

The Prevalence of Substance Abuse among Elective Surgical Inpatients in Teaching Hospitals in Kerman, Iran

Abstract

Background: Opioid abuse prior to hospitalization in patients undergoing surgical procedures is associated with challenges in pain management, determining anesthetic dose, and providing nursing care. This study aimed to evaluate opioid abuse/dependence in hospitalized patients undergoing major elective surgery. **Materials and Methods:** A total of 1000 patients who were candidates for major elective surgery were assessed for demographic characteristics, perioperative and postoperative pain management, type and route of opioid abuse, and the current use of other abused substances. **Results:** Substance abuse was observed in 34% of surgical inpatients. The mean duration of substance abuse was 4.3 ± 1.9 years. Opioids were the most frequently abused substances (67.9%), followed by naswar (16.4%) and marijuana (8.5%). The inhalation route (60%) was the most common route for opioid use, followed by injection (29.4%) and oral route (10.6%). The prevalence of opioid abuse in females (54.6%) was significantly higher than males (45.4%), ($P = 0.032$, odd ratio = 1.18, 95% CI = 1.03 - 1.42). Low education level was associated with a higher rate of substance abuse ($P = 0.042$, Odd ratio = 1.39, 95% CI = 1.14 - 1.64), but there was no significant correlation between sex, education level, and substance abuse type. Overall, opioid abuse and dependence were associated with at least a 30% increase in the need for opioid analgesics to relieve postoperative pain. No opioid withdrawal signs were recorded in opioid-abusing patients. **Conclusion:** The results showed substance/drug abuse in more than one-third of surgical inpatients (34%) and a higher rate of drug abuse in women, which was an unexpected finding. Opioid abuse was significantly associated with education level. Opioid-dependent patients received higher doses of opioids during postoperative periods. Since opioid abuse can affect both preoperative and postoperative surgical and nursing health professionals, especially nurses, need continued medical education and professional support in caring for these individuals.

Keywords: Iran, Kerman, substance abuse, surgical inpatients

Introduction

Substance abuse (abuse of opium, marijuana, alcohol, cocaine, amphetamine derivatives, LSD, and tobacco) is a worldwide problem.^[1] Opioids, including opium and heroin, are the most frequently abused substances in the general population in Iran; however, recent studies have indicated that alcohol is the most frequently abused substance among Iranian high school students.^[2,3] Substance abuse is prevalent among hospitalized patients in general medical hospitals; for example, substance abuse is common among approximately 50% of patients with schizophrenia.^[4,5] Opioid abuse is associated with a significant impact on pain management, anesthetic dose, and the quality of nursing care for hospitalized surgical inpatients. Opioid abuse in pregnancy could be associated with an exaggerated degree of postoperative

pain due to cross-tolerance to other CNS depressants, including anesthetic drugs.^[6]

Recent studies indicate that preoperative opioid abuse is associated with increased morbidity and mortality, and patients are more prone to postoperative pain, restrictions, and dissatisfaction.^[7] Illicit drug use, including opium addiction, could be associated with potential changes in the functions of the main systems of the human body, including the pulmonary, cardiovascular, nervous, renal, and hepatic systems; therefore, in addition to universal preventive measures, anesthesiologists should customize anesthetic management individually for these patients.^[8] Previous studies have revealed that verification of opioid dose throughout the perioperative and intraoperative periods is necessary for opioid abusers.^[9] Opium addiction is prevalent in Iran, and opium-addicted patients are more susceptible to hemodynamic instability,

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leading to increased challenges for anesthesiologists in managing general anesthesia in this group of patients.^[2,10]

Although opium abuse is not associated with an increase in the risk of developing deep vein thrombosis (DVT), its injection as heroin or dissolved opium increases this risk.^[11] Previous studies by Safaai and Kazemi (2010) showed that continued use of opium is a significant predictor for rehospitalization in patients undergoing coronary artery bypass grafting (CABG) surgery.^[12] Patients with substance abuse/dependence need special nursing care, and due to nurses' negative perceptions toward these patients, this could pose increased challenge for nurses caring for hospitalized surgical patients.^[13] Pain management during pre-, intra-, and post-operative periods is a major challenge for anesthesiologists.^[14,15] Postoperative pain management is based mainly on the appropriate administration of opioid analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, gabapentinoids (gabapentin and pregabalin), and low doses of ketamine.^[16]

Since opium addiction affects postoperative pain assessment, nursing care, hemodynamic stability, and pharmacokinetic changes of anesthetic drugs, the preoperative detection of patients addicted to opium is of great importance. Considering the challenges as mentioned above posed by patients addicted to opium during surgical procedures, this study was conducted to determine the prevalence of substance abuse, including opioid abuse and dependence, in patients undergoing major elective surgery. The anesthetic process and postoperative pain management were also evaluated.

