



Frog Sweat Misuse – Emerging Evidence from India

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Abstract

Background: Cutaneous secretion of frogs (Kambo) has been reported to be misused for its opioid-like psychoactive effects, mostly from the Amazonian basin of Brazil and Peru. This is a unique case of frog sweat misuse in a middle-aged male with opioid dependence from India.

Case description: A middle-aged male presenting with symptoms of opioid withdrawal reported using frog sweat as an alternate, long-acting form of opioid in a dependent manner for its much stronger psychoactive effect. Assessment and management using opioid substitution therapy along with motivational enhancement therapy have been discussed.

Conclusion: Frog sweat (Kambo) misuse is an emerging health risk in India along with different parts of the world and warrants research on epidemiology, clinical presentation, and management guidelines, along with its public health impact for effective regulation and control.

ARTICLE INFO

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Dates:

Received: 10-01-2024

Accepted: 20-03-2024

Published: 05-06-2024

Keywords:

Legal highs, New
psychoactive
substances, Frog
sweat, Misuse, Opioid
dependence.

How to Cite:

Kale Y, Bhatia G.
Frog Sweat Misuse –
Emerging Evidence
from India. *Indian
Journal of Clinical
Psychiatry*.2024;4(1):99-102.
doi: 10.54169/ijocp.v4i01.97

INTRODUCTION

Over the last few decades, the world witnessed the serendipitous discovery and use of several novel drugs and psychoactive substances, some with documented scientific merit and others whose psychoactive effects are still obscure to science.¹ These comprise compounds classified as “new psychoactive substances” characterized by a small scientific research base, ill-understood public health impact and challenges in identification and testing, resulting in poor international control.²

Cutaneous secretion from frogs is one such substance, which has surfaced recently among Indian youth for the purpose of seeking a high beyond the purview of laws and regulations.^{3,4} While this is a surprising finding in this part of the world, sweat from *Phyllomedusa bicolor*, also known as the giant leaf frog, has been used in indigenous medicine, known as Kambo, in the Amazon region, mostly Brazil and Peru, since ancient times and is known to contain a natural opioid dermorphin, with a high selectivity for mu-opioid receptors.⁵ However, this species of frog is not known to inhabit the Indian subcontinent or the Southeast Asia region as a whole.⁶ This indicates a different variety of frogs and probably a different kind of opioid responsible for the psychoactive effect.

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While newspaper reports have attempted to attract the attention of the scientific community and law enforcement agencies, expressing concerns about the possible adverse effects of using frog sweat for its potential psychoactive properties, there remains an abject lack of scientific research on the epidemiology of frog sweat misuse, clinical presentation and management. This is the first scientifically reported case of dependence on frog sweat from the South East Asia region. Attempts at review of existing research and clinical considerations have also been made along with discussion on future directions in this context.

Case Description

A 42-years old male presented to Outpatient Department of an addiction treatment clinic in Punjab, India, with complaints of generalized body ache, runny nose, intermittent chills, yawning, decreased sleep, irritability, anxiety and anhedonia for last 10 days. In an interview, he reported having used heroin by chasing route for 2 to 3 years in a dependent manner until one year back, when he was introduced to frog sweat by a friend. It was prepared by tying the frog by its forelimbs to a rope and rubbing its trunk vigorously with a cloth wick, making the frog perspire and then licking the sweat off its trunk. The patient was unable to provide a reliable identifying description of the frog, which belonged to the peddler and was not for sale. He reported that he would be invited to a secluded area by the peddler and not be allowed to touch or hold the tied frog, only permitted to take a single lick off the trunk. Within the next 30 to 45 minutes, he would perceive increased physical energy, euphoria, light-headedness, nausea and a sense of well-being and the effects lasted for up to 15 days, sometimes for a month as per the patient. But as the effects started declining or if he is unable to meet the peddler, there was an intense withdrawal similar to symptoms of opioid withdrawal but much more severe as compared to heroin, according to the patient, including body aches and cravings, physical symptoms would subside to tolerable levels after using upto one to two grams of street heroin. But the craving remained even after heroin consumption. Hence, the patient continued to use frog sweat as per availability (six times in the

last year), but his dose gradually increased to 2 to 3 licks at a time in order to feel the same level of euphoria. He experienced irritability and difficulty in concentrating when he tried to abstain and his work efficiency would reduce. The patient attempted to secure a regular supply from other peddlers and from other geographical locations. He spent lakhs of rupees to procure this species but was unsuccessful in maintaining a steady process of supply. His Last consumption was 20 days prior to visiting the clinic with withdrawal symptoms. His last heroin use was almost three weeks ago or two days before his last sweat consumption. He had taken some medicines from a local doctor to treat his withdrawals, details of which were not available.

Patient also reported to have used multiple substances occasionally in the past, like alcohol, ganja, afeem, benzodiazepines and buprenorphine tablets in the absence of heroin and frog sweat, but usage pattern was not suggestive of dependence on any substances other than heroin. There was no history of any psychiatric disorder or substance use in the family.

Difficulty in procuring the substance, inability to control or abstain from use, intense withdrawal symptoms and craving led to significant socio-occupational impairment and motivated him to seek medical opinion. The case was published after written informed consent was obtained from the patient.

