Providing Information Improved Adequate Storage and Disposal of Opioids by Bereaved Family Caregivers

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Abstract

Context:

Poor understanding regarding the safe use, secure storage, and adequate disposal of unused opioids may contribute to the opioid epidemic. It is unclear what happens to unused opioids in the households of deceased cancer patients.

Objectives:

Our aim was to investigate the patterns of use, storage, and disposal of unused opioids among families of deceased cancer patients.

Methods:

A questionnaire was administered to families of deceased cancer patients. Questions were related to the use, storage, and disposal of opioids prescribed to their deceased family member.

Results:

Completed questionnaires were received from the families of 240 patients. Of these, 129 (53.8%) and 99 (41.3%) participants were aware of the danger of diversion and need for safe disposal, respectively. One (0.4%) participant reported diversion. In total, 177 participants (73.8%) stored opioids securely, 6 (2.5%) had unused opioids at home, and 142 (59.2%) returned unused opioids to medical health providers. Knowledge of safe opioid disposal increased the rate of returning opioids to medical health providers (84.8% vs. 53.2%; $p < 0.001$) and decreased the rate of participant disposal (13.3% vs. 37.6%; $p < 0.001$). Prior knowledge of the risks of opioid diversion was associated with storing opioids securely (91.9% vs. 80.7%; $p = 0.028$).

Conclusion:

Most families of deceased cancer patients follow safe use, secure storage, and adequate disposal of prescribed opioids. Awareness of opioid diversion and the need for adequate disposal increased the prevalence of safe practices.

Introduction

Opioids are commonly prescribed for both cancer pain and non-cancer pain in the United States (US). Opioid prescriptions for chronic pain, and the incidence of death due to opioid-overdose, have rapidly increased (1), initiatives, such as monitoring prescribed drugs (3), registering patients to 1 pharmacy (4), and multicomponent interventions (5) have been adopted by the US Food and Drug Administration in an attempt to address overdoses from prescription opioids (2) and curb the opioid epidemic.

Additionally, provision of education to patients regarding proper storage, dangers of diversion, and appropriate means of disposal of unused opioids, is promoted(6)(7). Cancer patients requiring opioids also have a potential risk for opioid abuse and diversion. A survey in the US demonstrated that inappropriate and unsafe use, storage, and disposal of prescribed opioids occurred in a large proportion of cancer patients (8), and such practices subsequently improved by education programs (9). However, appropriate knowledge and understanding of opioid use, storage, and disposal by families of deceased cancer patients has never been investigated. The guidelines of the American Society of Health-System Pharmacists (ASHP) recommend that family education regarding opioid disposal should extend beyond the patient's death,

with the aim to prevent diversion and unsafe disposal of opioids (10). If opioids become commonly used for non-cancer pain in Japan, there is potential for an opioid epidemic, similar to the US. To prevent an opioid epidemic, it is necessary to understand the current compliance rate with the guidelines for proper use of opioid analgesics in Japan (11), which would then allow us to take any necessary preventative action.

The aim of our study was to evaluate compliance rates with adequate opioid storage, use, and disposal, and to investigate the influence that awareness and understanding of adequate practices has on compliance rates.

Setting and Participants

This study consists of a questionnaire administered to bereaved caregivers of cancer patients in 2 different settings. The first questionnaire was administered to families of deceased cancer patients who died at palliative care units (PCU) or at home between November 2011 and May 2015. The participating institutions were 2 PCU and 1 home-based hospice service. A total of 303 bereaved family members were retrospectively and consecutively enrolled from May 2015. The questionnaire was conducted in December 2015 by mail. No reminder or reward was given. This study was approved by the institutional review board (IRB) at the National Cancer Center Hospital.

The second questionnaire was a part of the Japan Hospice and Palliative care Evaluation 2016 (J-HOPE2016) study, which was administered to families of cancer patients who died in PCU between November 2013 and January 2016. Seventy-one PCU were included. From January 2016, a total of 764 bereaved family members were retrospectively and consecutively enrolled. The questionnaire was conducted in May 2016 by mail. Another questionnaire was sent 2 months later to non-responding families. This study was approved by the IRB at Tohoku University.

