WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 10, Issue 10, 1404-1409. Research Article ISSN 2277– 7105

CAFFEINE CONSUMPTION AND THE PREVALENCE OF CHRONIC DISEASE

***Andrew P. Smith PhD.**

Professor, Centre for Occupational and Health Psychology, School of Psychology, Cardiff University, 63 Park Place, Cardiff CF10 3AS, UK.

Article Received on
23 June 2021,

Revised on 13 July 2021,
Accepted on 02 Aug. 2021

DOI: 10.20959/wjpr202110-21318

***Corresponding Author**
Andrew P. Smith PhD.
Professor, Centre for Occupational and Health Psychology, School of Psychology, Cardiff University, 63 Park Place, Cardiff CF10 3AS, UK.

ABSTRACT

Background: There have been several previous reviews of associations between caffeine consumption and health. These show that there is a need to examine this issue in representative samples and consider chronic disease, recurring health problems and acute illness. This paper presents information about caffeine consumption and the prevalence of chronic disease. **Methods:** This paper reports the results of secondary analysis of epidemiological data from a representative sample of 6306 UK adults (58.6% working; 45.6 % male; 65% married or cohabiting, 18.5% single, and 15.2% divorced or widowed). Analyses examined associations between caffeine consumption and reporting of lifetime occurrence of chronic diseases, controlling for potential confounders. **Results**: Initial cross-tabulations revealed that caffeine consumption was associated with reduced risk of angina, diabetes, stroke, heart attack, high blood pressure, depression and bronchitis. When demographic and lifestyle covariates were included in the analyses, only the associations with depression and bronchitis remained significant. **Conclusion:** The present results show no significant negative health effects associated with caffeine consumption. Indeed, before adjusting for covariates, many of the associations between caffeine and health were positive. Possible reasons for this are discussed. When demographic and lifestyle covariates were included in the models, the only significant effects were that caffeine was associated with a lower prevalence of depression and bronchitis. Plausible biological mechanisms exist for these two effects.

KEYWORDS: Caffeine; chronic disease; depression; bronchitis.

INTRODUCTION

Adverse effects of caffeine on health were reported in a number of early studies. Many of these effects could be attributed to correlated attributes such as smoking or the method of preparing caffeinated beverages (e.g. boiling and recycling coffee). One of the most cited reviews of caffeine safety is that issued by Health Canada.[1] The authors of this paper concluded that an intake dose of up to 400 mg caffeine/day was not associated with adverse effects in healthy adults. Similar conclusions have been reached in reviews from other countries.[2] Other reviews have considered specific beverages such as coffee[3] and concluded that it is generally safe within usual levels of intake, with benefits of consumption being more frequently observed than harm. Other reviews have examined specific outcomes such as blood pressure[4] and concluded that the heterogeneity of the studies makes it difficult to reach a consensus.

Wikoff et al.[5] reviewed the effects of caffeine on five types of outcomes (acute toxicity, cardiovascular toxicity, bone and calcium effects, behaviour, and development and reproduction). Conclusions were based on the body of evidence for each outcome using a weight of evidence approach. The evidence from the review showed that consumption of up to 400 mg caffeine/day in healthy adults was not associated with overt cardiovascular problems, behavioural effects, reproductive/developmental effects, acute effects or bone status.

The aim of the present study was to examine more closely the association between caffeine consumption and the lifetime prevalence of chronic disease. The range of chronic diseases was wider than those covered in earlier reviews and included cardiovascular disease, cancer, diabetes, high cholesterol, respiratory problems and mental health issues. The sample was representative of the UK population[6] and included white-collar workers, blue-collar workers and those not working. Possible demographic and lifestyle confounders were also recorded and adjusted for in the analyses.

METHODS

The study was carried out with the ethical approval of the local, regional health board ethical committee. The sample was selected from the electoral register and sent questionnaires that included the relevant health information, demographics, lifestyle and caffeine consumption questions. The chronic health questions were taken from the Whitehall study.[7] Caffeine consumption was calculated from the amount of different types of coffee and tea.

Participants

Data from 6306 UK adults (mean age 48.5 years, s.d. 17.6; 58.6% working; 45.6 % male; 65% married or cohabiting, 18.5% single, and 15.2% divorced or widowed; 25.1% smokers; 51.7% secondary school education, 21.9% degree or national diploma; and 15.5% higher degree or similar professional qualification) are reported here.

Caffeine Consumption

The mean daily caffeine consumption was 271 mg/day, with a range of 0-2040 mg. Analyses compared non-consumers, those who consumed less than the median amount, and those who consumed an amount above the median.

Chronic Health Problems

The list of chronic health conditions is shown in Table 1.

RESULTS

Cross-tabulations between caffeine consumption and health problems are shown in Table 1.

Table 1: Caffeine consumption and health problems.

	No caffeine (N=469)	< 240 mg/day (N=2584)	>240 mg/day (N=3253)	p value
Angina	7.0%	6.5%	4.5%	0.002
High Cholesterol	8.2%	8.8%	8.8%	>0.05
Diabetes	6.0%	4.3%	3.2%	0.003
Stroke	5.2%	4.6%	3.1%	0.003
High blood pressure	23.0%	23.5%	20.5%	0.017
Depression/mental health problems	29.3%	21.7%	22.5%	0.001
Asthma	14.5%	13.3%	12.1%	> 0.05
Bronchitis	17.9%	13.9%	15.9%	0.025
Breast Cancer	0.4%	1.2%	1.2%	> 0.05
Other cancer	4.9%	3.4%	3.8%	>0.05

The results showed no evidence of caffeine consumers having more health problems than non-consumers. Two profiles of effect were observed. First, some health conditions showed fewer problems with greater caffeine consumption (angina, diabetes, stroke, and high blood pressure). Other health problems, depression/mental health problems and bronchitis, were less frequent in those with lower caffeine consumption.

