



HHS Public Access

Author manuscript

Prim Care Companion CNS Disord. Author manuscript; available in PMC 2022 February 05.

Published in final edited form as:

Prim Care Companion CNS Disord. ; 23(4): . doi:10.4088/PCC.21br02930.

Prevalence of Kratom Use and its Co-Occurring Substance Use Disorders in the United States, 2019

Kevin Y Xu, MD MPH¹, Carrie M Mintz, MD¹, Jacob T Borodovsky, PhD^{1,2}, Paul E A Glaser, MD PhD³, Laura J Bierut, MD^{1,4}, Richard A Grucza, PhD^{1,5}

¹Health and Behavior Research Center, Department of Psychiatry, Washington University School of Medicine, St. Louis, MO

²Center for Technology and Behavioral Health, Department of Biomedical Data Science, Geisel School of Medicine at Dartmouth, Lebanon, NH

³William Greenleaf Eliot Division of Child Psychiatry, Washington University School of Medicine, St. Louis, MO

⁴Alvin J Siteman Cancer Center, Barnes Jewish Hospital and Washington University School of Medicine, St. Louis, MO

⁵Departments of Family and Community Medicine and Health and Outcomes Research, St. Louis University, St. Louis, MO

To The Editor:

Kratom (*Mitragyna speciosa*) is a novel psychoactive drug that is often used to self-manage pain and opioid withdrawal.¹⁻³ While kratom, in itself, has been found to lack the addictive potential of classic opioids and may have promising therapeutic properties,⁴ there are concerns about the safety of unregulated kratom products in the US.⁵ As kratom has increasingly been found in association with overdoses, usually in the presence of other

Corresponding Author: Kevin Y Xu, MD MPH, Department of Psychiatry, Washington University School of Medicine, 420 South Euclid Ave, Campus Box 8134, St. Louis, MO 63110, Tel: 314-362-2462, Fax: 314-362-0193, xukeviny@wustl.edu.

Contributor Statement: KYX and RAG are guarantors and take full responsibility for the content of the manuscript, including data and analysis. KYX, LJB, JTB, CMM, and RAG contributed to conception and design. KYX, JTB, and CMM contributed to analysis. KYX, LJB, JTB, CMM, PEAG, and RAG contributed to interpretation. KYX, LJB, JTB, CMM, PEAG, and RAG contributed to manuscript preparation. All authors were involved in the critical revision of the manuscript and approved the version submitted. They are accountable for all aspects of the work and the ability to identify the contributions of each coauthor and ensure integrity of their contributions.

Disclosures:

LJB is listed as an inventor on US Patent 8080371, 'Markers for Addiction', covering use of SNPs in determining the diagnosis, prognosis and treatment of addiction. JTB serves on board of directors and is treasurer of the non-profit MySafeRx Inc. but does not receive any financial compensation for this work. All other authors (CMM, KYX, RAG, PEAG) declare no financial interests. All authors do not have financial relationships with organizations that may have an interest in our submitted work.

Data sharing Statement: No additional data available. We intend to provide relevant code on written reasonable request

Dissemination Declaration: Dissemination to study participants and or patient organizations is not possible/applicable due to the de-identified nature of our data.

Transparency declaration: The manuscript's guarantors affirm that the manuscript is an honest, accurate, and transparent account of the study being reported. We affirm that no important aspects of the study have been omitted. We affirm that any discrepancies from the study as planned and registered have been explained.

Patient and Public Involvement (PPI) Statement: This research was done without direct patient involvement.

substances,¹ it is important to understand the co-occurring substance use disorders (SUDs) associated with kratom use. The aim of the present study was to describe the prevalence of kratom use and co-occurring substance use using the National Survey on Drug Use and Health (NSDUH).

Methods:

We used data from the 2019 National Survey on Drug Use and Health ($n=56,136$, weighted interview response rate 72.1% for adolescents, 64.2% for adults), the first year for which kratom data were available. NSDUH is conducted annually among the civilian, non-institutionalized US population, aged 12 and older. We calculated prevalence estimates of self-reported history of kratom use, as well as co-occurring past-year opioid, stimulant, alcohol, marijuana, sedative, and other SUDs. Prevalence ratios were calculated via log-binomial regression. We tabulated the number of SUDs per individual and examined whether kratom use was associated with increased risk of multiple SUDs. Analyses were done with STATA 16 ; all estimates accounted for complex survey design. This study was exempted from review by the Washington University Institutional Review Board.

