

CERHR: Caffeine (8/18/03)

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Overview

Numerous studies have examined the effects of caffeine intake on fertility and pregnancy. Most studies found that moderate caffeine intake does not affect fertility or increase the chance of having a miscarriage or a baby with birth defects; some studies did find a relationship between caffeine intake and fertility or miscarriages. However, most of those studies were judged to be inadequate because they did not consider other lifestyle factors that could contribute to infertility or miscarriages. The Organization of Teratology Information Services (OTIS) stated that there is no evidence that caffeine causes birth defects in humans. Groups such as OTIS and Motherisk agree that low caffeine intake (<150 mg/day or 1-½ cups of coffee) will not likely increase a woman's chance of having a miscarriage or a low birth weight baby. Motherisk recommends that caffeine intake by pregnant women not exceed 150 mg/day whereas OTIS stated that moderate caffeine intake of 300 mg/day (equivalent to about 3 cups of coffee) does not seem to reduce fertility in women or increase the chances of having a child with birth defects or other problems. Caffeine can enter breastmilk, and high amounts can cause the baby to become wakeful and agitated. The American Academy of Pediatrics recommends that nursing women limit caffeine intake, but states that no harm is likely to occur in a nursing child whose mother drinks one cup of coffee a day. OTIS recommends that pregnant and nursing women drink plenty of water, milk, and juice and not substitute those fluids with caffeinated beverages.

Caffeine and Fertility

Numerous studies have been conducted to determine the effects of caffeine intake on fertility in women. The International Food Information Council (IFIC) has described and made conclusions about the following studies ([IFIC August 2002](#)).

One small study in 1988 suggested that caffeine, equivalent to the amount consumed in 1-to 2-cups of coffee daily, might decrease female fertility. However, the researchers acknowledged that delayed conception could be due to other factors they did not consider, such as exercise, stress or other dietary habits. Since then, larger, well-designed studies have failed to support these findings.

In 1990, researchers at the Centers for Disease Control and Prevention and Harvard University examined the association between the length of time to conceive and consumption of caffeinated beverages. The study involved more than 2,800 women who had recently given birth and 1,800 women with the medical diagnosis of primary infertility. Each group was interviewed concerning caffeine consumption, medical history and lifestyle habits. The researchers found that caffeine consumption had little or no effect on the reported time to conceive in those women who had given birth. Caffeine consumption also was not a risk factor for infertility.

Supporting those findings, a 1991 study of 11,000 Danish women examined the relationship among number of months to conceive, cigarette smoking and coffee and tea consumption. Although smokers who consumed eight or more cups of coffee per day

experienced delayed conception, nonsmokers did not, regardless of caffeine consumption.

OTIS ([OTIS 2001](#)) reviewed the studies examining caffeine effects on fertility and concluded that, "Low to moderate caffeine consumption (<300mg/day) does not seem to reduce a woman's chance of becoming pregnant."

Caffeine and Pregnancy

The March of Dimes ([MOD 2002](#)) notes that during pregnancy, caffeine easily passes from the mother to her unborn child through the placenta. Because the systems for breaking down and eliminating chemicals are not fully developed in the unborn child, blood levels of caffeine may remain elevated for longer periods in the unborn child compared to the mother. OTIS ([OTIS 2001](#)) notes that, "...higher amounts of caffeine could affect babies in the same way as it does adults. Some reports have stated that children born to mothers who consumed >500mg/day were more likely to have faster heart rates, tremors, increased breathing rate, and spend more time awake in the days following birth."

The effects of caffeine intake on miscarriages, birth defects, and low birth weight have been studied, and different results were obtained in the various studies.

The International Food Information Council (IFIC) has described and made conclusions about the following studies ([IFIC August 2002](#)).

Recently, researchers from McGill University in Montreal published a study showing a relationship between caffeine intake and miscarriage. While caffeine intake before and during pregnancy appeared to be associated with increased fetal loss, the authors failed to account for a number of factors that could result in a false association, including effects of morning sickness or nausea*, the number of cigarettes smoked and amount of alcohol consumed.

Just prior to the McGill study, a research team from the U.S.

National Institute of Child Health and Human Development conducted a study of 431 women. The researchers monitored the women and the amount of caffeine they consumed from conception to birth. After accounting for nausea, smoking, alcohol use and maternal age, the researchers found no relationship between caffeine consumption of up to 300 mg per day and adverse pregnancy outcomes, including miscarriage.

Additionally, in 1992, researchers analyzed the effects of cigarettes, alcohol and coffee consumption on pregnancy outcome in more than 40,000 Canadian women. Although alcohol consumption and smoking tended to have adverse effects on pregnancy outcome, moderate caffeine consumption was not associated with low birth weight or miscarriages.

Studies published during the 1980s also support the conclusion that moderate caffeine consumption during pregnancy does not cause early birth or low birth-weight babies. A review of more than 20 studies conducted since 1980 found no evidence that caffeine consumption at moderate levels has any discernible adverse effect on pregnancy outcome.

