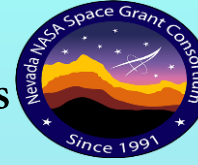




Coffee Consumption: Meta-Analysis on its Health Benefits



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Overview:

A meta-analysis of peer reviewed literature and web sites was conducted to first test the hypothesis that individuals who consume a moderate amount of coffee daily, have health benefits compared to those who do not drink coffee. Secondly, it was tested to see if the peer reviewed literature came to the same conclusion as web sites. Comparing two websites supported the hypothesis that those who consume coffee regularly are more healthy than those who do not. As a result, the scientific literature and web sites agree. Coffee's health benefits may further be investigated in the medical field.

Introduction:

Coffee is a fermented compound from roasted coffee beans, and is a popular beverage in the United States. Coffee's primary component, caffeine, is a stimulant that drives the central nervous system, heart and muscles while increasing alertness, and clear thinking (Coffee, n.d.). Having roughly 400 mg of caffeine is presumed safe and each cup of coffee has roughly 70 to 165mg, while it varies in different coffees. Shaikh & Uttekar (2020) acknowledge that excessive intake may lead to insomnia, nervousness, muscle tremors, elevated blood pressure, stomach problems and other adverse effects which lead to negative reputation of coffee.

Coffee has 1000 functional compounds in addition to caffeine including diterpenes, melanoids, quinides, lignans and trigonelline. O'Keefe et al. (2018) has established that these compounds have antioxidant and anti-inflammatory properties which may be responsible for cardioprotection and longevity. To establish that individuals enjoy health benefits from consuming coffee, several sources were consulted.

Method:

Read, compile and analyze the selected sources. All the indications and studies were closely examined on coffee's attributions.

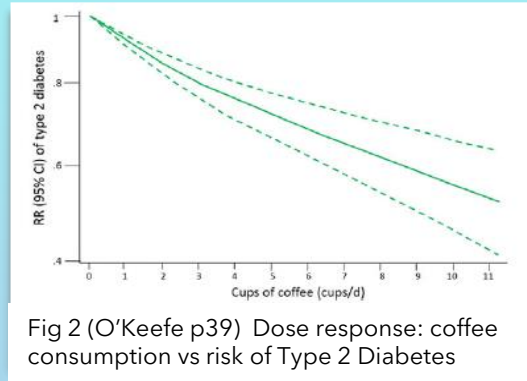


Fig 2 (O'Keefe p39) Dose response: coffee consumption vs risk of Type 2 Diabetes

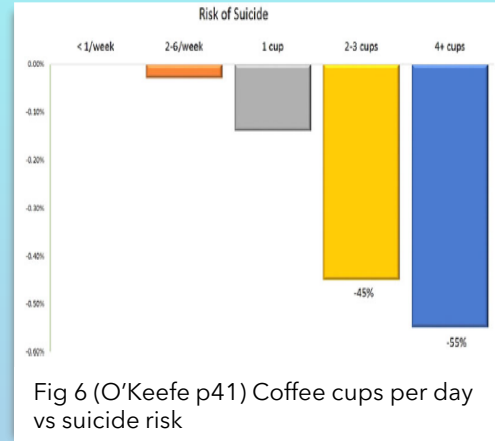


Fig 6 (O'Keefe p41) Coffee cups per day vs suicide risk

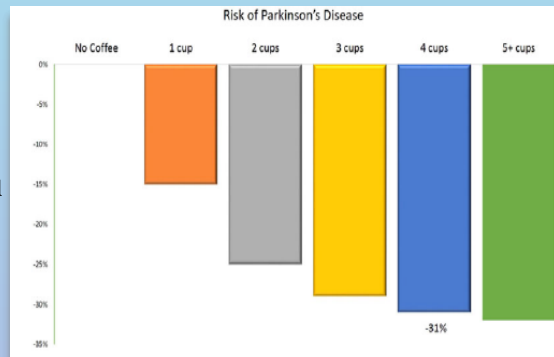


Fig 5. Coffee intake in cups per day and risk of developing Parkinson's disease.³⁶

