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Association of electronic prescription in controlled substances used

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ASSOCIATION OF ELECTRONIC PRESCRIPTION IN CONTROLLED SUBSTANCES USED

ABSTRACT

Introduction: Controlled substances have been described as pharmaceuticals or illegal medicines that act primarily on the central nervous system and could cause physical and mental dependence, eventually leading to addiction. Prescription opioids were a significant contributor to the opioid epidemic, accounting for more than 70,000 opioid-related overdose deaths, including illicit and prescription opioids, between 2018 and 2019. The Electronic Prescriptions for Controlled Substances (EPCS) initiative recently aimed to reduce rates of prescription opioid addiction, abuse, diversion, and death.

The system for controlled substances had become more widely used as providers and governments trying to combat the opioid problem. Because of its ability to prevent prescription forgery and identify multiple prescribers of prescribing and dispensing, e-prescribing for controlled substance (EPCS) had been believed to improve pain management and could play a key role in addressing the growing public health crisis of controlled substance abuse and overdose

Methodology: This research methodology involved a study of literature comprising several literature reviews. Six electronic databases were employed in the search. Overall, sources were thoroughly selected and referenced. The semi-structured interview was also carried with the provider working with the EPCS system in the Hospital.

Results: The literature analysis considered disparate studies relevant to the association of electronic prescription in controlled substances used. There was a mixed result; however, following the investigation of the review, and expertise interview the results have shown that

utilization of the EPCS had the potential to detect and prevent opioid diversion by eliminating paper prescriptions and could improve healthcare quality, safety, and efficiency while also lowering drug costs.

Discussion/Conclusion: Providers who have been prescribing controlled medications should develop prescription methods that reduce or prevent adverse effects from avoiding misuse. With the central coordination and clinical leadership, meaningful reductions in opioid overprescribing are possible and sustainable without decreasing patient satisfaction.

Keywords: Electronic prescription-controlled substances, EPCS, prescription narcotics, pharmacology opioid misused, Drug abuse, Illicit drugs, Opioid epidemics.

INTRODUCTION

Controlled substances have been described as a drug or other substance strictly regulated by the government due to the risk of abuse or addiction. The regulation covers how the substance had been manufactured, used, handled, stored, and disseminated. Opioids, stimulants, depressants, hallucinogens, and anabolic steroids have been controlled substances (Aro, Hussain, & Bobrin, 2021). In 2019, overdoses involving opioids killed approximately 50,000 people, with synthetic opioids accounting for nearly 73 percent of those deaths; Synthetic opioids, mainly illicitly made fentanyl, are at the heart of the overdose pandemic. Overdoses involving psychostimulants like methamphetamine are also on the rise, both with and without the use of synthetic opioids (Scholl, Seth, Kariisa, Wilson, & Baldwin, 2018). Even though controlled substances account for only 11% of all written, they were prescribed by 90%, making it critical to include them in e-prescribing systems (Thomas et al., 2012). Electronic Prescribing for Controlled Substances aimed to eliminate paper prescriptions by allowing clinical prescribers to write controlled drug

prescriptions electronically, making them digital and trackable for both the prescriber and the pharmacist and had been an essential part of any health information technology system, as well as a requirement for 'meaningful use' (Blumenthal & Tavenner, 2010). However, one of the single most difficult challenges for any prescriber was distinguishing between the legitimate prescription of controlled substances versus the prescription potentially used for illegitimate purposes (Preuss, Kalava, & King, 2021). The fact that different people have varying tolerance levels and require different opioid doses to achieve adequate pain relief was perhaps the most challenging aspect of caring for patients with pain (D'Aunno, Park, & Pollack, 2019).

To limit the likelihood of drug diversion and abuse, the DEA acknowledged the importance of ensuring that the rules regulating electronic prescription (EPCS) did not unintentionally enabled diversion and abuse (Abramson et al., 2012). The DEA's Interim Final Rule (on EPCS went into effect in June 2010, allowing for e-prescribing and laying out the rules for its use in the U.S (DEA., 2010). Providers, pharmacies, prescription system application vendors, and pharmacy system vendors were all subject to the rules (Kannry, 2011). Providers, pharmacies, prescription system application vendors, and pharmacy system vendors were all subject to the regulations (Kannry, 2011).