A seven-year study of 1,500 women examined caffeine use during pregnancy and subsequent child development. Caffeine consumption, equivalent to about 1 1/2 - 2 cups of coffee per day had no effect on birth weight, birth length or head circumference. Follow-up examinations at ages eight months, four and seven years also revealed no effects of caffeine consumption on a child's motor development or intelligence.

In the early 1980s, the U.S. Food and Drug Administration (FDA) conducted a study where rats were force-fed very high doses of

caffeine through a stomach tube. While the results prompted an advisory to pregnant women to avoid caffeine, the study was criticized as not being representative of the way humans consume caffeine.

In 1986, FDA researchers carried out another study, in which rats consumed high doses of caffeine in their drinking water. At the conclusion of the second study, the FDA found no adverse effects in the offspring, contradicting the agency's earlier findings.

Major studies over the last decade have shown no association between birth defects and caffeine consumption. Even offspring of the heaviest coffee drinkers were not found to be at higher risk of birth defects.

Groups such as OTIS, March of Dimes, and Motherisk reviewed studies examining caffeine intake during pregnancy and are in agreement that high caffeine intake (>300 mg/day, equivalent to more than 3 cups of coffee/day) should be avoided during pregnancy. There is also general agreement that low caffeine intake (<150 mg/day, about 1-½ cups of coffee) during pregnancy is not likely to harm the unborn child. However, there is some disagreement regarding moderate caffeine intake.

Following a statistical analysis of studies examining caffeine intake in pregnant woman, Motherisk ([Motherisk 2000](#)) stated, "Our results suggest a small but statistically significant increase in risk of spontaneous abortion and low birth weight babies in pregnant women consuming more than 150 mg of caffeine per day. Pregnant women should be encouraged to be aware of dietary caffeine intake and to consume less than 150 mg of caffeine a day from all sources throughout pregnancy."

Subsequent to their review of caffeine studies, OTIS ([OTIS 2001](#)) stated that "Recent reports suggest that low to moderate consumption of caffeine does not

increase the risk for miscarriage. A few studies have shown that there may be an increased risk for miscarriage with high caffeine consumption (>300 mg/day), particularly in combination with smoking or alcohol, or with very high levels of caffeine consumption (>800 mg/day). OTIS ([OTIS 2001](#)) goes on to say that, "In humans, even large amounts of caffeine have not been shown to cause an increased chance for birth defects." OTIS concluded that ([OTIS 2001](#)), "Most experts agree that moderation and common sense are the keys for consuming caffeinated items during pregnancy. "Moderate" caffeine consumption is approximately 300mg/day, which is similar to 3 cups of coffee. It is also important for pregnant women to drink sufficient quantities of water, milk and juice. These fluids should not be replaced with caffeinated beverages."

*Note: The IFIC ([IFIC August 2002](#)) stated that, "For some women, nausea - "morning sickness" - is a common experience during pregnancy. Though this phenomenon is unpleasant, researchers believe it's a positive sign of a healthy pregnancy. During a successful pregnancy, hormone levels are high, thus increasing the likelihood of becoming nauseated. If you're nauseated, you're not likely to consume all your favorite foods and beverages, including caffeine-containing beverages, so you may resort to a diet of saltines and sips of water. Because nausea affects what is consumed during pregnancy, researchers usually account for this when studying the effects of certain foods and food ingredients on pregnancy outcome. In the case of nausea's effects on caffeine consumption, it appears that moderate caffeine consumption is an incidental, rather than a causative, for miscarriages."

Caffeine and Breast Feeding

Caffeine can enter the breast milk of nursing mothers ([IFIC August 2002](#)).

According to the American Academy of Pediatrics ([AAP 2002](#)), "Caffeine tends to build up in babies' systems because their bodies cannot get rid of it very easily. A morning cup of coffee is not likely to harm your baby, but too much caffeine can cause problems such as poor sleeping, nervousness, irritability, and poor

feeding. Try using decaffeinated coffee and tea and avoid colas and other carbonated drinks that have added caffeine." OTIS ([OTIS 2001](#)) states that, "women should remain well hydrated with water, juice and milk while breastfeeding."

Caffeine Levels in Foods and Drinks

Levels of caffeine typically found in drinks and foods are listed in the following table obtained from the IFIC website ([IFIC August 2002](#)).

Item	Milligrams of Caffeine	
	Average	Range
Coffee (5-oz. cup)		
Brewed, drip method	115	60-180
Brewed, percolator	80	40-170
Instant	65	30-120
Decaffeinated, brewed	3	2-5
Decaffeinated, instant	2	1-5
Teas (5-oz. cup)		
Brewed, major U.S. brands	40	20-90
Brewed, imported brands	60	25-110
Instant	30	25-50
Iced (12-oz. glass)	70	67-76
Some soft drinks (6 oz.)	18	15-30
Cocoa beverage (5 oz.)	4	2-20
Chocolate milk beverage (8 oz.)	5	2-7
Milk chocolate (1 oz.)	6	1-15
Dark chocolate, semi-sweet (1 oz.)	20	5-35
Baker's chocolate (1 oz.)	26	26
Chocolate-flavored syrup (1 oz.)	4	4

Source: U.S. Food and Drug Administration and National Soft Drink Association

