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KRATOM EXPOSURES REPORTED TO TEXAS POISON CENTERS

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Kratom use is a growing problem in the United States. Kratom exposures reported to Texas poison centers between January 1998 and September 2013 were identified. No kratom exposures were reported from 1998 to 2008 and 14 exposures were reported from 2009 to September 2013. Eleven patients were male, and 11 patients were in their 20s. The kratom was ingested in 12 patients, inhaled in 1, and both ingested and inhaled in 1. Twelve patients were managed at a healthcare facility and the remaining 2 were managed at home.

KEYWORDS. Kratom, poison center

INTRODUCTION

Kratom (*Mitragyna speciosa korth*), in the same family as coffee (*Rubiaceae*), is a large tree native to countries in Southeast Asia, such as Thailand, Malaysia, and Myanmar.^{1–3} Traditionally, kratom leaves have been used as a herbal stimulant by laborers and farmers in the region.^{1,2} Individuals chew Kratom leaves for energy, to work harder, and for relief from muscle strain. Kratom has been used to treat a variety of other conditions, such as hypertension, coughs, and diarrhea. It also was used as a substitute for opium and to treat the symptoms of opioid withdrawal.^{1,4} Several extensive reviews of kratom have been published during the last several years in the literature.^{5–8}

Kratom contains more than 25 alkaloids, but mitragynine is the alkaloid most abundant in the plant and is considered to be primarily responsible for its opioid-like effects.^{1,9–11} Mitragynine is an indole alkaloid structurally distinct from opioids but similar to yohimbe. The alkaloid has been demonstrated to be active at supraspinal opioid mu- and delta-receptors.^{4,9,12,13} Mitragynine may stimulate post-synaptic alpha-2 adrenergic receptors; alternately, it may block stimulation of 5-HT_{2A}

receptors.¹⁴ The alkaloid is 13 times more powerful than morphine. 7-hydroxymitragynine, found in much smaller quantities in kratom, is 4 times more powerful than mitragynine.^{4,15} At lower doses, mitragynine produces stimulant effects, such as increased alertness, physical energy, talkativeness, and sociable behavior; at higher doses, the substance has sedative effects.^{1,8} The effects are dose dependent and occur 5 to 10 minutes after ingestion and last 2 to 5 hours.^{1,16}

Currently, kratom is available in the United States through the Internet and in smoke shops (headshops) without a prescription.^{1,8,17,18} It is available as leaves and in powder, extract, capsule, pellet, and gum forms.^{1,2,19} Kratom often is chewed, drunk as tea, or smoked.^{1,2,19,20} Adverse side effects reported with kratom use include nausea, vomiting, diarrhea, hallucinations, psychosis, seizures, palpitations, dizziness, agitation, respiratory depression, itching, sweating, dry mouth, constipation, increased urination, anorexia, and weight loss.^{1,2,16,18,21–25} Deaths involving kratom use have been reported.^{17,26,27} Kratom use can lead to addiction and withdrawal.^{1,22} The substance has been banned in several countries, such as Australia, Bhutan, Denmark,

Finland, Lithuania, Malaysia, Myanmar, Poland, and Thailand.²

There currently is no legitimate medical use for kratom in the United States.¹ As of January 2013, kratom was not scheduled under the US Controlled Substances Act.¹ However, the Drug Enforcement Administration (DEA) has listed kratom as a drug of concern.^{1,2,18,21} Typical drug toxicologic screens do not detect kratom.²⁸

Various western countries have reported growing kratom use in recent years.¹ Its use also appears to be rising in the United States.^{1,8,21} According to the System to Retrieve Information from Drug Evidence (STRIDE), a U.S. database for drugs analyzed by the DEA, and the National Forensic Laboratory Information System (NFLIS), which collects information from state and local forensic laboratories, mitragynine was found in one report in 2010, 44 in 2011, and 81 in the first 6 months of 2012.¹ Moreover, visits to hospital emergency departments and drug treatment facilities involving kratom have increased.^{18,21,22} There have been several media reports in the United States expressing concern about the substance.^{2,21,22,29}

There is limited information on the illicit use or adverse effects of kratom in the United States.¹ A review of U.S. poison center data during 2000–2005 identified only 2 exposures.⁸ Several case reports have been published in the literature.^{23,25–27,30,31} The intent of this study was to describe kratom exposures reported to a large poison center system.