The Electronic Prescriptions for Controlled Substances (EPCS) aimed to reduce prescription opioid addiction, abuse, diversion, and death (Danovich et al., 2019). Additionally, E-prescribing could improve healthcare quality, safety, and efficiency (Kaushal, Kern, Barrón, Quaresimo, & Abramson, 2010). The potential benefits of EPCS enhanced patient management and reduced prescription fraud associated with paper prescriptions, which account for a small but significant proportion of opioid medications diverted for abuse (Fischer et al., 2010). EPCS was

gaining popularity because of its ability to detect and prevent opioid diversion by removing paper prescriptions and allowing cross-referencing PDMP databases (Gawande, 2017). Without sacrificing convenience, EPCS provided accountability and security, and It's a potent weapon in the fight against the nation's opioid problem (Kausha et al., 2010). While EPCS regulations could improve patient care and provide practitioners with more data for quality improvement, they might also offer new obstacles to practitioners, facilities, and vendors (Kaldy, 2016).

EPCS mandates were in place in 23 states and were passed in September 2021. Furthermore, by 2022, all controlled drugs covered by Medicare Part D must be dispensed through electronic prescribing (Imprivata., 2021). Many current state and local laws aimed at better tracking controlled-substance prescriptions using e-prescribing technology, in conjunction with prescription drug monitoring programs, have aided adoption (Everson, Cheng, Patrick, & Dusetzina, 2020).

Therefore, this research aimed to analyze and assess the association between electronic prescribing-controlled substances and their impact on opioid prescribing.

METHODOLOGY

The working hypothesis was that electronic prescribing of controlled substances has intended to reduce opioid prescribing rates by reducing fraud and experienced more significant reductions in opioid prescribing

This qualitative study's methodology combined literature research with a semi-structured interview with the providers.

The conceptual framework for this research followed the research framework and process utilized by Yao, Chu, and Li (2010), Figure 1. The methodology used for this research study was a review of academic literature, involving the following steps:

Step 1: Literature Identification and Collection

The electronic databases of Marshall University nursing allied health, Marshall University Digital Scholar, ProQuest, PubMed research databases, Evidence-Based Medicine, JAMA, and Cochrane were searched for the terms "Electronic Prescription Controlled substances" OR "EPCS" OR "E narcotics prescription" OR "Prescription AND "Pharmacology opioid misused" OR "OPIOIDS" OR "DRUG Abuse" "AND "The United States." Government websites, The Journals of ONDC, CMS and Drug enforcement administration (DEA), ARHQ Evidence-based practice center, and Imprivata were cited. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis and PRISMA method (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group 2009). The search established 122 relevant articles were identified, and articles were excluded (N=94) if they did not meet inclusion criteria. Articles were included (N=28) if they explained the effect of electronic prescribing-controlled substances that had reduced the fraud and misuse of opioids. The 28 articles were thoroughly investigated and finally included in the data analysis, and 10 were used for the results, and 17 were used in the introduction.

Step 2: Formation of Inclusion Principles and Literature Analysis

A total of 32 Articles, written in English and published from 2010-2021, with relevant information about the electronic prescribing of controlled substances that intended to reduce opioid prescribing rates by reducing fraud and experienced more significant reductions in opioid prescribing, were scrutinized and used in the data analysis and presentation of the project study.

Also, the information found in the literature review was complemented by relevant details obtained from a semi-structured interview with the physician who has had enough expertise with EPCS used for the past five years in Geisinger medical center. The interview session was recorded on co-investigator's phone with approval from the Institutional Review Boards (IRB). (See Appendix A: Semi-Structured Interview Questions with an expert physician). The clinician was cited as an expert EPCS management throughout the review of this study. The literature search was performed by AS, J.O., and validated by A.C., who acted as second reader and counter-checked to confirm that references met the inclusion criteria.

RESULTS

In a study done between January 2014 and March 2015, the number of pharmacies that were equipped with (EPCS) increased slightly, from 78% (46,711 pharmacies) to 79% (47,971 pharmacies) across the country (Gabriel, Smith, Sow, Joseph, & Wilkins, 2016). The degree to which a state was able to help its citizens varied tremendously. In March 2015, for example, state pharmacy enablement ranged from 30% to 92%. The highest rate of EPCS pharmacy facilitation was in Rhode Island (96%), and the lowest was in North Dakota (30%). Between January 2014 and March 2015, national EPCS enablement among prescribers increased by 3.7%, from 0.6% to 4.3%, with more enablement in the urban areas than rural areas (Gabriel et al., 2016).

