The Effect of Kava Root Tea on Blood Pressure and Heart Rate

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Introduction - Medicinal Plants

- **Traditional Medicine**
  - Plants synthesize diverse chemicals
  - Utilizes different parts of plants

- **Modern Applications**
  - Creating drugs
    - Poppy seeds → opium
    - Willow bark → aspirin

- **Piper genus**
  - Black pepper (*Piper nigrum*)
  - Kava root (*Piper methysticum*)
The “Roots” of Kava Root

- **Origins of Kava**
  - Western Pacific plant
  - Roots prepared aqueously
  - Sedative and euphoric properties (used ceremonially)

- **Two strains emerge**
  - Noble - slow to grow, less concentrated
  - Non-noble - very fast to grow, highly concentrated

- Exported to other countries

- Controversy ensued

Effects on the Body (and Mind!)

- Anxiolytic properties of kavalactones
  - Therapeutic and calming
  - Used as a sedative (Garret et al. 2003)
  - No effect on cognitive function (Gendle et al. 2011)

- Possible treatment for autoimmune disease
  - Reduces inflammation via TNF-α (Pollastri et al. 2009)
  - Can cause inflammation via mast cells (Shimoda et al. 2012)

- Potential as a cancer treatment
  - Reduces likelihood of prostate cancer (Xuesen et al. 2012)
  - Reduces DNA damage in mice ([NW] 2014)
Purpose of Research

- Kava tea is becoming popular
- Kava has potential medical applications

What I wanted to measure
- Effects on heart rate
- Effects on blood pressure
Hypotheses

- The resting heart rate of people will be lower with kava consumption than without kava consumption.
- The resting blood pressure (both systolic and diastolic) of people will be lower with kava consumption than without kava consumption.
Experimental Design (Initially)

- Preparing my own kava tea
  - 200mg of kava powder (80mg of kavalactones)
  - 120mL of water (about 4 fluid ounces)

- 20 subjects, all of roughly same age
  - Half are a control group (consume nothing)
  - Half consume the kava tea

- Measure baseline HR/BP
  - Experimental subjects consume tea and wait 20 minutes
  - Control subjects simply wait 20 minutes

- HR/BP are re-measured
Experimental Design (What I Settled For)

- IRB Constraints
  - Found a group who already consumes kava
  - Sacred Root Kava Lounge & Tea Bar

- Measured HR/BP of kava drinkers
  - Noted their demographic & typical consumption

- Found a control group
  - People who matched the others’ demographics
  - Just measured HR/BP once (no before/after)

- Each group had 10 subjects (n=10)
  - Unpaired t test
Hypothesis 1

- The resting heart rate of people will be lower with kava consumption than without kava consumption.

- The resting blood pressure (both systolic and diastolic) of people will be lower with kava consumption than without kava consumption.
Results - Heart Rate

Control

Kava

Mean Heart Rate (BPM)

p = 0.5597
n = 10
Discussion - Heart Rate

- Supported by previous research
  - Kavalactones inhibit GABA_A receptors (Chua et al. 2016)
  - Allows for vagus nerve innervation
    - Greater vagus nerve activity in kava v. placebo (Watkins et al. 2001)

- Findings in other research are significant
Hypothesis 2

- The resting heart rate of people will be lower with kava consumption than without kava consumption.

- The resting blood pressure (both systolic and diastolic) of people will be lower with kava consumption than without kava consumption.
Results - Systolic Blood Pressure

Mean Systolic Blood Pressure (mmHg)

Control

Kava

Group

p = 0.2529  n = 10
Results - Diastolic Blood Pressure

Control

Kava

Mean Diastolic Blood Pressure (mmHg)

Group

p = 0.3424

n = 10
Discussion - Blood Pressure

- Previous research has similar findings
  - Systolic BP lower with kava consumption (Cropley et al. 2002)
    - Significant results after 7 days of consumption
    - Measured while subjects were under stress
  - Acts as a vasodepressor in felines (Hoover et al. 2006)
    - Via GABA_A receptor inhibition
    - Also inhibits calcium channels
Flaws and Sources of Error

- Could not control kava intake
  - Prepared inconsistently by bartender
  - Unknown kavalactone amounts
  - Unknown kavalactone chemotypes

- Inconsistence in measurements
  - Differences between control and experimental subjects
    - Differences among experimental subjects (short/long term use)
    - Unable to take “baseline” readings

- Small sample size

- Errors of the HR/BP Cuff
Conclusions and Future Research

- Kava does have documented effects on HR/BP
  - Both tend to decrease
  - My data reflects this trend

- Ideas for future research
  - Preparing my own kava tea (with known kavalactones)
    - Versus a placebo?
    - Track kava use over time?
  - Comparing prepared tea to store-bought tea

- Importance of future research
  - Potential as new plant-based medicine

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Questions?