Patients and Methods

Patient selection

A total of 1000 patients over 18 undergoing major elective surgery were selected from the surgery and orthopedic departments of Kerman University of Medical Sciences, Kerman, Iran, between 2018 and 2019. Written informed consent was obtained from each patient or their legal guardians after explaining the study and its aims. Opium addiction was defined as opium use for at least 12 months before admission.^[17] This protocol was approved by the Ethical Committee of Kerman University of Medical Sciences (ethics code: IR.KMU.AH.REC.1397.051). Demographic characteristics of patients (sex, age, and education level) were collected through a prospective researcher-made questionnaire.^[18] Non-academic education is defined as either being illiterate or holding a primary school, secondary school, or high-school diploma, and academic education is defined as university/college levels of education or their equivalents. The type of opioid abuse (raw opium, sukhteh/shireh, methadone, buprenorphine, tramadol, and heroin), the route of abuse (inhalation, injection, or oral), and the duration of abuse were recorded. In Iran, sukhteh is the pyrolyzed residue of opium scraped from opium pipes, and Shireh is a refined opium product made by boiling either raw opium or sukhteh and collecting the residue. Also, the current use of other abused substances, including marijuana, naswar

(tobacco leaves mixed with lime), and alcohol, was recorded, but due to legal considerations, alcohol abuse was not declared by hospitalized patients.

Anesthesia process and pain management in opioid-abusing patients

Opioid dependence is associated with a higher need for opioid analgesics to relieve postoperative pain. All the opium-addicted/dependent patients received at least 30% more opioid analgesic medication to relieve postoperative pain. Also, the patients were educated and allowed to use their regular equivalent opioid maintenance dose during hospitalization; the oral maintenance dose for morphine is three times its parenteral dose.^[19,20]

Statistical analysis

Data were analyzed using SPSS V.22.0 (SPSS, Chicago, IL) statistical software. Continuous variables were expressed as mean \pm SEM and were compared using one-way ANOVA and Tukey's post hoc test. Nonparametric categorical variables were analyzed by the X^2 test. A *P*-value of 0.05 or less was considered statistically significant.

Results

A total of 1000 patients were included in this study. [Table 1] shows the patients' demographic and preoperative characteristics. A total of 540 (54%) patients were females, and the remaining 460 (46%) were males. The overall prevalence of substance abuse was 34% (54.6% in females vs. 45.4% in males, *P* = 0.032, odd ratio = 1.18, 95% CI = 1.03 - 1.42), with a mean age of 42.9 \pm 2.8 years (19–65 years old) [Table 2]. About 65.3% of the substance abusers (*n* = 222) were employed, and 34.7% (*n* = 118) were unemployed. Education level analysis revealed that 60.6% of substance abusers had non-academic education. The mean duration of substance abuse was 4.3 \pm 1.9 years.

Opioids were the most commonly abused substances (67.9%), followed by naswar (16.4%) and marijuana (8.5%). The rate

Table 1: Substance abusers' characteristics (N = 340)

Age, mean yrs \pm SD	42.9 \pm 2.8
Female gender, N (%)	185 (54.6)
Employment, N (%)	222 (65.3)
Duration of abuse, mean yrs \pm SD	4.3 \pm 1.9
Education:	
A-Non-academic, N (%)	206 (60.6)
B-Academic, N (%)	134 (39.4)

Table 2: The age characteristics of substance abusers

Age (year)	Frequency N (%)
19–29	95 (27.9)
30–39	132 (38.8)
40–49	60 (17.6)
50–59	43 (12.7)
\geq 60	10 (2.9)

of opioid abuse among females was significantly higher than males ($P=0.032$, odd ratio= 1.18, 95% CI = 1.03 -1.42). Other abused substances (stimulants such as methamphetamine, crack, and LSD) were used by 4.4% of substance abusers. Also, the results showed that 25 (7.3%) of the drug abusers used two or more substances simultaneously. Raw opium (30%), sukhteh and shireh (25%), and methadone (12.9%) were the most commonly used opioids [Table 3]. Opioid inhalation was the most common route (60%) of opioid use, followed by injection (29.4%) and oral route (10.6%).

