

# The association between coffee consumption and type 2 diabetes in women

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## Introduction

In 2014, more than 442 million adults aged over 18 years were living with diabetes. (World Health Organization, 2016). Although type 2 diabetes is a worldwide chronic disease that affects many lives, it is a preventable condition that is associated with people's lifestyles and diets. Coffee is a common beverage that is favoured by many people across the globe. With the popularity of coffee, the health effects of drinking coffee have been studied across several populations. Palatini (2015) explains that coffee has a blend of several bioactive chemicals that may impact glycaemic control. Therefore, it is interesting to investigate the association between coffee consumption and the development of Type 2 diabetes to determine its effects on health.

Some studies show that the consumption of coffee can reduce the risk of Type 2 diabetes. In a population-based cohort study, researchers found that coffee consumption lowered the risk of type 2 diabetes among Dutch men and women (van Dam & Feskens, 2002). Similarly, the finding also showed an inverse association with the risk of type 2 diabetes in both middle-aged Finnish men and women (Tuomilehto et al., 2004), and many studies were done among both sexes in various populations. This literature review will explore the association among women to help fill the gap of sex-specific studies. To build on the existing literature, the purpose of this

literature review is to testify the consumption of coffee will reduce the risk of Type 2 diabetes among women.

### **Literature review**

In Pereira et al. (2006)'s study, 28,812 postmenopausal women aged 55 to 69 years were free of diabetes and cardiovascular disease. They were followed for 11 years by mailed questionnaire to examine the association between total, caffeinated and decaffeinated coffee intake and risk of developing Type 2 diabetes mellitus (Pereira et al., 2006). Pereira et al. illustrated postmenopausal women who consumed 6 or more cups per day had a 22% lower risk of diabetes compared to those who did not consume coffee (Pereira et al., 2006). Particularly, there was an inverse association between decaffeinated coffee and risk of Type 2 diabetes mellitus was stronger than regular coffee which contained caffeine in it (Pereira et al., 2006).

Adding to this, a prospective longitudinal cohort study of more than 1,300 Swedish women without prior diabetes or cardiovascular disease history participated in a similar study (Rosengren et al., 2004). Data were collected by questionnaires, physical examination, and blood sampling to conclude coffee consumption protected Swedish women from the development of diabetes (Rosengren et al., 2004). The risk of developing diabetes was the lowest among Swedish women who consumed 5 to 6 cups per day (Rosengren et al., 2004). In addition, serum cholesterol and triglycerides slightly attenuated the relation between coffee and the risk of diabetes (Rosengren et al., 2004).

In Sartorelli et al.'s (2010) study, researchers recruited 69,532 French women who were followed for 11 years. The results indicated an inverse association between coffee consumption and diabetes in French women (Sartorelli et al., 2010). Sartorelli et al (2010) also suggested that

the time of drinking coffee played a distinct role in glucose metabolism. In this cohort study, the inverse association between the coffee intake and risk of type 2 diabetes was restricted by the measurement time period of lunchtime (Sartorelli et al., 2010). At lunchtime, the inverse association was observed for both regular and decaffeinated coffee (Sartorelli et al., 2010).

## **Discussion**

Generally, the previously mentioned three studies all indicate that the consumption of coffee reduced the risk of type 2 diabetes in women. The study among women in Iowa showed that women who consumed 6 or more cups per day had a 22% lower risk of diabetes, in comparison to those who consumed 0 cups of coffee per day (Pereira et al., 2006). This evidence supports the suggestion that the consumption of coffee is efficacious in reducing the risk of type 2 diabetes among this population. Similarly, Rosengren et al. (2004) presented that the risk of developing diabetes was the lowest in women who consumed 5 to 6 cups per day. Furthermore, in the cohort study following French women, the results illustrated an inverse association between coffee consumption and diabetes (Sartorelli et al., 2010). These studies may indicate that the increase in the consumption of coffee can decrease the risk of type 2 diabetes among women.

Though three studies support the argument that the consumption of coffee can reduce the risk of type 2 diabetes among women, each study is distinct and has its own merits. In the Iowa women's Health Study, Pereira et al. (2006) further found out that decaffeinated coffee had a greater association between coffee consumption and risk of Type 2 diabetes than regular coffee, highlighting that different types of coffee also affected the relationship between diabetes risk and coffee consumption.

Moreover, in the prospective cohort study among Swedish women, researchers found a significant increase in serum cholesterol when coffee consumption was increased (Rosengren et al., 2004). Additionally, Rosengren et al. (2004) also illustrated that unfiltered coffee has been demonstrated to increase serum triglycerides. Specifically, since serum triglycerides are the form of fats from the food that we consume are carried in the blood, the increase of serum triglycerides was one of the greatest risk factors for the development of diabetes (Rosengren et al., 2004). Therefore, the protective effect of consuming coffee on diabetes might be mediated through the increase of serum triglycerides (Rosengren et al., 2004). Also, serum cholesterol and triglycerides led to slightly reduce the association between coffee and diabetes (Rosengren et al., 2004). In other words, this shows that serum cholesterol and triglycerides may be considered as a possible mediate effect on the protective effect of coffee (Rosengren et al., 2004). Therefore, the merit of the Swedish women cohort study was to take into account serum cholesterol and triglycerides before investigating the relationship between the consumption of coffee and the risk of Type 2 diabetes.

Despite these strengths, all these three research studies also have limitations that may affect the generalizability of results. Generally, both the Iowa women's Health Study and cohort study of Swedish women have the same weakness, which involves the labelling for the cup size as there was no clear measurement for the size of 1 cup. In addition, these studies might both have used different sizes of coffee in their respective study. With this possibility, the result for each study will bring in the difference for measuring the effect on type 2 diabetes. Therefore, the unclear labelling of the cup size can be considered as the limitation for both Iowa women's Health Study and Swedish women cohort study.

Furthermore, the cohort study of Swedish women also had the weakness that “women who developed diabetes after their last hospital stay or who were in the small group who had never been hospitalized would have been missed” (Rosengren et al., 2004, p. 94). It indicated that the excluded case for the development of Type 2 diabetes may slightly affect the result that Swedish women who consumed 5 to 6 cups per day can greatly reduce the risk of diabetes.

## **Conclusion**

Coffee is a popular drink with several controversial arguments for people’s health. Some studies explored that coffee had a positive association between coffee and coronary disease (Greenland, 1933). However, coffee also can be a protective factor for type 2 diabetes. This literature review synthesized three populations of women in America, Sweden, and France, rather than focusing on one population to interpret the consumption of coffee lowered risk of type 2 diabetes and tried to generalize to women outside of these populations. Based on these studies, researchers suggested that women who consume coffee 5 to 6 cups per day lowered the risk of Type 2 diabetes, especially decaffeinated coffee. Pereira et al. (2006) recommended that decaffeinated coffee had a greater than regular coffee to reduce the risk of Type 2 diabetes. Furthermore, Rosengren et al. (2004) pointed out that unfiltered coffee increased serum triglycerides and led to a higher risk for the development of diabetes. In the French women cohort study, the time for consuming coffee played an important role to reduce the risk of Type 2 diabetes. Sartorelli et al. (2010) recommended that lunchtime would be the best time that had a great effect to reduce the risk of Type 2 diabetes. To understand coffee consumption can reduce the risk of Type 2 diabetes is not enough. It is also important to understand other factors in relation to coffee consumption, including the amount of caffeine, to determine its effect on type 2 diabetes.

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