Residents were the most common kind of provider who supplied opioid prescriptions at discharge (79.1%), followed by advanced practice professionals (APP, 77.6%), and finally attending physicians (71.6%) (Cao, Monteiro, & Wills, 2020). According to a web-based survey done in Finland involving 269 GPs, GPs' job flexibility has been boosted by electronic health records and e-prescribing (Kivekäs, Enlund, Borycki, & Saranto, 2016).

Electronic prescription of controlled substances and fraud.

EPCS improved patient safety by reducing the risk of fraud and diversion observed with paper opioid prescriptions. With up to 9% of opioid paper prescriptions suspected of being forged or fraudulent, the widespread use of EPCS has substantially influenced opioid prescribing (Achar, Sinha, & Norcross, 2021).

According to the DEA, EPCS reduced the following types of prescription diversion: stealing prescription pads or printing them and writing non-legitimate paper prescriptions; altering a legitimate prescription to obtain a higher dose or more dosage units (e.g., changing a "10" to a "40"); phoning-in non-legitimate remedies late in the day when it is difficult for a pharmacy to complete a confirmation call to the practitioner's office; and altering a prescription record at the pharmacy to hide diversion from pharmacy stock (Achar et al., 2021).

Electronic prescribing of controlled substances and the opioid crisis.

In a case study done at Anne Arundel Medical Center from April 2016 to April 2018, about 44,000 clinical contacts were documented. From a beginning level of 34.4 MME per encounter per month, the total health system MME per encounter fell by 1.0 MME per encounter per month. The monthly MME per interaction was 58% lower after the post-intervention observation than the 6-month baseline average. From a baseline level of 428 MME per prescription per month, morphine milligram equivalents per opioid prescription declined by 8 MME per month. The MME per prescription each month was 34% lower after the 16-month post-intervention period than at the start (Meisenberg, Grover, Campbell, & Korpon, 2018). From a starting point of 11.5%, the percentage of clinical contacts resulting in an opioid prescription was lowered by

0.2% each month. The opioid prescription rate was 38% lower at the end of the 16-month post-intervention period than at the start (Meisenberg et al., 2018).

A case study done at Yale New Haven Health System from February 2017 to August 2017 revealed that the median number of opioid pills prescribed per surgery reduced from about 30 pills per patient before the prescription default modification to about 20 pills per patient following the change in the prescription default (Chiu et al., 2018). Prescriptions issued for 30 pills reduced from 39.7% (554 of 1397) before the EPCS to 12.9% (183 of 1420) after the EPCS, while prescriptions written for 12 pills rose from 2.1% (29 of 1397) before EPCS to 24.6% (349 of 1420) after EPCS. The number of prescriptions written for 20 tablets increased significantly from 12.2% (171 of 1397) before EPCS to 19.6% (278 of 1420) after EPCS. After acquiring EPCS, the total opioid prescription reduced by 34.41 MME prescribed (Chiu et al., 2018).

In a study done at a dental facility in New York from December 1st, 2012, to February 28th, 2013, over three months before the required Prescription Drug Monitoring Programs (PDMP), and from December 1st, 2013, and February 28th, 2014, after PDMP implementation, Table 1 shows the frequency and quantity (numbers of tablets) of opioid and non-opioid analgesics prescribed for dental emergency patients. The most prescribed opioid analgesics were hydrocodone, codeine, and oxycodone (Rasubala, Pernapati, Velasquez, Burk, & Ren, 2015). Ibuprofen and acetaminophen were the most prescribed non-opioid analgesics. Following the mandated PDMP's introduction, there was a general trend toward fewer opioid prescriptions and more non-opioid analgesic prescriptions (Table 1). By the end of the trial, the total number of opioid analgesics prescribed over three months dropped from 5096 to 1120 pills, a 78% decrease in absolute numbers (Rasubala et al., 2015).

States implementing both mandatory PDMP used, and pain clinic laws were significantly associated with reducing the combined drug overdose death rate of −1.1 per 100,000 residents (Dowell, Zhang, Noonan, & Hockenberry, 2016). Combining mandatory provider reviews of state-run prescription drug monitoring program data with pain clinic regulations reduced opioid prescription volumes by 8% and prescription opioid overdose death rates by 12% (Brandeau, Pitt, & Humphreys, 2018).

Cost of implementation of electronic prescribing for controlled substances.