This study showed no significant correlation between age and the rate of substance abuse ($P=0.388$). There was a significant correlation between education level and drug abuse, *i.e.*, the rate of substance abuse was significantly higher in patients with non-academic educations (60.6%, $P=0.042$, Odd ratio=1.39, 95% CI = 1.14 -1.64). There was no significant correlation between gender, education level, and substance abuse type [Tables 4 and 5].

Table 3: Patterns of substance abuse

Type of Substance Abuse	Frequency N (%) *
Raw opium	102 (30)
Sukhteh/shireh	85 (25)
Methadone	44 (12.9)
Naswar	56(16.4)
Marijuana	19 (8.5)
Combined use	25 (7.3)
Others	34 (10.0)

* Some substance abusers may simultaneously abuse two or more substances.

Preoperative patient evaluation for pain management was conducted by patient counseling, psychological interventions, and the administration of pharmacological agents, including ketorolac, indomethacin, celecoxib, acetaminophen, and gabapentin. The results showed that anesthetic induction in patients who received their usual opioid maintenance doses was similar to non-opioid users [Table 6].

The results showed that propofol, ketamine, and fentanyl were the most commonly used anesthetics, and morphine, methadone, ketorolac, ketamine, and acetaminophen were the most commonly used analgesics used to relieve postoperative pain. However, opium-dependent patients received at least 30% higher doses of opioid analgesics, were allowed to use their opioids orally, or were given the equianalgesic dosing of opioid agonists (morphine, methadone, and fentanyl) in combination with NSAIDs (mainly either ketorolac 30 mg/ IV or acetaminophen 1 g/ IV). Also some patients received 0.5 mg/kg ketamine or gabapentin (300mg/ tid/ oral). Since the opioid users were educated and allowed to use their regular equivalent opioid maintenance dose during hospitalization so our results showed no opioid withdrawal signs among opioid dependent patients. The anesthetic process in marijuana and naswar abusers was similar to that of non-abusers.

Discussion

Accurate information about a patient's opioid dependency and substance abuse is necessary for preoperative and postoperative management. Our survey demonstrated that more than one-third of surgical inpatients (34%) were substance/drug abusers, which is significantly higher than the general population lifetime substance use in Western countries (17%).^[21] Also,

Table 4: Correlation between substance abuse and gender (N = 340)

Type of Substance Abuse	Gender		P-Value
	Male N (%)	Female N (%)	
Opium	41(26.5)	46 (24.9)	0.49
Sukhteh/shireh	45 (29)	40 (21.6)	0.16
Methadone	14 (9)	30 (16.2)	0.19
Naswar	29 (18.7)	27 (14.6)	0.90
Marijuana	9 (5.8)	20 (10.8)	0.29
Combined use	12 (7.8)	13 (7)	0.39
Others	5 (3.2)	9 (4.9)	0.90
Total	155 (100)	185 (100)	

Table 5: Correlation between substance abuse and education level (N = 340)

Type of Substance Abuse	Education level		P-Value
	Academic, N (%)	Non-academic, N (%)	
Opium	30 (22.3)	57 (27.6)	0.32
Sukhteh/ Shireh	38 (28.3%)	47 (22.8)	0.97
Methadone	11 (8.2)	33 (16)	0.41
Naswar	26 (19.4)	30 (14.5)	0.48
Marijuana	13 (9.7)	16 (7.8)	0.16
Combined use	9 (6.7)	16 (7.8)	0.16
Others	7 (5.2)	7 (3.4)	0.32
Total	134 (100)	206 (100)	