Questionnaire

Produced entirely in Japanese, the questionnaire was developed based on a questionnaire from a previous study (8) by 13 healthcare professionals and 2 bereaved family members, who were not participants. The questionnaire consisted of 11 questions relating to opioid use, storage, and disposal. Questions were developed according to the Japanese guideline for opioid use, which defined “adequate” as follows: 1) no diversion, 2) storage in a safe place where children cannot access, and 3) returning unused opioids to medical providers or a pharmacy.

Statistics

Continuous data were summarized using mean ± standard deviation. The prevalence of each response was calculated. The chi-square test was performed to assess the influence of providing information on opioid storage and disposal. The significance was set at $p < 0.05$. Statistical software IBM SPSS (version 24) was used for all data analyses.

Results

Questionnaires were mailed to 1067 families and 686 responses were received. Of these, 446 were excluded due to not wanting to participate (n = 85), no use of opioids (n = 281), and no answer to all questions (n = 80). A total of 240 participants (median age, 62; female, 65.4%) were analyzed (Table 1).

The compliance rate of opioid use, storage, and disposal

One hundred twenty-nine participants (53.8%) were aware that the use of opioids by anyone other than the patient was prohibited (Table 2). One participant (0.4%) had used remaining opioids. Opioids were stored in a secure place by 177 participants (73.8%). Ninety-nine participants (41.3%) had received information regarding the appropriate disposal of opioids (Table 2). Among those participants, information was delivered to them by a nurse (62%), pharmacist (38%), or physician (32%). Ten participants (4.2%) had a trouble disposing opioids. Unused opioids were returned to a pharmacy or

provider in 142 cases (59.2%). Among the participants who disposed unused opioids by themselves, the method of disposal included discarding in the trash and flushing down a toilet, which were 19.2% and 1.3%, respectively.

The influence of providing information on compliance rate

Providing information about opioid disposal significantly decreased the number of participants who had trouble disposing opioids (2.1% vs. 8.9%, $p = 0.038$) and disposed unused opioids by themselves (13.3% vs. 37.6%, $p < 0.001$), and increased the number of participants who returned unused opioids to pharmacy or medical provider (84.8% vs. 53.2%, $p < 0.001$) (Table 3). Additionally, receiving information about diversion was significantly associated with storing opioids safely compared to those who did not (91.9% vs. 80.7%, p=0.028).However, there was no significant difference in returning unused opioids to health care providers (76.0% vs. 63.8%, p=0.086) or disposing of them themselves (23.4% vs. 35.1%, p=0.099) (Table 3).

Discussion

Our study evaluated the compliance rate of opioid use, storage, and disposal and the impact of providing information has on the compliance rate, from the perspective of families of deceased cancer patients. In this study, a small number of participants indicated diversion had occurred.

The most important finding from this study was that the compliance rate of opioid use and storage was high, as compared to accurate disposal in bereaved families. In our study, the percentage of unsafe use, secure storage, and disposal to a pharmacy or medical provider were 0.4%, 73.8%, and 59.2%, respectively, compared with 26.0%, 78.0%, and 8.0% in a previous study of cancer patients from the US. It must be noted here that opioids are not recommended routinely to be returned back to the prescriber or pharmacy in the US. The high compliance rate in our study might be influenced by an unrealistic fear of addiction and life-shortening behaviors prevalent in Japan (12)(13). However, our study highlighted that the diversion of opioids by bereaved family members also occurs in Japan. Before the last decade, about 40% of terminally ill cancer patients had a fear of addiction in the US (14). However, opioid prescriptions for chronic pain have dramatically increased in the US (1, 2), thereby increasing access to opioids. These changes in opioid consumption might reflect the differences between the present study and previous studies concerning the compliance of opioid use, storage, and disposal. Japanese families demonstrated the high compliance rate of opioids use, storage, and disposal. However, a small number of participants indicated diversion occurred. Therefore, future challenges include maintaining a high compliance rate and preventing the diversion of opioids to an illegal marketplace.

