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

S. ‘Apo’ Aporosa (PhD)  
Te Huataki Waiora (School of Health, Sports and Human Performance), The University of Waikato, New Zealand

Introduction

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

Kava

Kava (Piper methysticum) contains active properties - kavalactones.

- Kavalactone levels vary dependent upon the maturity of the plant and cultivar type.
- It is estimated 70% of kava users in New Zealand (NZ) and Australia drive following high traditionally influenced kava use.
- 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.

Kava psychopharmacology

The majority of kava psychopharmacology knowledge results from studies at pharmaceutically influenced kava use.

- Kavalactone metabolism is modulated by MAO-B inhibition.
- Potentiates GABA A through enhanced ligand binding to GABA receptors.
- Block calcium ion channels related to neurotransmitter release excitation.
- Reduces the neuronal reuptake of noradrenaline and possibly dopamine.

Methods/Measures

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

Results

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

Aim: To investigate potential methodological challenges, particularly within the naturalistic traditionally influenced kava use testing, in a feasibility study using the BG.

Methods/Measures

- Eldridge et al. defined a feasibility study, “in which investigators attempt to answer a question about whether some element of the future trial can be done, and Aporosa’s respect-based Pacific methodological framework, guided the protocol.

- Traditional kava users (n=21 males; mean age = 46.5 ± 12.4) attended a 6 hour traditionally influenced kava session. Both participants drank 3.6 litres (6.33 prints) of kava equaling to 5,220mg of kavalactones (based on HPLC analysis).

- In total, participants completed 80 BG (www.corntecmetrics.com CMF) somato-sensory psychometric testing.

- The introduction of a placebo driven double blinded methodology. However, as Aporosa and Tomlinson explain, this is next to impossible under the conditions in which kava is normally consumed due to:
  - Variations in kavalactone strength with variation across kava drinks.
  - Kava’s union with cultural values and respect which prevent a kava substitute, placebo or deception.
  - 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 metabolism and dose relationship of kavalactones with cognitive impact; this is knowledge that is currently beyond kava psychotropic and psychopharmacological understanding.

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.

- Consistent with observations of the behaviour of participants in the 2017 study (utilising the industry standard measure of drug driving), obvious negative changes over time was evident for reaction time, attention focus, time perception and temporal order judgement for one participant.

- 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.

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