



ASSOCIATION BETWEEN DEPRESSION AND LOWER LEVEL OF SEROTONIN AND THEOBROMINE - A REVIEW STUDY

Medical Biochemistry

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ABSTRACT

Theobromine and depression risk are not well correlated, and diagnosing depression is a challenging task. Furthermore, theobromine content is difficult to determine since it fluctuates based on dietary intake or the quantity of other food items it contains. Assuming a correlation, we hypothesize that the outcome may be the reverse, i.e., that the use of theobromine-containing items helps those who are depressed. It would be interesting to try to match the data on theobromine consumption with the type of therapy utilized in depressed persons, as certain antidepressant medicines modify the demand for food goods.

KEYWORDS

Depression, Theobromine, food stuffs, etc.

INTRODUCTION

It is challenging to conduct population-based research, particularly when it comes to eating habits. In fact, no two people follow the same diet, making it exceedingly challenging to plan a study and gather the data needed to draw trustworthy findings. "Increased theobromine intake is associated with increased risk for depression," according to newly published research (Li et al., 2022). We were surprised because we have published articles of evidence that methylxanthines, including caffeine, theophylline, and theobromine, provide health benefits in some pathologies, neurodegenerative diseases among them, not only as potential disease-preventing agents but also as compounds that help in patients' daily lives (Onätibia-Astibia et al., 2016; Onätibia-Astibia et al., 2017). The authors are cautious that more research is needed to confirm the finding.

Furthermore, we believe that neither the evidence provided nor the earlier literature adequately supports the conclusion. However, certain information on population heterogeneity and the variety of eating habits—which can differ greatly from person to person—are concerning. For instance, the ratio of depressed to non-depressed people varies depending on a number of factors, including education and wealth. Furthermore, it appears that the primary research parameter—the theobromine consumption in grams per day—was evaluated. One questions the validity of theobromine intake measure, even with a more homogeneous sample and equal ages for depressed and non-depressed individuals.

Since diagnosing depression accurately is difficult, we believe it is safe to infer that there is no reliable technique to gauge "depression" among the general population. The approach employed in the Study (Gonzales-Yépez et al., 2023)—that is, dividing the score that results into those with more and those with less depressed symptoms—raises doubts as to whether it can be regarded as a trustworthy parameter in correlation analysis. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (American Psychiatric Association, 2023) states that in order to diagnose depression, a patient must have either

- A lack of interest
- A poor mood for 15 days in a row. However, as far as we are aware, no depression score has been agreed upon.

In fact, we are curious as to how an appropriate analysis can be carried out in research where "a score of 5 or above on the Patient Health Questionnaire was defined as the presence of depression" (Visioli et al., 2009). One wonders what the score may be for those who are not depressed, even if depression were a single thing and those who are depressed were assigned a score of 5. However, the purpose of my discussion is to attempt to draw conclusions from the data acquired

rather than to debate the approach.

MATERIAL AND METHODS

The material collected from different articles like- PubMed, Medlar, Scopus, Web of Science published article, different textbooks etc. from our college library.

Regulation Of Theobromine In Depression

In actuality, there isn't a reliable method for evaluating depression or for regularly measuring theobromine consumption. Therefore, given the information provided by (Tatiana García-Blanco et al., 2017) and additional information found in the literature, is it feasible to draw any supplementary. Here, we offer an alternate interpretation of the study's findings that can be in line with knowledge on the intake of dietary foods that contain the greatest amount of theobromine. The alternative perspective will just take into account the relationship between theobromine consumption and actual depression, rather than the relationship between the two.

Assume that there is a true relationship between depression and theobromine consumption. The crucial question here is whether consuming theobromine causes depressive symptoms, such as poor mood, lower interest in everyday tasks, or less pleasurable acts, or if the opposite is true—that is, if persons who are depressed are more inclined to consume theobromine-containing foods and beverages. It has previously been discussed how chocolate, tea, and/or coffee intake relates to direct vs reverse causation. Dietary food is valued in modern cultures because it may be connected to health, according to a 2009 assessment based on data from the conference "Dietary food, Lifestyle, and Health" (Milano, 2007) (Ross et al., 2000).

