the ‘afterglow’ period and suggests it is worthy of further exploration as another possible psychological mechanism. Given psychological gains to mindfulness and cognitive flexibility occurred regardless of prior ayahuasca use suggests ayahuasca offers potentially therapeutic effects for both psychedelic naïve and experienced ayahuasca drinkers.

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F06

COGNITIVE FUNCTIONS ASSOCIATED WITH CONSUMPTION OF TRADITIONAL VOLUMES OF KAVA (PIPER METHYSTICUM): A FEASIBILITY STUDY

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Introduction: Kava (Piper methysticum) is a traditional and culturally significant Pacific Island beverage, which contains active compounds called kavalactones that produce soporific relaxant effects similar to Benzodiazepine (Sarris et al, 2012, Human Psychopharmacology Clinical and Experimental, 27:262-9). Traditional kava drinkers frequently exceed the pharmacologically recommended amount of ≤300mg of kavalactones/day by 30 times (Aporosa & Tomlinson, 2014, Anthropologica, 56:163-75). Little is known about cognitive function at this high consumption rate. With Pacific peoples in New Zealand over represented in motor vehicle accidents, Police suspect traditional kava use may be a contributing factor. Previous research (Aporosa, 2017, Journal of Psychopharmacology, 31[8], A84) used an industry standard measure of drug driving to examine cognitive functions of kava users in a naturalistic setting. The industry standard measure revealed no statistical differences in cognitive functioning between kava users and control participants, despite observation of slowed movement and slurred speech by the kava users. Consequently, with full study utility as a goal, the feasibility of using a new psychometric measure of cognitive functioning – the Brain Gauge (BG) – was examined in a naturalistic setting.

Methods: Drawing on Eldridge et al’s (2016, PLoS One, 11[3]: p.15) definition of a feasibility study, experienced kava consumers (n=2 [males], mean age = 46.5) attended a 6 hour traditionally influenced kava session, each drinking 3.6 litres of kava equating to 5,220mg of kavalactones. At baseline, the participants completed BG (www.corticalmetrics.com [CM]) somato-sensory psychometric testing to measure six strategic, tactical and operational cognitive faculties including fine-motor-skills and fatigue. Each of the six domains are scored and compared against norms, which also informs a composite CM score. Re-testing was conducted following 3 and 6 hours of kava consumption.

Results: Consistent with subjective observations of the behavior of the participants, obvious negative changes over time were evident for reaction time, attention focus, time perception and temporal order judgement for one participant (CM composite score: 85 at baseline, 80 at 3 hours, 55 at 6 hours) but positive changes were evident for the second participant (CM composite score: 73 at baseline, 73 at 3 hours, 92 at 6 hours).

Conclusions: Unlike the industry standard measure of drug driving used in the previous study, use of the BG is feasible in a naturalistic setting. A full controlled study, aimed at understanding kava’s effects on driving following high consumption, is about to commence.

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Cognitive functions associated with consumption of traditional volumes of kava (Piper methysticum): A feasibility study

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The need for sufficient participant numbers based on power calculations compared against control (Paper discussing full list of confounds currently under review.) Kava produces soporific relaxant non-Bwarenaba NZ and Pacific Island Police suspect that some unsafe driving is linked to kava use at high Aporosa, S. 2017, Wainiqolo Aalbersberg Poulsen block the calcium ion channels related to reduction of neurotransmitter release excitation, The New Zealand Institute of Environmental Science and Research (NZESR) reported increased variations in kavalactone strength with limited regulation across studies, and the need for experienced kava drinkers capable of consuming large volumes of kava who would immediately McCormack, L., 2012. Aporosa, S. 2014. reverses monoamine A Fijian based ethnographic study reported a “four variations in kavalactone strength with limited regulation across studies, and the need for experienced kava drinkers capable of consuming large volumes of kava who would immediately

Kava psychopharmacology

The majority of kava psychopharmacology knowledge results from studies at pharmacologically recommended doses <300mgs kavalactones per day. Reaction time research at ≥300mgs kavalactones is inconsistent, ranging from “significantly increased” response accuracy to a 40% reduction in “reaction time ... in comparison to placebo”. Recent research reported that kavalactone “modes of action are not fully understood”, even less is understood regarding “the neurophysiological mechanisms associated with kavalactone metabolism”.

