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Prevalence and motivations for kratom use in a sample of substance users enrolled in a residential treatment program



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ABSTRACT

Background: Kratom use in the West has increased recently, yet the prevalence and motives for use among individuals with a history of substance use disorder (SUD) have not been fully examined. Kratom has been documented as a means of treating chronic pain, mitigating drug dependence, and easing withdrawal symptoms, yet it is unclear if substance users are utilizing kratom as a self-medication. Abuse liability, side effects, and overall appeal of kratom remain uncertain.

Methods: In April 2017, an anonymous survey regarding kratom use and motivations was completed by clients enrolled in a 12-Step-oriented residential program. 500 respondents with a self-reported history of SUD completed the survey.

Results: 20.8% of respondents endorsed lifetime kratom use and 10.2% reported past-12-month use. Kratom-users were younger ($= 32.1$ vs. 35.9 , $p < 0.001$) and were more versatile substance users. A majority (68.9%) of kratom-users reported having used the drug as a means of reducing or abstaining from non-prescription opioids (NPO) and/or heroin, and 64.1% reported using kratom as a substitute for NPO/heroin. 18.4% of kratom-users reported using the drug due to a disability or chronic pain. One-third of kratom-users stated that kratom was a helpful substance and that they would try it again. However, kratom was not preferred and was indicated as having less appeal than NPO, heroin, amphetamines, and Suboxone.

Conclusions: Among substance users, kratom use may be initiated for a variety of reasons, including as a novel form of harm-reduction or drug substitution, particularly in the context of dependence and withdrawal from other substances.

1. Introduction

Mitragyna speciosa, often referred to as kratom, is a botanical native to Asia that has been used for centuries for medicinal, folk, and recreational purposes, but which has recently seen increased availability and use in non-Asian countries (Brown et al., 2017; Grewal, 1932; Nelson et al., 2014). In the past decade, the use of novel alternatives to illicit drugs has proliferated, however, it remains unclear the extent to which kratom use in the West can be included among such “psycho-naut” trends (Cinosi et al., 2015; Orsolini et al., 2015; Rech et al., 2015; Warner et al., 2016). Given the limited data on kratom, it is also uncertain what the primary differences in motivations and using patterns are between kratom-users in the West and in Asia, where kratom is indigenous.

Dozens of kratom’s alkaloids have been successfully isolated and identified (Suhaimi et al., 2016), the most widely studied are

mitragynine and 7-hydroxymitragynine (for a more detailed discussion see Hassan et al., 2013; Takayama, 2004).¹ Kratom’s leaves can be chewed, though oftentimes it is prepared as a beverage or taken orally in powdered form (Assanangkornchai et al., 2007; Grundmann, 2017). Kratom produces variable effects depending upon strain type and dose, with some strains eliciting stimulatory effects and others producing analgesic and anxiolytic effects (Babu et al., 2008; Harun et al., 2015; Hassan et al., 2013; Hazim et al., 2014; Sabetghadam et al., 2013; Yusoff et al., 2016).

To date, no controlled experimental studies in humans exist, however, in exploratory studies, kratom has been associated with a variety of beneficial effects, including pain relief, improved mood, relaxation, pleasant somatic sensations, and increased socialization and energy (Ahmad and Aziz, 2012; Assanangkornchai et al., 2007; Grundmann, 2017; Saingam et al., 2013). Analgesic and antinociceptive properties of kratom have also been demonstrated in animal assays, though kratom’s

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¹ Differences in alkaloid content and potency have been documented and depend on numerous factors (León et al., 2009; Takayama et al., 1998). For instance, the age of the plant from which the leaves were sampled, the geographical region, time of year that the leaves were harvested, and the route of administration.

stimulatory effects are less well established (Apryani et al., 2010; Carpenter et al., 2016; Matsumoto et al., 2004; Shaik Mossadeq et al., 2009; Takayama, 2004). Additionally, kratom has been associated with anxiolytic, anti-depressive, mood stabilizing, and anti-inflammatory effects in both humans (Grundmann, 2017; Swoger et al., 2015) and non-human animals (Kumarnsit et al., 2007; Yusoff et al., 2016). There are limited data regarding how kratom use may impair or enhance neurocognitive functioning in humans, though alterations in affect, attentional bias, learning, and working memory associated with kratom have found initial support in animal assays (Apryani et al., 2010; Hazim et al., 2011; Ismail et al., 2016; Senik et al., 2012a,b; Yusoff et al., 2016). Similarly, kratom dependence symptomatology requires more exploration given that some regular users report low craving, while others express difficulty abstaining (Ahmad and Aziz, 2012; Singh et al., 2015).

Common side effects associated with kratom use in humans include constipation, dehydration, dry mouth, fatigue, increased body temperature, lethargy, weight loss, and nausea (Ahmad and Aziz, 2012; Assanangkornchai et al., 2007; Grundmann, 2017; Singh et al., 2015; Suwanlert, 1975; Swogger et al., 2015; Trakulsrichai et al., 2015). Anecdotal reports document more severe effects including hypothyroidism, seizure, coma, and hepatotoxicity (Boyer et al., 2008; Kapp et al., 2011; Nelsen et al., 2010; Sheleg and Collins, 2011). One study exploring possible thresholds for kratom toxicity in non-human animals conducted by Kamal et al. (2012) found no significant toxicity or fatalities even when large doses were administered. Similar results have been reported by Macko et al. (1972) and Sabetghadam et al. (2013), however, other animal studies provide conflicting accounts of kratom's overall effect profile, which is believed to be predicated by dose concentration, duration of use, and alkaloid type (Azizi et al., 2010; Janchawee et al., 2007).

