

Kayla Holt

Dr. Katie Silliman

NFSC 440

November 13, 2012

AND Evidence Analysis Worksheet

Citation	Exaggeration of Postprandial Hyperglycemia in Patients with Type 2 Diabetes by Administration of Caffeine in Coffee
Study Design	A within-subject or crossover study design that was a double-blind and placebo-controlled study
Class	B
Research Purpose	The purpose of this research was to test whether caffeine when the form of coffee leads to an increase in postprandial hyperglycemia or high blood sugar post meals in patients who have Type 2 Diabetes and who drink coffee regularly.
Inclusion Criteria	<ul style="list-style-type: none">• Adult coffee drinkers, 20 in total; 9 men and 11 women• Adults with type 2 diabetes, who had the diabetes for at least 6 months or more• These adults were to treat their diabetes with diet, exercise, orally administered anti-diabetic agents or some combination of these factors• Adults who completed two mixed-meal tolerance tests (MMTT)• Adults who are habitual coffee drinkers, drinking 2 or more cups of coffee per day
Exclusion Criteria	<ul style="list-style-type: none">• Study participants were excluded if they required insulin• If they used drugs known to affect glucose or caffeine metabolism such as tobacco and or contraceptive steroids• Study participants were excluded if they had other “major” medical disorders
Description of Study Protocol	<ul style="list-style-type: none">• Treatments were administered in a double-blind manner• Treatments order was counter-balanced within the group• Caffeine (250 mg anhydrous) was given in 10 mL of preserved water which also contained trace amounts of quinidine• The placebo solution contained quinidine only which was used to mask the bitterness of caffeine• Both caffeine and placebo treatments were given in 16oz of fresh, filter-brewed decaffeinated coffee.• Adding caffeine to decaffeinated coffee allowed for control of the caffeine content and other chemical compounds of interest

<p>Data Collection Summary</p>	<ul style="list-style-type: none"> • Testing was conducted on two different mornings within a two week period, each test was preceded by an overnight fast and overnight fast from all caffeine substances • Blood samples were taken of the participants after the overnight fasts to provide baseline blood glucose samples. Then participants received the treatment or placebo within a 10 minute period. After the treatment participants all received a mixed-meal tolerance test (MMTT) in the form of a liquid meal – Boost Plus; that contained 75g of carbohydrate. Blood samples were collected again at 1 and 2 hours post MMTT. • Incremental area under the MMTT 2-hour concentration time curves (AUC 2h) for glucose and insulin were calculated using the trapezoidal rule • By using the pre-coffee fasting values and the values at both 1 hour and 2 hours after the meal, this gave incremental area values • Incremental areas for coffee and placebo were compared using repeated-measure analysis of variance (Proc Mixed, SAS version 8, SAS Institute, Cary, NC) • Preliminary testing revealed no effects of treatment order in these analyses • Order factor was not included in the final analysis • Outcome data was presented as mean values, P <0.05 was used for finding significance
<p>Summary of Results</p>	<ul style="list-style-type: none"> • Table 1 shows that patients were factored by age, height, weight, BMI, time since diabetes diagnosis, their HbA1c levels, and fasting glucose, fasting insulin and caffeine intake. The table provides a mean and standard deviation along with a range for the factors of the 20 participants in the research study • Figure 1 shows the effects of the 250mg dose of caffeine in plasma glucose and insulin concentrations during the MMTT in all 20 study participants with type 2 diabetes. The figure shows that the p-value was P=0.02 and that the mean glucose value after the administration of caffeine rose 28% than those in the control group. The mean insulin value after the administration of caffeine rose 19% in contrast to those who received the placebo. • The results of this study disprove the common belief that habitual coffee drinking leads to the development of tolerance to the effects of caffeine. • The exploratory correlation analysis indicated that the variation in age, body weight, BMI, fasting plasma glucose concentration, long-term glucose control reflected by HbA1C and normal level of daily caffeine intake did not account for variation in the magnitude of the effect of caffeine on postprandial glucose. <p>Results:</p>

	<ul style="list-style-type: none"> • Glucose and insulin responses to the MMTT were quantified by the incremental areas under the 2-hour concentration-time curves (AUC 2h) • Administration of caffeine in decaffeinated coffee increases postprandial glucose and insulin responses both (P=0.02) • The mean plasma glucose AUC2h was 28% larger after the administration of caffeine than after the administration of the placebo, or the decaffeinated coffee
Author Conclusion	<p>Components in coffee such as caffeine did not prevent postprandial hyperglycemia by caffeine in these patients with type 2 diabetes, who were regularly consuming coffee. Repeated on a daily basis, such effects could impair long-term glucose control in those patients with type 2 diabetes who habitually drink coffee or other caffeinated beverages. The findings in this study should raise concerns for patients with type 2 diabetes who drink coffee. The study showed that blood glucose was affected when coffee is consumed, and the effects of caffeine can persist for 10 hours or more after drinking coffee or other caffeinated beverages.</p>
Reviewer Comments	<p>Strengths:</p> <ul style="list-style-type: none"> • This study used the addition of caffeine to decaffeinated coffee to control for other substances or traces that may be present in the placebo group • The set amounts of caffeine added a strength to the study <p>Weaknesses:</p> <ul style="list-style-type: none"> • Having a group of only 20 participants is not enough to give the statistical data any real value • No initial study was done to test those 20 individuals to their sensitivity to caffeine