | 13.9        |
| 4                    | 20                 | 23.2        |
| 5                    | 44                 | 51.1        |
| Total                | 86                 | 99.7        |

<sup>a</sup>Note that 1 denotes least effective and 5 denotes most effective, the rest donating in between ratings.

### Discussion

The principal objective of this study was to assess the utilization of prescription opioid pain medications by adult dental patients attending a USA dental college emergency clinic in recent years, by taking into consideration their demographic characteristics. Of the patients considered in the study, 43% reported using prescription opioid pain medications.

From analysis of the data, the most likely dental patient to use an opioid pain medication is an educated Caucasian woman in the proximity of middle age. Since the proportions of the 2 major groups of survey participants, Caucasian and African American, approximated the state's demographics, race, as such, may not necessarily be a contributing factor for opioid pain medication use. On the other hand, the fact that the ratio of male and female respondents was lower and higher than the state's estimates, respectively, can provide evidence for increased use of opioid medications by women. These observations, as a whole, are consistent with the reports of previous surveys conducted under various scenarios [7,16,17].

In the current study, 9 different types of opioid pain medications were reported prescribed by health practitioners, and, of the medications mentioned, hydrocodone and oxycodone were far more commonly used, followed by tramadol and morphine, the remaining five being considered of minor importance (Table 2). Meantime, it may be of interest to note that 5% of the patients surveyed also used codeine in combination with nonopioid analgesics. Taken together, our findings are consistent with the types and patterns of opioid pain medication use reported in earlier studies for hydrocodone, oxycodone, tramadol, morphine, codeine and fentanyl [1,15, 17-20].

Being more widely used, hydrocodone and oxycodone are of particular interest. These drugs, in pure form, are Schedule II controlled substances that are often prescribed to control moderate to severe pain. With inappropriate use, both drugs can lead to serious harmful effects, including, tolerance, addiction, drowsiness, respiratory depression and even death with over dosage [1-4]. It is generally recommended that when hydrocodone and oxycodone are considered to be prescribed, it should be for a relatively short-term, and only after assessing the abuse potential of the patient. Belonging to the class of opioid analgesics, the less commonly prescribed medications reported here, generally have similar pharmacological properties, but with certain variations in therapeutic effectiveness and adverse effects [1,14-18].

The fact that almost all the medications reported by the patients in our study were (1) obtained with prescriptions from qualified professionals, (2) used individually, (3) restricted to be used for short periods of time or used as needed, (4) not used for any other purpose, and (5) not shared with any other person, are all indications that the recent opioid-use guidelines provided by health institutions and professional organizations, such as the CDC, AMA and ADA were largely followed [6,10-13,18,21]. In addition, our realization that the majority of the patients expressed their satisfaction with the use of the drugs prescribed for them provides further evidence for implementation and usefulness of the guidelines recommended. From these observations, it can be implied that the cause of the ongoing opioid abuse epidemic in USA is more likely to be related to other contributing factors rather than to prescriptions supplied by health providers. In this regard, there is evidence that the current opioid-linked deaths are predominantly driven by an epidemic of non-medical use of fentanyl [19-22]. This is in contrast to previous widespread beliefs that the abuse of prescription opioid painkillers is the culprit for the opioid epidemic problem.

At this point, mention should be made that the current study could be associated with certain limitations. Although the study subjects were likely to be from different parts of the state, since the survey was restricted to one study site, the results reported could impose certain limitations for generalization. The survey also depended on self-reports of study subjects, which could be influenced by aspects of misrepresentation, bias and under-reporting of information. In the questionnaire, patients were asked to report use of opioid medications and related information during the past 12 months, with the possibility of raising additional challenges to recall details of past events by the patients. Despite these shortcomings, the current study can instigate a renewed interest for enhanced appreciation and better understanding of the opioid crisis. Further research is needed in this direction taking the limitations noted into consideration.

## Conclusion

Our questionnaire-based study reported here identified prescription opioid pain medications used by a group of US patients whose major demographic characteristics are similar to those reported recently in other related studies. These demographic findings together with our data indicating the appropriate use of medications by the patients and their expressed satisfaction with the medications provide support for the use of opioid medications under scenario described. Our study, therefore, suggests that the ongoing opioid abuse epidemic in US is less related to the use of prescription opioid medications, but it is more likely linked to some other external factors, including the non-medical use of highly potent substances such as fentanyl, as widely reported in the literature. Further studies are warranted to verify and extend this observation, with additional consideration of the study limitations noted.

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