Scalise and colleagues found that the cost of implementing a simple e-prescribing platform ranges from $1,500 to $4,000 per practitioner in a 2007 study. An advanced system with alarms, reminders, and system integration costs $29,000 per physician the first year and $4,000 per physician each year after that (Hahn & Lovett, 2014).

DISCUSSION

EPCS had been an essential tool in healthcare facilities. It facilitated the monitoring of prescribed controlled substances, curbing prescription errors that might occur. This would have helped provide a better quality of care to patients. EPCS provides a complete record of controlled substance prescription; both physicians and patients could be monitored through it. These had been particularly important for public health, and law enforcement initiatives like the DEA addressing misuse and diversion of opioid medications as detecting and curbing fraud associated with controlled substances might have become easier.

The clinical response to the opioid crisis were specific obligation for health systems and their physician leaders. They employed or contract with many clinicians both in hospitals and in the community, they were frequently the conveners of organized medical staff quality

improvement, they had been having a mission to improved and protect the public's health, and existing channels of communication to educate and inform the public and patients about opioid risks and alternatives.

Although slow, there is progress in acquiring EPCS as utilization and sustainability of the system, which had been very expensive for most hospitals since they do not receive financial support from the HITECH act of 2009, whose primary focus is EHR.

Barriers to implementation of EPCS.

The main barrier to the implementation of EPCS had been the financial commitment required. Hospitals might have to invest their own money in an e-prescribing system, which was very expensive. HITECH Act of 2009 only covers EHR deployment and had allocated about 22 billion EHR used.

LIMITATION

This literature review had several limitations, resulting from the search approach used. Articles used for the research were restricted to relevant Electronic Prescription Controlled substances. While EPCS shows to be promising in controlling the opioid crisis, these findings do not apply to all hospitals and clinical settings; they have policy implications and cost factors. The possibility of inadvertently omitting helpful information from the review could have been high due to the method employed. A case study on implementing the EPCS method used in hospitals was limited in search. Finally, there was the likelihood of author, publisher, and affiliation bias in the material used for the literature review.

