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The effect of coffee consumption on type two diabetes mellitus

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Abstract

Coffee consumption is one of the most common daily habits worldwide; and previously it was known to be bad for the human health. However, these days some researchers try to found the relationship between coffee consumption and reduce risk of chronic disease and one of these diseases is type two diabetes mellitus. Those researchers selected pre diabetic people on their studies and they focus on number of cups per day, type of coffee consumed and some additional ingredient added to coffee and their impact on reducing risk of type two diabetes mellitus.

Keywords: Diabetes mellitus, Pre-diabetes, Coffee consumption, Cohort study, Chromogenic acid

Introduction

Long ago, Coffee was condemned as being bad for human health. Yet, there is growing evidence that it may protect against certain kinds of cancers, liver disease, depression, and even type two diabetes mellitus. This is good news for those who cannot face the day until they get a cup of coffee. In fact, several studies have been investigated that coffee intake is closely linked to type two diabetes mellitus; the very early studies were published in the late 1960s. Since these initial studies, numerous cohort studies and cross-sectional studies, along with a few systematic reviews and meta-analyses on coffee consumption and the risk of type two diabetes mellitus, have been published. Diabetes mellitus is characterized by abnormal insulin secretion or insulin resistance, resulting in hyperglycaemia. According to the Global Report on Diabetes from the World Health Organization (WHO), 422 million adults worldwide were living with diabetes in 2014, compared with 108 million in 1980 (Mattias et al, 2018). Type two diabetes is a major health problem worldwide that is associated with increased morbidity and mortality.

This research is to appraise two articles their similarity and difference. First the PICO element details of both articles, the population for the first article that done by (Base smith, 2006) is patients who have impaired glucose and the population in the second article which was done by (Ji-Ho lee et al., 2015) is pre diabetic patient from single medical institution with glycosylated haemoglobin level from 5.7% to 6.4%. The intervention was coffee consumption for both articles. The control for the first article that done by (Base smith, 2006) is impaired glucose coffee drinker. However in the second article which done by (Ji-Ho lee et al., 2015) the control is patient with and without diabetes progression based on frequency and method of coffee intake. The outcome of both articles is the amount and the method of coffee intake has effect on type two diabetes mellitus.

Search strategies

The search strategy was done via a series of brainstorming sessions among 5 research team members

The databases chosen were PubMed as it was recommended by most EBM guides. This database is also available for free and easily searchable.

The PICO framework is known to help searchers achieve relevant results of higher precision.

It formats a clinical question in 4 components: population (P), intervention (I), comparison (C) and outcome (O), so we create our PICO question which was (Coffee Consumption reduce the Risk of Type 2 Diabetes Mellitus among Middle-aged people).

The search was conducted under the instruction of Dr.Hassan.Keywords used were dependent on the PICO elements. Articles selected after checking for relevance were combined and summarized. We increased the efficacy of our search strategy by reducing common errors such as spelling errors or using wrong line numbers.

During article screening, many unrelated papers were found during our search which requires a significant amount of time to sift through this information. So,the search was

switched to use two most important elements which are 'coffee' and 'diabetes'.

PubMed has its own indexing language which is MeSH. This allowed standardardisation of key terms. When search terms were entered together with synonyms or alternative terms, more relevant results were obtained. One of the articles we obtained was systematic review which compare many study together, from that we choose 2 articles that we can compare between them.one was perspective study and the other one was cohort study. The mean time taken by the search itself was 3weeks; this excludes the steps on checking for relevance and summarization of evidence.

Summary of both studies

Studies

Article 1

Author/year	Study aim	Study design	Participant	intervention	Outcome measure	Result	Limitation
BESA SMITH 2006	To investigate the association between coffee intake and incident diabetes based on OGGT and examines coffee habit in those with impaired glucose separately from those with normal glucose at baseline.	Perspective cohort study	individual with impaired glucose	Coffee consumption	The amount of coffee that reduce risk of type 2 diabetes	Past and current coffee drinkers had a reduced risk of incident diabetes compared with those who never drink coffee.	Participants were predominantly middle-class and white, results may not be applicable to other ethnicities and socioeconomic strata.

Article 2

Author/year	Study aim	Study design	Participant	intervention	Outcome measure	Result	Limitation
Ji-ho lee,mi-kyeongoh,wonjoonlee 2015	To determine of coffee intake has prophylactic effect on diabetes progression.	cohort	3497 pre diabetic patent from single medical institution with glycated hemoglobin 5.7% to 6.4%.	No intervention	The amount and method of coffee intake has prophylactic effect on diabetes progression and chlorogenic acid is strong antioxidant in coffee might help in regulate blood sugar level and decrease risk of diabetes	Drinking coffee without sugar and creamer at least three times daily has the greatest preventive effect on diabetes onset.	No limitation