Ever since, the question has always been whether dietary foods and, instance, mental illnesses are linked in a positive or negative way. A more recent systematic study from 2017 suggested that eating certain foods and drinking certain liquids, such as tea, coffee, or chocolate, may protect against depression (Eskelinen et al., 2009). With a neurodegenerative condition like non-familial Parkinson's disease (PD), where age is the primary risk factor, one may determine one's likelihood of developing the disease by looking at factors like nutrition and lifestyle. Strong evidence suggests that long-term consumption of caffeine, another methylxanthine, lowers the risk of Parkinson's disease.

In a similar, drinking tea and coffee, as well as other liquids and food items high in methylxanthines, reduces the chance of developing Alzheimer's disease, another age-related illness (Eskelinen & Kivipelto, 2010). Assessing the risk of an illness that can strike at any

age is more challenging. To put it another way, there isn't a clear correlation between methylxanthine consumption and sickness that can be shown between dietary habits and modern diseases. The next alternative is to think about the two possible outcomes:

- (i) Theobromine consumption causes poor mood and lower interest in going about daily activities.
- (ii) Depressed individuals are more prone to consume theobromine-containing foods and beverages.

DISCUSSION

Modern civilizations believe that consuming theobromine makes people happier and/or less anxious. In our nation, we have always been dependent on a variety of food items that are the richest in theobromine in their most traditional form. Relevant data on the beneficial benefits of eating certain meals on mood and the varying impacts depending on whether food is consumed "mindfully versus non-mindfully" have been presented by relatively recent research (Sindi et al., 2018). A finding from the study raises questions regarding the attraction of theobromine and the items that contain it: "This effect was partially mediated by self-reported food liking." Foods strong in theobromine seem to elevate mood when consumed, especially when consumed in moderation (Meier et al., 2017).

Mode Of Action

At the mechanistic level, methylxanthines primarily function by inhibiting the four-cell surface G protein-coupled adenosine receptors, which are highly expressed in the brain. It is well known that theobromine and theophylline have considerably distinct effects from one another. The efficacy of methylxanthines varies depending on the specific adenosine receptor they bind to. They are nonselective antagonists of various receptors. Theobromine may target various adenosine receptors, but the most plausible explanation is that it affects them in a different way, either qualitatively or quantitatively (Martínez-Pinilla et al., 2015).

There's an even more complicated option involving the theobromine-containing food desire that arises when patients take certain therapeutic medications. In particular, we believe that specific therapy information for depression sufferers would be highly valuable in identifying the varying impacts of theobromine consumption based on the medicine used.

Level Of Serotonin In Depression

Not to mention, eating a diet heavy in sugar and fat might have a negative impact on a person's mental health if they consume it frequently. Those who are prone to depression or experience bouts of anxiety have been found to have cravings for sweet or sugary meals, which appears to be connected to elevated serotonin levels in the brain. This would also be considered a case of reverse causation. It's interesting to note that tryptophan, a direct precursor of serotonin, is created during the metabolism of certain dietary components (Dala-Paula et al., 2021). Polyphenols are additional bioactive components of dietary foods that may have an indirect or direct antioxidant impact in the setting of neuropsychiatric disorders. In this regard, a 2019 review examines the polyphenolic content of coffee, tea, and cocoa in comparison to other dietary foods, both qualitatively and quantitatively (Bhagat et al., 2019), while a more recent review examines the data pointing to the potential role of polyphenols in depression (Kabra et al., 2022).

Conclusion

In this conclusion, there are still a lot of unanswered questions regarding the relationship between theobromine and depression. However, further clinical studies and more research that, despite their technical difficulties, help separate the effects of theobromine from other dietary ingredients will undoubtedly provide the answers. It would also be crucial to determine the precise relationship between the consumption of foods high in theobromine and depression, as well as how certain foods interact with medications used to treat depression in patients.

Conflict Of Interest -NIL

Source Of Support –NONE

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