Secondly, we found that providing information about disposal and prohibition of diversion of opioids increased the compliance rate of correct opioid management by family members of deceased cancer patients. Education for patients and their families plays an important role in preventing opioid-related problems, such as abuse, misuse, and dependency (5, 15). In a group of patients who were prescribed opioids for non-cancer pain, a web-based education program concerning opioid storage and disposal increased patient knowledge about appropriate use, secure storage, and disposal (16). In cancer patients, the provision of educational materials (EM) improved patient-reported safe use (18% with EM vs. 25% without EM), storage (75% with EM vs. 70% without EM), and disposal (76% with EM vs. 28% without EM) of opioids (9). Additionally, providing information about opioid disposal increased the number of patients returning unused opioids to a pharmacy (55.6% with information vs. 17.2% without information) (17). From these studies, it is evident that patients who received information demonstrated safe use, secure storage, and adequately disposed of prescribed opioids. In this study, information was provided by pharmacists for nearly 40% of participants. The ASHP guidelines recommend that family education regarding the safe and legal disposal of medication should extend beyond the patient’s death, to prevent diversion and illegal disposal and, consequently, have a greater impact on family and public health (10). A Japanese nationwide survey of 500 pharmacies found that 76.3% of pharmacies had engaged in the disposal of unnecessary medicines and used medical equipment (18). Additionally, our previous study at a palliative care clinic indicated that pharmacists discovered patient related problems with opioid disposal and subsequently educated on adequate disposal

(19). Although a system-based approach for the opioid epidemic is necessary in the US (5, 20), education and provision of information by pharmacists and pharmacies may be an appropriate strategy in preventing an opioid epidemic in Japan.

In the future, if opioids are commonly prescribed for non-cancer pain, diversion, unsafe storage, and illegal disposal of opioids might also occur in Japan. The pharmacy- and pharmacist-based approach for providing information along with physician/provider led education programs about safe use, secure storage, and adequate disposal of opioids for both patients and families has the potential to maintain high compliance rates. Further studies investigating the necessary content and delivery of education programs are needed.

Our study had several limitations. First, we could not rule out recall bias in the questionnaire. There is a possibility that the participants were reluctant to answer honestly about the use of opioids. Second, the questionnaire had a moderate response rate and there were many missing data values. Third, our study did not investigate the role of risk factors for the misuse and abuse of opioids such as alcohol, smoking, and history of substance abuse. When prescribing opioids, it is recommended that patient risk factors are identified, and these patients should be monitored (21). Further studies evaluating the influence of risk factors on compliance are required.

Conclusions

Most families of deceased cancer patients demonstrated a high compliance rate with the safe use, secure storage, and adequate disposal of prescribed opioids. A small number of participants were involved with diversion. Providing information to families regarding the prohibition of diversion and adequate disposal of opioids increased the compliance rate.

Declarations

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Conflicts of interest/Competing interests

None declared.

Availability of data and material

The data that support the findings of this study are available from the corresponding author, TM, upon reasonable request.

Code availability

Not applicable.

Authors' contributions

AO, T Miura and NF contributed to the study conception and design. NI, YS, T Morita and MM supervised the whole study process. AO and TM wrote the first draft of the manuscript and all coauthors reviewed the manuscript and provided critical revisions. All the authors have approved the final version of the manuscript.