Fig 5 (O'Keefe p41) Coffee cups per day vs Parkinson's disease risk

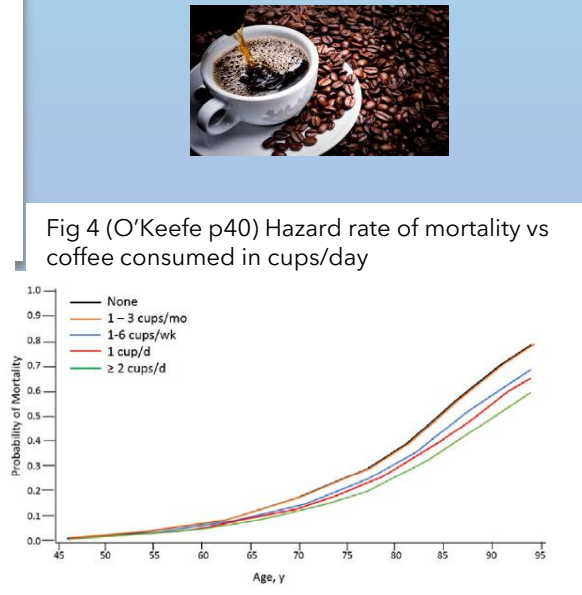


Fig 4 (O'Keefe p40) Hazard rate of mortality vs coffee consumed in cups/day

Results:

Klein (2020) reports a study by Ghanbari At Erasmus University Medical Center in Rotterdam, Netherlands that looked for methyl groups on the DNA of 16,000 European and African American descendants in the US and Europe. They uncovered 11 chemically tagged DNA sites associated with digestion, processing of harmful chemicals and controlling inflammation were methylated more differently the more cups of coffee a subject drank over controls. The study took into account age, BMI, smoking and alcohol use as risk factors. The researchers published in bioRxiv may explain the health benefits of coffee.

The two websites provided no data only conclusions drawn from somewhere. WebMD has hundreds of references but zero citations. Medicinenet.com has four references and zero citations. Both websites make broad statements. Representative statements from WebMD include that one cup of any kind of coffee per day can reduce your chance of immediate death from any cause and reduces fatigue. Representative claims from Medicinenet include protection from Parkinson's, dementia, type 2 diabetes, heart attack and stroke.

Conclusion:

All analyzed sources agree that consistently drinking coffee has more health benefits than avoiding coffee supporting the hypothesis. Coffee's antioxidant and anti-inflammatory functions may be caused by epigenetic modification of genes. Methyl groups added to genes for digestion, inflammation and detoxifying harmful substances may explain the numerous benefits of coffee. Consumption of 3-4 cups of coffee lowered the risk of Parkinson's disease, suicide, type 2 diabetes and all cause mortality, and moderation lessens adverse effects. These health benefits were found in large, randomized and diverse groups of humans and not present in controls that did not drink coffee. More studies should be conducted to confirm the beneficial effects of moderate coffee consumption in nutrition and additional health fields.

Acknowledgements:

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References

Coffee: Overview, uses, side effects, precautions, interactions, dosing and reviews. (n.d.). Retrieved March 2, 2021, from <https://www.webmd.com/vitamins/ai/ingredientmono-980/coffee>
Klein, A. (2020). Epigenetic hints for the health benefits of drinking coffee. *New Scientist* (1971), 246(3280), 10.
O'Keefe, JH, DiNicolantonio, JJ, & Lavie, CJ. (2018). Coffee for Cardioprotection and Longevity. *Progress in Cardiovascular Diseases*, 61(1), 38-42.
Shaikh, J., & Suyog Uttekar, P. (2020, October 20). What are the negative effects of coffee? Retrieved March 2, 2021, from https://www.medicinenet.com/what_are_the_negative_effects_of_coffee/article.htm