Kratom use has been reported for managing chronic pain and for supplementing prescription drug regimens (Boyer et al., 2007; Boyer et al., 2008; Grundmann, 2017; Prozialeck et al., 2012), and as a means of mitigating drug dependence (Ahmad and Aziz, 2012; Cinosi et al., 2015; Grundmann, 2017; Low et al., 2016; Suwanlert, 1975; Ward et al., 2011). Vicknasingam et al. (2010) documented kratom use as a method of drug substitution and for easing withdrawal symptoms. Recently in the U.S., non-prescription opioid (NPO) and heroin rates have risen significantly (Kanouse and Compton, 2015; Kolodny et al., 2015; Kertesz, 2017), though the proportion of individuals using kratom due to NPO/heroin dependency is unknown.

It is also unclear how to characterize notions of kratom dependence verses kratom utility. Some regular users have reported that kratom helps to increase social, occupational, and psychological functioning (Grundmann, 2017; Singh et al., 2015), while other users have reported needing to use daily; however, broad dependence indicators, (e.g., craving withdrawal) vary (Ahmad and Aziz, 2012; Assanangkornchai et al., 2007; Saingam et al., 2013, 2016; Singh et al., 2016; Swogger et al., 2015; Vicknasingam et al., 2015). In a U.S. sample, withdrawal symptoms were reported by less than half of users (Grundmann, 2017). Evidence suggests that the length, frequency, and quantity of use may positively correlate to severity of tolerance and withdrawal in both humans and animals (Assanangkornchai et al., 2007; Matsumoto et al., 2005; McWhirter and Morris, 2010; Saingam et al., 2016; Yusoff et al., 2017) though this phenomenon has not been clearly substantiated (Havemann-Reinecke, 2011; Singh et al., 2016). Kratom has been under-researched and in the absence of controlled experimental studies, uncertainty and concern over kratom remain.²

² Such uncertainty is attributable to multiple factors, including possible variability in the content of kratom products purchased in the West compared to presumably fresher preparations in Asian countries (Griffin et al., 2016; Lydecker et al., 2016; Singh et al., 2016); variations in using patterns and motives within and across geographic regions and cultures (Vicknasingam et al., 2010); co-ingestion with other substances (Neerman et al., 2013) possible dose escalation (Vicknasingam et al., 2010), and sensationalized or

Between 2010–2015 660 kratom-related calls were made to the American Association of Poison Control Centers (AAPCC), accounting for approximately 0.0004% of all exposure calls (Anwar et al., 2016). A minority of cases (7.4%) included “life-threatening” symptoms, with severity most pronounced in instances where kratom was co-ingested with anti-depressants, mood stabilizers, anticonvulsants, and illicit drugs (Anwar et al., 2016). Reports suggesting kratom-related fatalities are few and ambiguous (Arndt et al., 2011; Holler et al., 2011; Karinen et al., 2014; Kronstrand et al., 2011; McIntyre et al., 2015; Neerman et al., 2013). Even operating under the premise that kratom was the only substance consumed prior to death, such reports demonstrate no causal connection. Multiple fatalities have also been attributed to caffeine, and there exist common instances of individuals with cardiac problems dying after consuming Aspirin tablets, yet the cause of death is not attributed to Aspirin (Banerjee et al., 2014; Lewis et al., 1983).

Finally, kratom is legal throughout much of the U.S., however, the Drug Enforcement Administration has designated it to its “Drugs and Chemicals of Concern” list and is poised to schedule kratom under the Controlled Substances Act, though the reasons for this action are unclear (Castillo, 2017; Federal Register, 2016). Although efforts to enable detection of kratom's active alkaloids are advancing, metabolites are not currently detectable by drug screens (Fuenffinger et al., 2017; Lesiak et al., 2014; Warner et al., 2016). Similar to other newer substances, kratom may be an attractive alternative for individuals who encounter drug testing (Gunderson et al., 2014; Perrone et al., 2013). Criminal justice system (CJS)-involved individuals enrolled in substance use disorder (SUD) treatment often have compelling incentives to pass drug tests (e.g., threat of parole revocation to serve the remainder of a 10-year sentence) such that they may be inclined to substitute preferred but detectable substances for undetectable alternatives (Ralphs et al., 2017). An opioid- or stimulant-dependent individual might temporarily substitute their drug regimen with kratom if they believe there is a likelihood of testing. Though opioids and stimulant drugs are metabolized and eliminated quickly, they are nevertheless still detectable on commonly used drug screens whereas kratom currently is not (Prutipanlai et al., 2017).

1.1. Purpose of study

Kratom use is likely being initiated for multiple reasons, including the management of health conditions, mitigation of drug dependence, and for recreation (Ahmad and Aziz, 2012; Assanangkornchai et al., 2007; Grundmann, 2017). However, few data are available describing the prevalence and motives for kratom use among individuals with SUD. The aim of this study was to determine the prevalence and motivations for kratom use in a sample of individuals receiving SUD treatment. Additional aims included identifying routes of administration, methods for obtainment, and indicators of adverse effects. Given the uncertainty surrounding kratom's abuse liability and perceived salience, an ancillary aim was to determine if users preferred kratom to other substances.

2. Methods

2.1. Study participants and data collection

Clients in five recovery centers operating under a 12-step, residential therapeutic-community model were purposefully sampled for inclusion. All data were collected in April 2017. The recovery centers are part of a network of 17 community-based residential recovery programs open to individuals with SUD. A convenience sample was obtained by meeting with clients during program hours. Clients were

(footnote continued)
inaccurate media coverage (Miller et al., 2015).

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