Ethics approval

This study was approved by the institutional review board (IRB) at the National Cancer Center Hospital and Tohoku University.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

References

1. Rudd RA, Aleshire N, Zibbell JE, Gladden RM (2016) Increases in Drug and Opioid Overdose Deaths–United States, 2000–2014. MMWR Morb Mortal Wkly Rep 64:1378–1382
2. Voelker R (2016) New Attempt to Curb Opioid Abuse. JAMA 315:1101
3. Dowell D, Zhang K, Noonan RK, Hockenberry JM (2016) Mandatory Provider Review And Pain Clinic Laws Reduce The Amounts Of Opioids Prescribed And Overdose Death Rates. Health Aff (Millwood) 35:1876–1883
4. Skinner AC, Ringwalt C, Naumann RB et al (2016) Reducing Opioid Misuse: Evaluation of a Medicaid Controlled Substance Lock-In Program. J Pain 17:1150–1155
5. Liebschutz JM, Xuan Z, Shanahan CW et al (2017) Improving Adherence to Long-term Opioid Therapy Guidelines to Reduce Opioid Misuse in Primary Care: A Cluster-Randomized Clinical Trial. JAMA Intern Med 177:1265–1272
6. FDA consumer health information. How to dispose of unused medicines. US Food and Drug Administration Web site. Available at: http://www.fda.gov/downloads/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/UnderstandignOver-the-CounterMedicines/ucm107163.pdf Accessed December 8, 2017
7. Lock it up: medicine safety in your home. US Food and Drug Administration Web site. Available at: http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm272905.htm Accessed December 8, 2018
8. Reddy A, de la Cruz M, Rodriguez EM et al (2014) Patterns of storage, use, and disposal of opioids among cancer outpatients. Oncologist 19:780–785
9. de la Cruz M, Reddy A, Balankari V et al. The Impact of an Educational Program on Patient Practices for Safe Use, Storage, and Disposal of Opioids at a Comprehensive Cancer Center. Oncologist 2017;22:115–121
10. Herndon CM, Nee D, Atayee RS et al (2016) ASHP Guidelines on the Pharmacist's Role in Palliative and Hospice Care. Am J Health Syst Pharm 73:1351–1367
11. Guidance for the (2017) proper use of opioid analgesics in Japan. Ministry of Health, Labor and Welfare
12. Morita T, Miyashita M, Shibagaki M et al (2006) Knowledge and beliefs about end-of-life care and the effects of specialized palliative care: a population-based survey in Japan. J Pain Symptom Manage 31:306–316
13. Akiyama M, Takebayashi T, Morita T et al (2012) Knowledge, beliefs, and concerns about opioids, palliative care, and homecare of advanced cancer patients: a nationwide survey in Japan. Support Care Cancer 20:923–931
14. Weiss SC, Emanuel LL, Fairclough DL, Emanuel EJ (2001) Understanding the experience of pain in terminally ill patients. Lancet 357:1311–1315
15. Losby JL, Hyatt JD, Kanter MH, Baldwin G, Matsuoka D. Safer and more appropriate opioid prescribing: a large healthcare system's comprehensive approach. J Eval Clin Pract 2017

16. McCauley JL, Back SE, Brady KT (2013) Pilot of a brief, web-based educational intervention targeting safe storage and disposal of prescription opioids. Addict Behav 38:2230–2235
17. Sada E, Deguchi M, Tomiyasu S et al. Iryou-you mayaku no toriatsukai ni kansuru chousa houkoku: Kanja-muke Rifuretto to houmon yakuzai shidou keihatsu DVD o chushin ni. (Survey report on handling of opioids: Leaflet for patient and DVD for medication instruction by home visit.) Nihon Yakuzaishikai Zasshi. (Journal of the Japan Pharmaceutical Association.) 65(8), 921–923, 2013–08. (Japanese)
18. Yoshiyama Y, Kawakami M, Narukawa M et al (2015) Questionnaire Survey on the Ideal Roles of Community Pharmacies. Japanese Journal of Pharmaceutical Health Care Sciences 41(6):424–434
19. Okizaki A, Motonaga S, Matsumoto Y et al (2015) Pharmacist's role in palliative care outpatient clinics: a record of pharmacists' activity in the Comprehensive Cancer Center. Jpn J Pharm Palliat Care Sci 8:39–45
20. Westanmo A, Marshall P, Jones E, Burns K, Krebs EE (2015) Opioid Dose Reduction in a VA Health Care System–Implementation of a Primary Care Population-Level Initiative. Pain Med 16:1019–1026
21. Nuckols TK, Anderson L, Popescu I et al (2014) Opioid prescribing: a systematic review and critical appraisal of guidelines for chronic pain. Ann Intern Med 160:38–47