Clinical examination revealed burn marks on the index finger of the right hand, mild dilation of pupils, bradycardia (HR: 60 bpm) and hypotension (BP: 100/70 mmHg). Mental status examination revealed dysphoric, non-reactive affect, stage of motivation was contemplation with an external locus of control. The clinical opioid withdrawal scale (COWS) score was 22, indicating moderate withdrawals. Laboratory investigations viz; complete blood count, liver function test, kidney function tests, HIV, HBsAg and anti-HCV were within normal limits. The urine drug screen was positive for opioids and negative for other substances, including buprenorphine, cannabinoids and benzodiazepines.

This patient fulfilled the diagnostic criteria for opioid dependence as per ICD-11 by meeting the criteria of strong internal desire to take opioids;

difficulties in controlling opioid use in terms of its onset, termination, or levels of use; a physiological withdrawal state; and a progressive neglect of alternate pleasures or interests because of opioid use.

The patient was not willing to be admitted. Hence, office-based treatment was started with a sublingual buprenorphine-naloxone fixed-dose combination (2 mg/0.5 mg) 2 tablets a day after informed consent and clonazepam 0.5 mg tablet HS and SOS for anxiety were prescribed with alternate day follow-up visits. Within the first week, buprenorphine + Naloxone was up-titrated to 8 mg/2 mg dosage as per withdrawal and craving according to COWS score. Urinary drug screening indicated compliance with buprenorphine abstinence from other illicit substances. He was also started on motivational enhancement therapy, one session per week. The patient is following-up regularly for the past one month with one lapse in between of cue-induced cravings. Weekly relapse prevention sessions have also been started.

The short-term goals of the treatment plan include focusing on abstinence from illicit opioids, treatment compliance and effective practice of refusal skills. Long-term goals include maintenance on treatment focus, craving management, attaining stability in professional life and stable relationships.

DISCUSSION

This case of a young male using frog sweat is one of few cases to be reported worldwide and the first from India to the best of our knowledge. Although it is unusual to find the same specific species of frog as the one reported from the Amazon, the Himalayan region of India appears to harbor a few species of frogs whose cutaneous secretions may also contain compounds with opioid-like psychoactive effects.³

Kambo, a secretion from a frog that is mostly found in South America, has been used as a natural painkiller in indigenous medicine since ancient times. Kambo is derived from secretions collected from the frog *Phyllomedusa bicolor* and has been found to contain several active peptides, including phyllocaeruleins (hypotensive properties), tachykinins and phyllokinins (vasodilators), dermorphins and deltorphins (opiate-like actions) and adeno-

regulins (antibiotic properties). Kambo is used most commonly by applying on freshly created superficial burns (“dots”) on the arms, legs or chest. The secretion most likely enters the lymphatic system and, subsequently, the bloodstream within minutes, inducing hypotension, sweating, tachycardia, heavy vomiting and edema, usually subsiding within an hour. This is followed by listlessness and euphoria.^{7,8} In this case, the specific opioid or the exact species of the frog could not be determined due to technical reasons, however, further analysis is required in order to characterize the compound’s properties, assess public health risk and impose controls as needed. The methodology used to obtain sweat in this case was similar to that generally used in obtaining kambo.

Literature regarding the recreational use of Kambo is scanty and most studies are based on anecdotes and personal experiences, with only a few studies employing objective assessment. An online survey enquiring into motivations for Kambo use among 386 German individuals (mean age 38 ± 9 years) reported general healing, detoxification and spiritual growth as the most common reasons for trying Kambo.⁹ A few studies also reported beneficial effects on mental and physical health, including, among many other conditions, depression, Hashimoto thyroiditis, coeliac disease, post-traumatic stress disorder, diabetes, infectious diseases, cancer and hypertension.⁵ A few case reports also demonstrated life-threatening effects of Kambo poisoning that included severe vomiting, seizures, unconsciousness, syndrome of inappropriate antidiuretic hormone secretion [SIADH] and Boerhave syndrome.¹⁰⁻¹²

After reports of several deaths due to suspected kambo poisoning, Australia banned its use in 2021 and classified it as a schedule 10 poison, a classification reserved for the most lethal poisons and toxins in the country.¹³ Commercial transactions involving Kambo and its use by non-indigenous individuals or communities have been banned in Brazil since 2004.⁸ However, kambo is not subject to legal restrictions or international controls in other parts of the world yet, possibly due to a lack of evidence on the recreational use of Kambo in different parts of the world, its dependence potential and public

health impact. The species of frogs and the opioid compounds present in the cutaneous secretions may differ in different geographical regions. Thus, extensive research and evidence generation is required before international drug control and law enforcement organizations impose effective controls on these substances.

CONCLUSION

This is one of the first cases of the use of frog sweat as a substitute for heroin in an opioid-dependent patient from India, indicating that frog sweat misuse is growing from a regional problem to an international issue. There is a need for systematic research on frog sweat misuse, assessing the extent, clinical attributes and management along with potential public health impact in order to develop effective controls and preventive strategies.

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