Logistic regressions were carried out with the health conditions as the outcomes, demographic and lifestyle variables as covariates, and caffeine consumption as the predictor

variable. The only analyses where the effects of caffeine remained significant were depression/mental health (OR = 0.85 CI 0.74, 0.98 p =0.021) and bronchitis (OR = 0.82 CI 0.70, 0.96 p = 0.015). These effects were observed when separate analyses were carried out for white-collar workers, manual workers and non-workers. Other analyses split caffeine consumption at the 400mg cut-off point, as this has been suggested as the threshold for changes in effects. Identical results were obtained using this procedure. A final analysis compared those with the highest 10% of caffeine consumption (over 600 mg/day) with the others and found no evidence of adverse health effects.

DISCUSSION

The first conclusion from the present results is that there was no evidence of adverse effects of caffeine consumption on health. Indeed, the initial cross-tabulations showed that it was the non-consumers who reported the greater health problems. These effects were largely no longer significant when potential confounders were statistically controlled. Another possible reason for the negative effects of not consuming caffeine is that those with health problems are often told by their doctors to restrict caffeine consumption. Such effects of the disease influencing consumption are often reported in the alcohol literature, with those who do not consume any alcohol reporting more health problems than those who drink a moderate amount.

The two robust effects of caffeine consumption were reduced depression and other mental health problems and less reporting of bronchitis. A meta-analysis of caffeine and depression[9] found that the risk of depression decreased when caffeine intake was between 68 and 509 mg/day. Plausible mechanisms underlying the association between caffeine and reduced depression have been identified. Caffeine, as a nonspecific A1/A2A receptor antagonist, generates psychostimulant effects by modulating neurotransmission[10, 11], and metabolites of caffeine act on adenosine transmitters in the brain.[11] Caffeine has also been shown to improve airways function[12], which provides a plausible mechanism for the reduced level of bronchitis in caffeine consumers.

CONCLUSION

There have been a large number of reviews of the effects of caffeine on health, but there is still a need to examine a range of disease outcomes in representative samples. A secondary analysis of a representative UK adult sample examined associations between caffeine consumption and chronic disease. There was no evidence of adverse health effects of caffeine

and some evidence of beneficial effects. Many of the beneficial effects of caffeine could be accounted for by confounding factors. Lower levels of depression and other mental health problems were reported by caffeine consumers. Bronchitis was also lower in those who consumed caffeine. Plausible mechanisms for these effects of caffeine have been identified.

REFERENCES

1. Nawrot P, Jordan S, Eastwood J, Rotstein J, Hugenholtz A, Feeley M. Effects of caffeine on human health. Food Addit Contam, 2003 Jan; 20(1): 1-30. doi: 10.1080/0265203021000007840. PMID: 12519715.
2. Smith PF, Smith AP, Miners J, McNeil J, Proudfoot, A. Report from the expert working group on the safety aspects of dietary caffeine. ANZFA 2000.
3. Poole R, Kennedy OJ, Roderick P, Fallowfield JA, Hayes PC, Parkes J. Coffee consumption and health: umbrella review of meta-analyses of multiple health outcomes. BMJ, 2017 Nov 22; 359: j5024. doi: 10.1136/bmj.j5024.
4. De Giuseppe R, Di Napoli I, Granata F, Mottolese A, Cena H. Caffeine and blood pressure: A critical review perspective. Nutrition Research Reviews, 2019; 32(2): 169-175. doi:10.1017/S0954422419000015
5. Wikoff D, Welsh BT, Henderson RG, Brorby G, Britt J, Myers E, Goldberger J, Lieberman H, O'Brien C, Peck J, Tenenbein M, Weaver C, Harvey S, Urban J, Doepker C. Systematic review of the potential adverse effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. Food and chemical toxicology, 2017; 109 Pt 1: 585-648.
6. Smith A, Johal SS, Wadsworth E, Davey Smith G, Peters T. The Scale of Occupational Stress: the Bristol Stress and Health at Work Study. HSE Books. Report 265/2000.
7. Marmot MG, Rose G, Shipley M, Hamilton PJ. Employment grade and coronary heart disease in British civil servants. Journal of Epidemiology and Community Health, 1978; 32(4): 244–249. doi:10.1136/jech.32.4.244
8. Smith AP. Caffeine at work. Human Psychopharmacology Clinical and Experimental, 2005; 20: 441-445.
9. Wang L, Shen X, Wu Y, Zhang, D. Coffee and caffeine consumption and depression: A meta-analysis of observational studies. Australian & New Zealand Journal of Psychiatry, 2016; 50: 228 - 242.
10. Ferré S. An update on the mechanisms of the psychostimulant effects of caffeine. J Neurochem, 2008 May; 105(4): 1067-79. doi: 10.1111/j.1471-4159.2007.05196.x.

11. Morelli M, Carta AR, Kachroo A, Schwarzschild MA.. Pathophysiological roles for purines: Adenosine, caffeine and urate. Editor(s): Anders Björklund, M. Angela Cenci, Progress in Brain Research, Elsevier, Chapter 10, 2010; 183: 183-208.
12. Welsh EJ, Bara A, Barley E, Cates CJ. Caffeine for asthma. Cochrane Database Syst Rev, 2010 Jan 20; 2010(1): CD001112. doi: 10.1002/14651858.CD001112.pub2.