Tables

Table 1
Participant characteristics

Variable (N = 240)		**N (%)**
Age	Median (IQR)	62 (54–70)
	Missing	7 (2.9)
Gender	Female	157 (65.4)
	Male	78 (32.5)
	Missing	5 (2.1)
Relationship	Spouse Children Daughter/son-in-law Sibling Parent Other Missing	127 (52.9) 76 (31.7) 15 (6.3) 10 (4.2) 3 (1.3) 5 (2.1) 4 (1.7)
Type of opioids*	Oral Patch Injection Suppository Other (Buccal, Sublingual) Missing	166 (69.2) 91 (37.9) 44 (18.3) 78 (32.5) 10 (4.2) 5 (2.1)

*Multiple answers were possible.

Table 2
Compliance with opioid use, storage, and disposal

Variable (N = 240)		N	%
Opioid use			
Family members took unused opioids.	Yes	1	0.4
	No	195	81.3
	Missing	44	18.3
I gave unused opioids to non-family members.	Yes	0	0
	No	196	81.7
	Missing	44	18.3
I got asked by someone to give unused opioids.	Yes	0	0
	No	196	81.7
	Missing	44	18.3
I was told that other people should not use opioids prescribed for patients.	Yes	129	53.8
	No	59	24.6
	Missing	52	21.7
Opioids storage			
I have kept opioids out of reach of children and pets.	Yes	177	73.8
	No	23	9.6
	Missing	40	16.7
I still have unused opioids at home.	Yes	6	2.5
	No	203	84.6
	Missing	31	12.9
Opioids disposal			
I had a trouble disposing opioids.	Yes	10	4.2
	No	190	79.2
	Missing	40	16.7
I got information about disposal methods for opioids from someone or	Yes	99	41.3
examined for myself.	No	95	39.6
	Missing	46	19.2
I gave unused opioids to healthcare facility.	Yes	142	59.2
	No	90	37.5
	Missing	8	3.3
I gave unused opioids to non-medical care person.	Yes	5	2.1

Variable (N = 240)		N	%
	No	227	94.6
	Missing	8	3.3
I disposed unused opioids by myself.	Yes	53	22.1
	No	177	73.8
	Missing	10	41.7

Table 3
Influence of providing information on compliance

	I was told that other people should not use opioids prescribed for patients.			I got information about disposal methods for opioids from someone or examined for myself.		
	Yes (N = 129)	No (N = 59)		Yes (N = 99)	No (N = 95)	
	N (%)	N (%)	p-value	N (%)	N (%)	p-value
Opioid use						
Family members took unused opioids.	1 (0.8)	0 (0)	0.496	0 (0)	1 (1.1)	0.290
Opioids storage						
I have kept opioids out of reach of children and pets.	114 (91.9)	46 (80.7)	0.028*	83 (87.4)	82 (90.1)	0.555
I still have unused opioids at home.	2 (1.6)	2 (3.4)	0.416	1 (1.0)	5 (5.4)	0.087
Opioids disposal						
I had a trouble disposing opioids.	5 (4.0)	5 (8.8)	0.185	2 (2.1)	8 (8.9)	0.038*
I gave unused opioids to healthcare facility.	98 (76.0)	37 (63.8)	0.086	84 (84.8)	50 (53.2)	< 0.001*
I gave unused opioids to non-medical care person.	4 (3.1)	1 (1.7)	0.589	2 (2.0)	2 (2.1)	0.958
I disposed unused opioids by myself.	30 (23.4)	20 (35.1)	0.099	13 (13.3)	35 (37.6)	< 0.001*