Table 6: Anesthetic and analgesic doses used during surgical process

Opioid users
Anesthetics:
Fentanyl: 2–6 µg/kg/ IV
Propofol: 1–2 mg/kg/ IV
Ketamine: 1–2 mg/kg/ IV
Thiopental: 3–5 mg/kg/ IV
Preoperative Analgesics:
Ketorolac: 30 mg/ IV
Acetaminophen: 1 g/ IV
Celecoxib: 100 mg/oral
Indomethacin: 75 mg/oral
Gabapentin: 300 mg/oral
Postoperative Analgesics:
Opioids
Morphine: 0.1 mg/kg/ IV
Methadone: 5 mg/IV
Meperidine: 0.5 mg/kg/ IV
NSAIDs:
Ketorolac: 30 mg/ IV
Ketamine: 0.5 mg/kg/ IV
Acetaminophen: 1 g/ IV
Gabapentin: 300 mg/ tid/ oral

NSAIDs: non-steroidal anti-inflammatory drugs

substance abuse was inversely related to education level, with a significantly higher level in patients with lower education levels, which is in line with previous studies.^[22] Contrary to our results, Charitonidi *et al.* (2016) showed that the impact of education on substance use is complex. In addition to the education level, socioeconomic status plays a vital role in the pattern of drug abuse, *i.e.*, there is a significant correlation between high socioeconomic status and a higher consumption rate of alcohol and other illicit drugs. In contrast, lower socioeconomic status was associated with more tobacco use.^[23] Previous studies indicate that socioeconomic status and higher parental education and income may be associated with the pattern of substance abuse because of the increased ability to access or purchase substances.^[24] Humensky (2010) reported that higher binge drinking and marijuana use rates in early adulthood were associated with higher parental income.^[25] Also, our study showed a significantly higher rate of drug abuse in women, which is an unexpected finding. Most previous studies indicate that substance abuse is more prevalent among males.^[26] Although traditional studies reported a higher rate of drug use/abuse in males, however the pattern of drug abuse have been changed over the over recent decades, indicating a significant increase in the prevalence of the rate of women with drug-related problems.^[27]

There is not enough studies to elucidate the mechanism(s) affecting the gender differences in drug abuse. but biological, neural systems, psychological, cultural and socioeconomic factors may influence the initiation, patterns of drug abuse and help-seeking patterns for drug use/ abuse in women vs men population.^[28,29] Sex and ovarian hormones play an important

role in the in the neurochemical and behavioral responses to acute and repeated exposure to drugs of abuse.^[30] Hormonal conditions present in adolescence may have critical roles new psychoactive drugs, so further investigations are needed to elucidate the biological responses to a certain drug.^[31] Also we concluded that men declare less abuse drugs due to legal consideration and the females are more honest, less inhibited, or simply politico-socio factors may play a significant role in gender differences in drug abuse.

Also, Wasilow-Mueller and Erickson (2001) indicated that differences between the sexes play an essential role in the causes, outcomes, and management of drug dependency.^[32]

Our results showed that opioids were the most abused substances in hospitalized patients (67.9%), followed by naswar or nas (16.4%), which is used mainly in East Asia. Abusers put this mixture on the floor of the mouth under the lower lip or inside the cheek for extended periods. In contrast with our results, alcohol and marijuana were the most commonly abused substances in other countries.^[33] In our study, marijuana was abused by 8.5% of surgical inpatients. Among the Egyptian population, cannabis, followed by opiates and alcohol, is the most commonly used substance, and males abuse drugs more commonly than females.^[34] Lu *et al.* (2008) reported that heroin was the most commonly abused drug in the Chinese population.^[35] Alcohol abuse and tobacco smoking were among the most common forms of substance abuse among Irish university students between 1973 and 2002.^[36] Bonsack *et al.* (2006) reported that the lifetime prevalence of substance use among psychiatric patients was high for alcohol but lower for benzodiazepines, cannabis, and cocaine.^[21] Wu *et al.* (2006) reported a high prevalence of alcohol use disorder (25.7%) among hospitalized patients in eastern Taiwan, which is lower than our study results for opioid abuse.^[37]