Results:

As shown in Table 1, prevalence of lifetime kratom use in the US was 1.5% (95% Confidence Interval [CI]: 1.4-1.6%). Among those who used kratom, 50.9% (46.8-54.9%) used more than one year ago, 28.4% (24.4-32.8%) used within the past year, and 20.7% (17.2-24.6%) used within the past month. Most lifetime kratom users were male (61.2%, 56.6-65.6%), white (81.9%, 78.1-85.1%), and between ages of 18-34 (55.2%, 49.9-60.4%). Few users were under the age of 18.

Almost one third (31%; 26.6-35.7%) of kratom users had at least one SUD. Whereas the prevalence of opioid use disorder was 0.5% (0.4-0.6%) among never users, this increased 18-fold to 8.9% (6.3-12.5%) among lifetime kratom users. Kratom use was also associated with increased prevalence of prescription stimulant (16.5-fold, 95% CI: 9.2-29.5), methamphetamine (12.5-fold, 8.3-18.8), cocaine (14-fold, 8.5-23.1), and tranquilizer and/or sedative use disorders (16.8-fold, 9.3-31.1).

Lifetime kratom use was also associated with a higher burden of multiple SUDs. Among never users, the past-year prevalence of experiencing three or more co-occurring SUDs was 0.16%. However, this prevalence increased almost 20-fold to 2.81% among kratom users. In addition, whereas only 7.6% (95% CI: 7.2-8.0%) of never users reported a major depressive episode in the last year, this increased to 26.7% (22.7-31.0%) for kratom users.

Discussion:

Nearly one-third of lifetime kratom users in the US have at least one SUD; over one-fourth experienced past-year major depression. Lifetime kratom use is associated with a higher risk of other SUDs, especially opioids, stimulants, and sedatives. Importantly, the high burden of co-occurring SUDs among kratom users should *not* be interpreted to suggest that kratom causes SUDs; existing studies show that kratom itself does not typically produce a

“high” in comparison to classic opioids, with the vast majority of users not meeting DSM criteria for kratom-related SUDs.⁶⁻⁸ Multiple studies have found that kratom alkaloids have unique binding properties that show potential for management of pain,⁹ as well as ameliorate opioid withdrawal symptoms with minimal CNS depression.¹⁰ More research using nationally representative data are needed to elucidate the interplay between kratom’s therapeutic promise and safety concerns, especially given a current lack of quality control surrounding kratom products.⁵

Acknowledgments:

This work was supported by National Institutes of Health (NIH R25 MH112473-01, KYX; R21 DA044744, RAG; U10 AA008401, R01 DA036583 LJB; K12 DA041449 CMM; R21 AA02568901 and F32 AA027941, JTB). These funding sources had no role in the study design, implementation, or interpretation of results. We acknowledge the support of Dr. Nuri Farber and the Psychiatry Residency Research Education Program (PRREP) of Washington University (R25 MH112473-01) as well as the National Center for Advancing Translational Sciences of the National Institutes of Health under UL1 TR002345.

References

1. Anwar M, Law R, Schier J. Notes from the Field. Kratom (*Mitragyna speciosa*) Exposures Reported to Poison Centers — United States, 2010–2015. *MMWR Morb Mortal Wkly Rep.* 2016.;65:748–749. [PubMed: 27466822]
2. Schimmel J, Amioka E, Rockhill K, et al. Prevalence and description of kratom (*Mitragyna speciosa*) use in the United States: a cross-sectional study. *Addiction.* 2020.
3. Grundmann O. Patterns of Kratom use and health impact in the US-Results from an online survey. *Drug Alcohol Depend.* 2017;176:63–70. [PubMed: 28521200]
4. Veltri C, Grundmann O. Current perspectives on the impact of Kratom use. *Subst Abuse Rehabil.* 2019;10:23–31. [PubMed: 31308789]
5. Prozialeck WC, Avery BA, Boyer EW, et al. Kratom policy: the challenge of balancing therapeutic potential with public safety. *Int J Drug Policy.* 2019; 70: 70–77. [PubMed: 31103778]
6. Grundmann O, Babin JK, Henningfield JE, et al. Kratom use in the United States: a diverse and complex profile. *Addiction.* 2020.
7. Garcia-Reomeu A, Cox DJ, Smith KE, et al. Kratom (*Mitragyna speciosa*): User demographics, use patterns, and implications for the opioid epidemic. *Drug Alcohol Depend.* 2020; 208:107849. [PubMed: 32029298]
8. Smith KE, Lawson T. Prevalence and motivations for kratom use in a sample of substance users enrolled in a residential treatment program. *Drug Alcohol Depend* 2017; 180: 340–8. [PubMed: 28950240]
9. Todd DA, Kellogg JJ, Wallace ED, Khin M, Flores-Bocanegra RS, Tanna S, et al. Chemical composition and biological effects of kratom (*Mitragyna speciosa*): In vitro studies with implications for efficacy and drug interactions. *Scientific Reports* 2020; 10: 19158. [PubMed: 33154449]
10. Wilson LL, Harris HM, Eans SO, Brice-Tutt AC, Cirino TJ, Stacy HM, et al. Lyophilized Kratom Tea as a Therapeutic Option for Opioid Dependence. *Drug Alcohol Depend* 2020; 216: 108310. [PubMed: 33017752]