Critical Appraisal

The articles purpose and aim is to find the relationship between the coffee consumption and reducing type 2 diabetes mellitus. Both articles studied the suitable population to achieve the intervention. The cohort was recruited and represented of a defined population in both studies. (Smith, 2006) measures the consumption of caffeinated and decaffeinated coffee and its effect on reducing risk of having type 2 diabetes mellitus.(Ji-Ho Lee, 2015) study measures the consumption of black coffee and coffee with cream and sugar in reducing risk of having diabetes. The outcome for (smith, 2006) was accurate measures that the caffeinated coffee reduces the risk type 2 diabetes mellitus. (Ji-Ho Lee, 2015) study was measures the difference between the consumption of black coffee and coffee with cream and the outcome was no significant

difference between them in reducing diabetes mellitus. Both authors identified all important confounding factors such as smoking, age, Sex, physical activity, BMI, alcohol and hypertension, but (Ji-Ho Lee, 2015) study was involve only male population. (smith, 2006) study was achieve strong and high precise result in his study that shows the high effect of caffeinated coffee in reducing risk of having type 2 diabetes mellitus, but (Ji-Ho Lee, 2015) study shows no significant differences between black coffee and coffee with cream in reducing risk of having diabetes. The result obtained by (smith, 2006) study is hard to ignore because it is not by chance and there is significant different between caffeinated and decaffeinated coffee in reducing type 2 diabetes mellitus. Moreover, it could be easily applied to the local population as drinking coffee is considered as daily habit for most people. There are many cohort studies

were done previously to prove the relationship between coffee and type 2 diabetes mellitus and they found that caffeine and chlorogenic acid reduces risk of type 2 diabetes. We can implicate this study in our life in order to reduce risk of type 2 diabetes mellitus.

Discussion

The health benefit of coffee for diabetes differs from case to case. In the first article which was done by (Smith, 2006) we consider coffee habits in those with impaired glucose separately from coffee habits in those with normal glucose at baseline. Associations were adjusted for sex, age, physical activity, BMI, smoking, alcohol, hypertension, and baseline fasting plasma glucose (FPG). Questionnaires were applied to know the Characteristic such as Age, Sex, physical activity, BMI (kg/m²), Smoking, alcohol and Hypertension along with coffee drinking status which are nondrinker, past drinker and current drinker. All 910 participants did not have diabetes at baseline; 593 had normal glucose and 317 had impaired glucose. The baseline fasting plasma glucose was 5.4 ± 0.6 mmol/l. The average age was 65.9 years, 41% of the participants were male, and 85% reported physical activity three or more times per week. Fifty-seven percent were underweight or normal weight and 7% were obese. In addition, 12–13% were current smokers, more than half drank 1–30 g of alcohol on an average day, and 44% were hypertensive. 97 participants reported never drinking coffee, 153 were past coffee drinkers, and 660 were current coffee drinkers. Current coffee drinkers were significantly more likely to report they were current smokers and that they drank an average of 1–2 alcoholic drinks per day. Age, sex, physical activity, BMI, and hypertension did not differ significantly by coffee drinking status. In addition, 379 of nondiabetic participant's drink 1–2 cups per day while 183 drinks 3–4 cups per day and 98 drinks more than 5 cups. Moreover, 133 of impaired glucose participants drink 1–2 cups per day, 59 drinks 3–4 cups per day and 26 drinks more than 5 cups. So, in this study, current or past coffee drinkers who did not have diabetes at baseline had a 60% reduced risk of type 2 diabetes during the next 8 years, when compared with those who never drank coffee. Additionally, those without diabetes who had impaired glucose at baseline were similarly protected against incident diabetes. The quantity of coffee consumed daily did not predict diabetes risk in either that with normal or impaired glucose at baseline.

The second article which was done by (Ji Ho lee,etal) we consider coffee consumption and black coffee of those with impaired glucose separately from normal glucose based on the baseline measurement. Questionnaires were applied to know the Characteristic such as sex, age, medical history, anthropometric data, coffee, and sugar and creamer intake. All 3497 participants did not have diabetes at baseline and 390 had impaired glucose. Among those that consumed coffee twice or more a day, only 7% consumed black coffee, while 27% consumed coffee mixed with creamer and sugar. Of these subjects, only 4.2% consumed black coffee, 24% mixed their coffee with creamer and sugar \geq three times per day, which is equivalent to one cup. So, drinking coffee without sugar and creamer at least three times daily has the greatest preventive effect on diabetes onset.

Conclusion

In Conclusion, the active components of coffee is chlorogenic acid, a strong antioxidant, might help regulate blood sugar levels and decrease the risk of diabetes. coffee drinkers who did not have diabetes at baseline had a reduced risk of type 2 diabetes, when compared with those who never drank coffee. those without diabetes who had impaired glucose at baseline were similarly protected against incident diabetes. There is other study point out that drinking coffee without sugar and creamer at least three times daily has the greatest preventive effect on diabetes onset.

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