The type of drug abuse showed no significant relationship with gender and education level. Contrary to our results, previous studies showed gender differences in drug abuse and alcohol abuse between males and females.^[38,39] McCabe *et al.* (2007) revealed several important racial/ethnic and gender differences in drug use among college students.^[40] Barnes *et al.* (2002) showed that alcohol use is affected by gender, age, and racial/ethnic background.^[41] Also, previous studies indicate the role of gender in influencing the course of substance use.^[42] Although most studies indicate a higher rate of substance abuse in men, recent epidemiologic studies have revealed that the gap between men and women has been closing in recent years, and almost equal rates of substance abuse in male and female adolescents have been reported by some investigators.^[43,44]

In agreement with previous reports, the results indicated that ketorolac, indomethacin, celecoxib, acetaminophen, and gabapentin were the most frequently used non-opioids for managing perioperative pain in hospitalized patients.^[45]

This study indicated that the anesthesia process in opium-addicted patients who used their usual opioid maintenance dose

was similar to non-opium users; however, the need for an opioid analgesic to manage postoperative pain was at least 30% higher than it was for non-opioid users. Our results showed no opioid withdrawal signs among opioid dependent patients during the post-anesthetic process, the patients received higher doses of opioid analgesic for postoperative pain management and also the opioid users were educated and allowed to use their regular equivalent opioid maintenance dose during hospitalization period. In agreement with our results, similar studies confirm that opioid maintenance therapy is the backbone for pain management in opioid-addicted patients, and most patients need additional opioid analgesia.^[14] Since the patients were educated to use the equianalgesic doses of opioids during the postoperative period, no opioid withdrawal symptoms were reported in opioid-addicted hospitalized patients.^[20]

Although most opium-addicted patients use their regular amount of opium after the surgical process, due to the negative social attitude towards patients who abuse drugs, they hide their use from health professionals, especially nurses, so this may complicate pain management control in opium-addicted hospitalized surgical patients. Similar reports confirm the complication of pain management in opioid-abusing surgical inpatients.^[46]

Since other investigators have documented the efficacy of cannabinoids in treating neuropathic pain due to the antinociceptive effects of marijuana, the postoperative pain management in marijuana abusers was similar to non-abusers.^[47,48]

The results showed that propofol, ketamine, and fentanyl were the most commonly used anesthetics, and morphine, methadone, ketorolac, ketamine, and acetaminophen were the most commonly used analgesics used to relieve postoperative pain. Our results are in complete agreement with some similar studies indicating that non-steroidal anti-inflammatory drugs (NSAIDs), intravenous acetaminophen, gabapentinoid agents, and low-dose ketamine infusions were the main pharmacological agents used to relieve postoperative pain.^[16,49] This study showed adequate pain control during postsurgical period in both opioid –dependent and other abuser patients which used marijuana, naswar and combined abusers, so we propose our pain control protocol for the management of postsurgical pain in surgical patients.

Due to inadequate pain control in opioid users and abusers and subsequent complications, all health professionals, including anesthesiologists, surgeons, and nurses, should be familiar with the challenges of providing pain control and nursing care for these patients.^[46]

Since some patients may hide their substance abuse, the physicians cannot fully identify substance abuse/dependence among patients before surgical procedures, so nurses should be aware of symptoms of drug dependency and opioid withdrawal syndromes in postoperative nursing care. Our results recommend a systematic clinical assessment of opioid use in patients

undergoing any surgical procedure that needs anesthetic drugs. Also, health professionals need continued medical education and professional support in providing care to these individuals.

In summary, our results showed relatively high rates of opioid abuse among surgical inpatients, with a higher rate in low-educated patients and women, the latter of which is an unexpected finding. The type of substance abuse was not related to gender and education level. Opioid abusers required at least 30% higher doses of opioid analgesics to control postoperative pain, but the anesthesia process in opioid users, who continued to use their regular maintenance opioids, was similar to non-opioid users.

Since there are no universal guidelines for postoperative pain management of patients with opioid addiction, anesthesiologists should formulate pain management strategies for both opioid and non-opioid patients undergoing surgery in the pre-, intra-, and post-operative periods.

Limitations

Despite the full assurance given to the patients of the anonymity of the survey, some patients did not declare the consumption of substances. Also, the socioeconomic status of surgical inpatients, which affects the substance abuse pattern, was not determined.

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Conflicts of interest

Authors declare no conflict of interest.

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