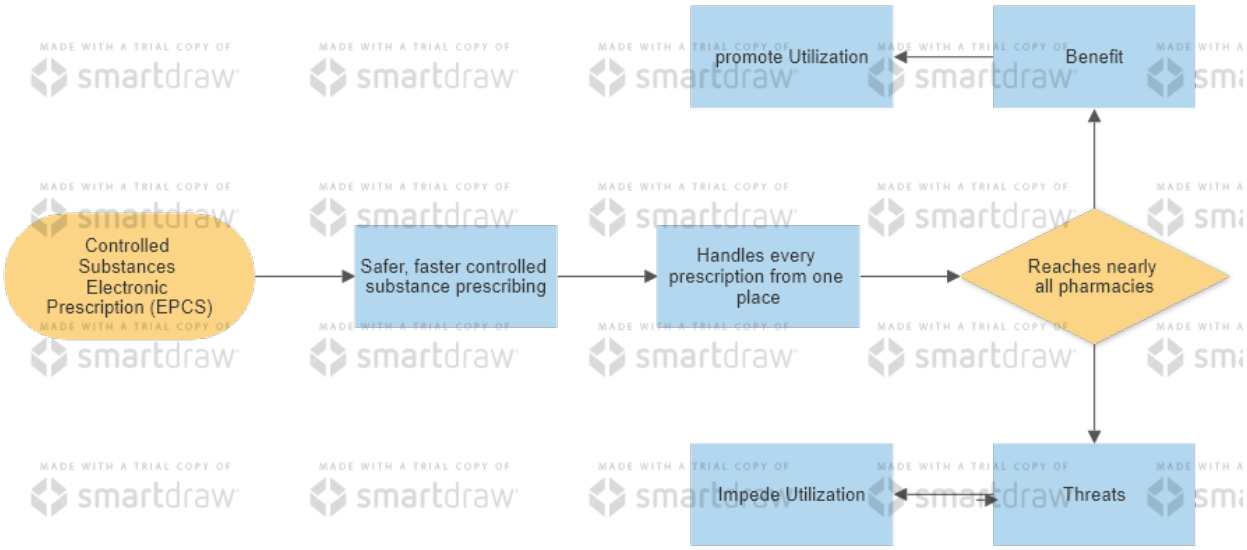
PRACTICAL IMPLICATION

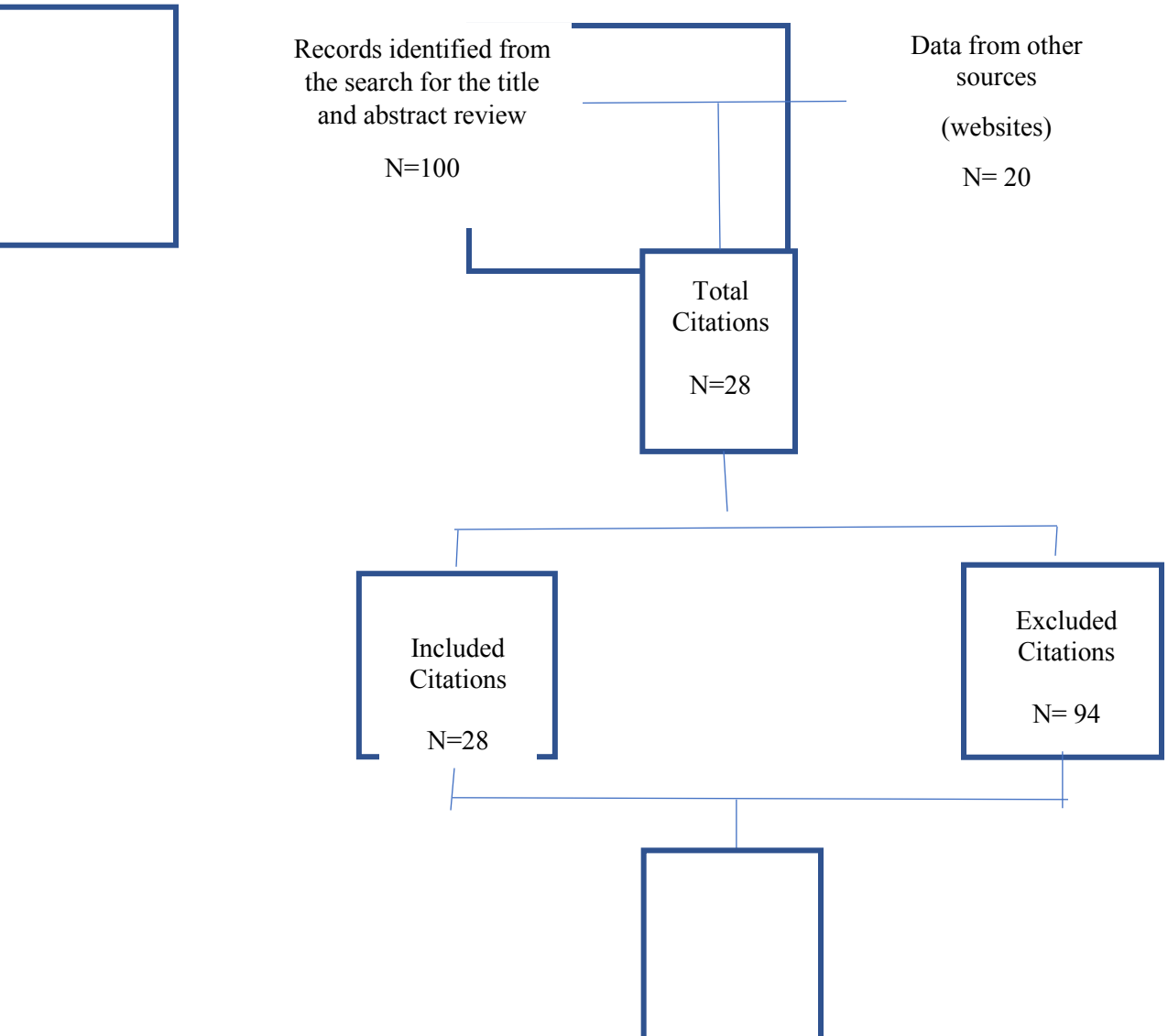
The practical suggestion resulting from this literature and case study must be evaluated in the future analysis includes consideration of outcome for the control of opioids epidemic nation widely after implementing Electronic Prescription Controlled substances effect achieving scale. Adopting EPCS widely might improve overall safety efficacy, quality, and control of the opioid crisis.

CONCLUSION

Although EPCS has decreased the overall prescription rate of controlled substances, it is unclear whether this has helped reduce the opioid crisis. With central coordination and clinical leadership, meaningful reductions in opioid overprescribing are possible and sustainable without decreasing patient satisfaction.

