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Does consumption of caffeine correlate with spontaneous abortion?

In this age of technology, complex chemical engineering changes the lives of every industrialized life. Abundant preservatives fill our food for longer shelf life, dangerous cleaners and disinfectants fill our homes, and intense chemical therapies, used by modern doctors, are used to combat cancers at the cost of patients' own healthy cells. It seems that contemporary chemical use is often a health give and take. Caffeine, this incredibly common compound, is the most widely used pharmacological substance in the world. Over 80 percent of the world's population consumes caffeine (James, 1997). What effect does caffeine have on fetal development and birth?

Research overall has shown varying results with respect to the negative effect of caffeine during human pregnancy. Some debates stem from methods used in reporting caffeine consumption, as we will see later. Other indiscretions come from the fact that many women who spontaneously abort or give birth to children with low birth weights or cranial circumference not only consume caffeine, but many smoke tobacco, drink alcohol, may be older and have little or no nausea during the first trimester (Mills et al., 1996). Many of the findings can also be bias because the group selection processes are not accurate representations of the society as a whole (Infante-Rivard et al, 1993)

Caffeine is found in many forms; including coffee, tea, cola drinks, cocoa, and a list of medications, including Excedrin. It's effect varies, but Claire Infante-Rivard explains in a study printed in the Journal of the American Medical Association Studies, that caffeine is absorbed into all tissues of the body very rapidly. It does so by "crossing the placenta," causing "chromosomal aberrations in Mammalian cells." Animal studies

show “embryo-fetal morbidity and mortality increase with increasing doses of caffeine”. She states that these effects could very well carry over into a human fetus. These findings of animal birth defects caused from high doses of caffeine seem to be unanimously accepted throughout the medical field. During the 1980’s the Food and Drug Administration issued a caution to pregnant women to limit their caffeine intake because of evidence in lab animal testing that had been undertaken (Infante-Rivard et al, 1993).

In our first study, seven hundred fifty seven women were studied to find the connection between caffeine and spontaneous abortion. Seventy-five spontaneous abortions were reported from this population-based study. In the study performed by Wanqing Wen, an additional factor of nausea was incorporated with the caffeine consumption of the testing group. Seventy-one women reported no sickness or nausea during the first trimester of pregnancy, and of these, 29.6% miscarried. This percentage was compared to 7.2% of the five hundred fourteen women who were nauseous. The women who consumed caffeine during the first trimester and did not experience nausea had no percentage increase of miscarriage, but some increase of spontaneous abortion was seen among those women experiencing nausea during the same time. When the additional variable of caffeine consumption was incorporated, there was a correlation between the use of caffeine and the number of miscarriages. The author asserts that, “these results suggest that maternal caffeine consumption during pregnancy may influence fetal viability in women with nausea” (Wen, 2001).

In another study published by the Journal of the American Medical Association, it is also concluded that caffeine intake during pregnancy can affect fetal death rates. One

thousand three hundred twenty two women that were studied, all of whom were in the same point of gestation. Of these, three hundred thirty one miscarried due to the elevated consumption of caffeine. The women were divided according to caffeine intake, measured in milligrams. Four control groups were formed and were divided as follows; less than 48 milligrams ingested per day, 48-162 milligrams ingested per day, 163- to 321 milligrams ingested per day, and greater than 321 milligrams ingested per day. As the milligrams of caffeine consumed per day increased by hundreds, a linear trend was seen on the logistical scales increasing the risk of spontaneous abortion. It is also emphasized that the half-life of caffeine metabolism is increased during pregnancy (Infante-Rivard et al, 1993).

The studies previously cited contrast in the methods used to decipher caffeine intake. These researchers measured levels of caffeine ingested by the number of caffeinated beverages. Another study utilizes measurement of caffeine's primary metabolite, paraxanthine, to see if it had any association to miscarriages. In twelve different sites in the United States, forty two thousand women, during the years 1959 and 1966, were tracked during their pregnancies, ending in fifty five thousand births. Five hundred ninety one of these women reported miscarriages with in the first four months of pregnancy. Each woman who miscarried their fetus had at least four control subjects to compare to, from the same site, whose levels of paraxanthine were measured the same day. Three groups were created based on paraxanthine levels: less than 50 ng/mL, 50 to 1845 ng/mL, and greater than 1845 ng/mL. Those five hundred ninety one women who miscarried had a higher mean serum concentration of paraxanthine than that of the control group. When the first group, those with 50 ng/mL or paraxanthine, was compared to those

in the last group, those with paraxanthine levels greater than 1845 ng/mL, odds ratios showed that the higher levels were at greater risk. These greater levels of paraxanthine could be compared to an ingestion of either eleven cups of coffee in a smoker or 6 cups of coffee in a nonsmoker. The five hundred ninety one women who miscarried were reportedly more likely to smoke, were less likely to have vomited and used medications with caffeine. Based on the results of this study, physicians can more adamantly discourage high levels of caffeine intake during pregnancy (Hendrich and Leclair, 2000).

Caffeine is a part of all our lives, and such needs to be treated with caution. Animal testing and human studies point out that caffeine use can affect every person as well as unborn children. All chemicals we use in our daily lives need to be used prudently. Medications and common stimulants that contain caffeine, need to be used cautiously during pregnancy, as has been pointed out through these studies. It is the common practice of physicians to discourage use of caffeine during pregnancy either as medication or out of dependency.

## Works Cited

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