METHODS

The Texas Poison Center Network (TPCN) is a telephone consultation service that provides information on and assists in the management of exposures to a variety of substances (e.g., medications, illicit drugs, industrial and household chemicals, plants, animals, food, herbal products). It is comprised of 6 poison centers that service the entire state, a current population of more than 25 million. The poison centers use a single, common electronic database to collect demographic and clinical information on each call. The data fields and allowable field options

were standardized by the American Association of Poison Control Centers (AAPCC).³²

For this retrospective study, the TPCN database was searched for all kratom exposures reported between January 1998 and September 2013. For these exposures, the distribution by various demographic and clinical factors was described. The Texas Department of State Health Services considers this investigation exempt from ethical review.

RESULTS

No kratom exposures were reported between 1998 and 2008, and 14 exposures were reported between January 2009 and September 2013 (2 in 2009, 1 in 2010, 4 in 2012, and 7 from January to September 2013). Eight of the exposures involved kratom alone and 6 involved additional substances (e.g., wild dagga, wormwood, alprazolam and synthetic cannabinoid, synthetic tryptamine, alcohol, and methamphetamine and risperidone).

Eleven patients were men and 3 were women. Eleven patients were in their 20s; the others were age 18, 39, and 48 years. The kratom was ingested in 12 patients, inhaled in 1, and both ingested and inhaled in 1. All of the exposures occurred at the patient's own residence. Eight exposures were reported as intentional misuse or abuse, 4 as an adverse reaction, and 1 each as therapeutic error and intentional (unspecified).

Ten patients were already at or en route to a healthcare facility when the poison center was contacted, 2 were referred to a healthcare facility by the poison center, and 2 were managed at home. Four patients had a medical outcome of minor effects, 5 had moderate effects, 1 had major effects, 2 were not followed with no more than minor effect possible, and 2 were unable to be followed but judged as a potentially toxic exposure. There were no deaths.

The reported clinical defects were tachycardia (n = 5), hypertension (n = 4), agitation (n = 4), nausea (n = 3), vomiting (n = 3), confusion (n = 3), tremor (n = 3), diaphoresis (n = 3), drowsiness (n = 2), hallucinations (n = 2), mydriasis (n = 2), dyspnea (n = 2),

bradycardia (n = 1), abdominal pain (n = 1), slurred speech (n = 1), hyperventilation (n = 1), and elevated creatine phosphokinase (n = 1). The reported treatments were administration of intravenous fluids (n = 6), benzodiazepines (n = 4), other sedation (n = 2), antiemetics (n = 1), antihypertensive (n = 1), and oxygen (n = 1).

DISCUSSION

Kratom exposures have been reported to Texas poison centers only during the past 5 years, with half reported in the first 9 months of 2013. This is consistent with reports that kratom use in the United States is increasing.^{1,8,18,21,22} Still, only 14 kratom exposures were reported to Texas poison centers, even though at least 1 death associated with kratom occurred in the state and a drug treatment facility reported a surge in admissions involving the drug.^{18,26} During 2012, a total of 474 synthetic cannabinoid (e.g., K2, Spice) and 160 synthetic cathinone (e.g., bath salts) exposures were reported to Texas poison centers. This suggests that, even though the number of reported kratom exposures may have increased in recent years, its impact on poison centers is small compared with other new substances of abuse. However, this could change in the future.

Most of the patients were men and in their 20s, a finding consistent with several case reports and other reported literature.^{8,17,18,25–27,33} The preponderance of the exposures occurred by ingestion, and more than half were due to intentional misuse or abuse of the substance. The majority of the patients were managed at a healthcare facility. The reported adverse effects were in agreement with previously published information.^{1,16,18,22,24,25,33} This investigation adds to the limited information available on potentially adverse kratom exposures in the United States. However, additional studies involving larger datasets would be useful.

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