

Coffee effects on human health

Abbreviations: NTD, neural tube defects; CVM, cardiovascular malformations; SA, spontaneous abortion; SGA, small gestational age; SIDS, sudden infant death syndrome; GDM, gestational diabetes mellitus

Introduction

The last two decades have witnessed an increasing number of publications on Coffee and its effects on human health. I myself was honored to be asked to write a chapter of a book dedicated to a new academic area in the biomedical sciences, entitled Translational Toxicology (Molecular and Integrative Toxicology series, Springer Publisher). This field of science reflects the increasing interest in the research of possible beneficial/toxic effects of drugs/food during child development from fetus to adolescence. It was while gathering the material to write this chapter that I realized that so much that is criticized by researchers/scientists, is actually a series of myths. I just read a paper, for example, on the antibacterial properties of coffee against microorganisms involved in dental caries and periodontal disease.¹ This is one of the many examples of wrong ideas about coffee, that it could cause caries. Another myth that prevents children and teenagers of drinking coffee is that coffee can cause health problems when administered to children. After going through hundreds of peer review articles, my conclusion in the chapter that I wrote is that coffee, as almost everything that is a good nutrient, when used with moderation, is good for human health. Children in countries where coffee is an important product in their internal/external market, such as Brazil and Colombia, have coffee given to children as part of their breakfast at school, as a mix of coffee and milk.² There are surveys showing that children that drink coffee in the morning and also during the break in the afternoon, show a better performance at school and are more alert and prepared to absorb the material taught in class.³⁻⁵

It is interesting to observe how far can go the idea of blaming regular coffee intake to almost everything bad for health and that does not have a good reason to explain it yet. I divided the chapter I wrote in 3 parts: Coffee effects from fetus to early childhood; Coffee effects during infancy and Coffee effects during adolescence. The first part covered the following topics:

I. Coffee and congenital malformations

- a. Orofacial Clefts
- b. Neural Tube Defects (NTD)
- c. Cardiovascular Malformations (CVM)
- d. Down Syndrome Pregnancy

II. Coffee and pregnancy loss and weight reduction

- a. Spontaneous abortion (SA)
- b. Small Gestational Age (SGA) and Pre-term Birth
- c. Sudden infant death syndrome (SIDS)

III. Coffee and gestational complications

- a. Gestational Diabetes Mellitus (GDM)
- b. Other studies

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Roseane Santos

Department of Pharmaceutical Sciences, South University
School of Pharmacy, USA

Correspondence: Roseane Santos, Associate Professor,
Department of Pharmaceutical Sciences, South University
School of Pharmacy, 709 Mall Boulevard, Office 341 Savannah,
GA. 31406, USA, Tel 912-201-8131,
Email rsantos@southuniversity.edu

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IV. Coffee and risk of tumors

- a. Childhood Acute Leukemia

V. Other

- a. Maternal Stress
- b. Breastfeeding

I listed those topics to show how many different aspects that were already investigated in the children born from mothers that drink coffee regularly; trying to connect coffee drinking habit and translate it into toxic effects. I found some controversies between authors as to blame coffee or not. I myself as a researcher dedicated to coffee and its effects in human health; and as a pharmacist with deep knowledge of the complex chemical composition of our daily 'cup of joe'; understand where those controversies come from. Even though, coffee is a universal beverage, consumed by millions of people, number 2 after oil, as natural trade product, it don't have a nutrition fact label in its package. As result, coffee is compared in those studies with no distinction from what kind of beans were used (normally a mix of *Coffea arabica* and *Coffea robusta*), where the beans come from and how the coffee beans used to prepare the coffee brew were roasted (very dark, dark, medium, light). Those properties alone can increase or decrease the amount of their chemical composition vary greatly and consequently produce different effects. For example, *c. arabica* and *c. robusta*, differ in their amounts of caffeine and chlorogenic acids (antioxidants), the first has 1-1.5% and 5-7% and the second one has 3-4.5% and 7-9%, respectively (ref.). Further on, to make things even more complex, the degree of roasting and the brewing method also interfere in the final composition of the coffee brewed. Finally, it was recently created The Coffee and Caffeine Genetics Consortium, looking for genome-wide identification of possible loci associated with coffee consumption,⁶ which means that the effect of coffee in the human body is also reflective of individual genome that can ultimately reverse, increase, decrease or abolish possible coffee effects on human health.

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Conflict of interest

The author declares no conflict of interest.

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