Figure 1. Conceptual Framework created by investigators using SmartDraw and adapted from that of Yao, et al (2010) (Yao et al., 2010; SmartDraw, 2019).





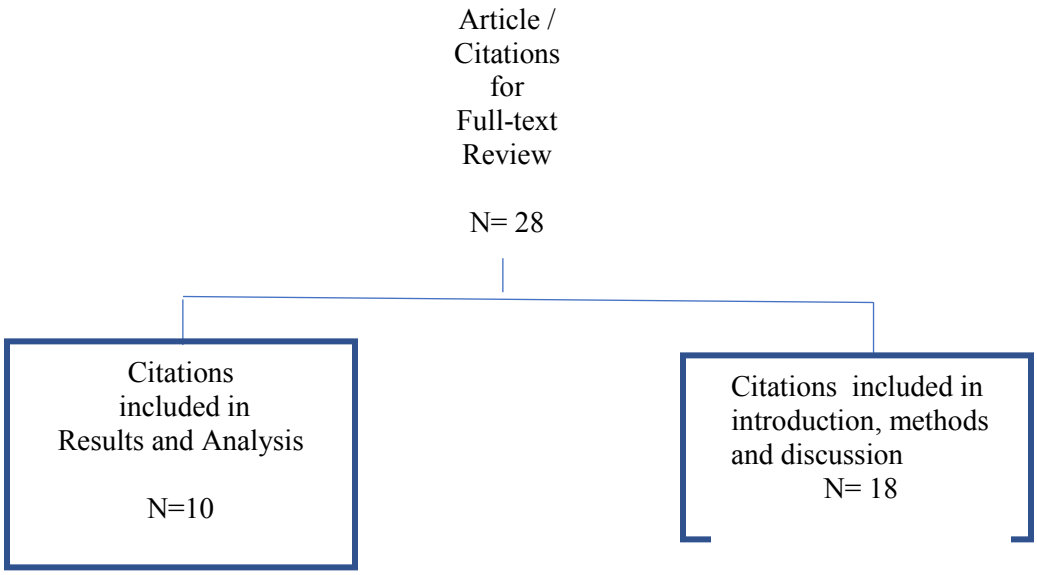


Figure 2: Overview of Literature Evaluation adapted from Moher, Liberati, Tetzlaff, Altman, The PRISMA Group (2009) For more information, visit www.prisma-statement.org.

APPENDIX A.

SEMI_STRUCTURED INTERVIEW QUESTIONNAIRE: ASSOCIATION OF ELECTRONIC PRESCRIBING WITH CONTROLLED SUBSTANCE USE.

1. Have you ever used e-prescribing when prescribing controlled substances?
2. How long have you used e-prescribing for controlled substances?
3. In the last 30 days, how many times have you prescribed controlled substances?
4. Would you say that the frequency of prescribing controlled substances has increased or decreased since the introduction of e-prescribing?
5. What is the barrier that you face in prescribing controlled substances using e-prescribing?
6. Do you think e-prescribing of controlled substances has helped reduce the opioid pandemic?
7. Has e-prescribing led to benefit in controlling the opioid pandemic?

8. Do you think e-prescribing has helped decrease fraud associated with controlled substances in hospitals?
9. How has e-prescribing helped decrease fraud in hospitals?
10. Do you think e-prescribing is a sustainable trend in attempts to decrease the use of controlled substances?

TABLE 1.

Frequency and quantity (numbers of pills) of pain medication prescriptions for dental emergency patients before and after implementation of the mandatory prescription drug monitoring program (PDMP) (Rasubala et al., 2015).

		Pre-iSTOP		Post-iSTOP-1		Post-iSTOP-2	
		prescriptions	pills	prescriptions	Pills	prescriptions	pills
Opioids	Hydrocodone	378	4145	163	1393	106	827
	Codeine	51	650	24	222	30	251
	Oxycodone	23	301	3	24	4	42
	Subtotal	**452**	**5096**	**190**	**1639**	**140**	**1120**
Non-opioids	Ibuprofen	1000	22257	1051	23600	1198	25846
	Acetaminophen	23	467	107	1645	119	1992
	Subtotal	**1023**	**22724**	**1158**	**25245**	**1317**	**27838**
	Total	**1475**	**27820**	**1348**	**26884**	**1457**	**28959**

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