Table 1 –
Prevalence of Kratom Use and Co-Occurring Substance Use Disorders in the United States, 2019

	Never Used Kratom, n=55188			Lifetime Kratom Use, n=948			Prevalence Ratio (Kratom / Never Kratom)				
	Frequency	Weighted Prevalence (%)	95% CI		Frequency	Weighted Prevalence (%)	95% CI		95% CI		
Sex (Female)	26231	51.7	51.0	52.3	557	38.8	34.4	43.4	1.3	1.5	1.2
Age (Years)											
12 to 17	13339	10.9	10.6	11.2	58	4.0	2.9	5.4	0.4	0.3	0.5
18 to 25	13844	7.4	7.2	7.6	382	13.6	11.3	16.2	1.8	1.5	2.2
26 to 34	8342	17.4	16.9	18.0	259	37.7	33.2	42.3	2.2	1.9	2.5
35 and Older	19663	64.3	63.7	65.0	249	44.8	39.6	50.1	0.7	0.6	0.8
Race											
White	31368	61.7	60.7	62.7	721	81.9	78.1	85.1	1.3	1.3	1.4
Black	7210	12.2	11.4	13.0	46	4.4	2.8	6.6	0.4	0.2	0.6
Hispanic	10749	17.4	16.6	18.2	99	7.6	5.4	10.6	0.4	0.3	0.6
Asian	2686	5.9	5.4	6.4	11	0.9	0.4	2.0	0.2	0.1	0.3
Native American	1022	1.0	0.8	1.1	22	1.2	0.6	2.4	1.3	0.7	2.4
Multirace	2153	1.9	1.8	2.1	49	4.0	2.3	7.0	2.1	1.2	3.6
Past Year Major Depressive Episode	4228	7.6	7.2	8.0	239	26.7	22.7	31.0	3.5	3.0	4.1
			Past Year Substance Abuse or Dependence								
Opioids (Heroin or Pain Reliever)	292	0.5	0.4	0.6	77	8.9	6.3	12.5	18.0	12.1	26.9
Heroin only	57	0.1	0.1	0.1	12	0.8	0.3	2.1			
Pain Reliever only	214	0.4	0.3	0.5	48	6.2	4.0	9.4			
Heroin and Pain Reliever	21	0.04	0.02	0.1	17	2.0	1.2	3.3			
Prescription Stimulants	131	0.2	0.1	0.2	26	2.8	1.6	4.6	16.5	9.2	29.5
Methamphetamine	197	0.3	0.3	0.5	44	4.3	2.9	6.5	12.5	8.3	18.8
Cocaine	180	0.3	0.2	0.4	42	4.0	2.6	6.0	14.0	8.5	23.1
Alcohol	3170	5.1	4.8	5.4	193	17.8	14.8	21.3	3.5	2.9	4.2
Marijuana	1474	1.6	1.5	1.8	130	10.6	7.8	14.2	6.6	4.8	9.0
Tranquilizer and/or Sedative	142	0.2	0.2	0.3	32	3.6	2.2	6.1	16.8	9.3	30.6
Hallucinogens	79	0.1	0.1	0.1	11	1.4	0.7	2.8	16.8	9.0	31.1
Any Substance Use Disorder (SUD)	3698	5.9	5.6	6.3	301	31.0	26.6	35.7			
1 SUD	3327	5.4	5.1	5.7	224	23.7	20.1	27.8			
2 SUDs	278	0.4	0.4	0.5	48	4.5	2.9	6.9			
3 or more SUDs	93	0.2	0.1	0.2	29	2.8	1.7	4.6			

¹Including opioids, prescription stimulants, methamphetamine, alcohol, marijuana, prescription tranquilizers or sedatives, hallucinogens, cocaine