The 2016 WHO kava risk assessment report lists 28 “data gaps” and requested “further data” regarding kava ethnobotany, psychopharmacology and mechanisms of action related to “human health effects”.

Traditional kava use and driving

Traditionally, kava is mixed by steeping or straining the crushed roots of the plant in water to make a culturally important beverage used in almost every ceremony from birth to death.

Introduction

It is believed the traditional Pacific drink kava contributes to unsafe driving. A recent study utilising an industry standard measure of drug driving failed to register effects to selected cognitive functions. The following reports on a subsequent feasibility study with a new method.

Kava

Kava (Piper methysticum) contains active properties - kavalactones. Kavalactones levels vary dependent upon the maturity of the plant and cultivar type.

- Kavalactones:
  - block the calcium ion channels related to reduction of neurotransmitter release excitation, putatively GABAergic, through enhanced ligand binding to GABA receptors, reduces the neuronal uptake of noradrenaline and possibly dopamine, reverses monoamine oxidase (MAO-B).
- Kava produces soporific relaxant non-hallucinogenic effects similar to Benzodiazepine.

Kava plant and harvesting kava at three years of age

Kava being prepared for consumption

Kava drinking in New Zealand

The current study

The inconsistency between the results and observations (in the 2017 study)⁴ may be due to a lack of test sensitivity. This informed the identification of a novel assessment of neurological functioning – the Brain Gauge (BG).

Methods/Measures

Elbridge at al⁴ define a feasibility study, “in which investigators attempt to answer a question about whether some element of the future trial can be done”, and Aporosa and Tilmison⁵ explain, this “is next to impossible under the conditions in which kava is normally consumed” due to:

- “the identification of a novel assessment of neurological functioning
- Individual participant rates of kavalactone metabolite and dose relationship of kavalactones with cognitive impact; this is knowledge that is currently beyond kava psychotropic and psychopharmacological understanding.
- (Paper discussing full list of confounds currently under review.)

Results

Brain Gauge results (participant AA)

1c: Baseline 1b: 3 hours 1c: 6 hours

Brain Gauge results (participant MA)

2c: Baseline 2b: 3 hours 2c: 6 hours

Discussion

The methods proved a robust procedure that could be effectively used to examine the effect of kava on neurological function while still maintaining the naturalistic setting of a traditional kava session. Confounders for full scale experiments were identified:

- The need for sufficient participant numbers based on power calculations compared against control (n=18).
- The introduction of a placebo driven double blind methodology. However, as Aporosa and Tilmison⁵ explain, this “is next to impossible under the conditions in which kava is normally consumed” due to:
  - variations in kavalactone strength with limited regulation across studies, kava’s union with cultural values and respect which prevent a kava substitute, placebo or deception, and
  - the need for experienced kava drinkers capable of consuming large volumes of kava who would immediately recognize the absence of mouth ‘tingle’ produced by the interaction of selected kavalactones with oral sensory nerves.

- Individual participant rates of kavalactone metabolite and dose relationship of kavalactones with cognitive impact; this is knowledge that is currently beyond kava psychotropic and psychopharmacological understanding.

Conclusion

Unlike the industry standard measure of drug driving used in the 2017 study, the BG is feasible in a naturalistic setting. At this stage, the challenge remains of designing a ‘gold standard’ double blind placebo study in a naturalistic traditional kava setting.

Funded by a NZ Health Research Council: Pasifika Award, the full controlled study has commenced. The full study is anticipated to assist Police and NZESR in understanding kava’s effects on driver safety following high consumption, and inform WHO “data gaps” related to psychotropy, psychopharmacology and mechanisms of action.

References