
SPECIAL ARTICLE

Impacts of Smoking on Women's Health: A Review

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Introduction

Despite the known risks of smoking, 18.5% of American women still smoke.⁽¹⁾ Most of them were in the reproductive ages, between 25 and 44 years old. Even more alarming, 12% of women giving birth reported themselves as smokers during pregnancy.⁽²⁾ Asian women had the lowest smoking prevalence, whereas American Indian/Alaska natives were among the highest. Prevalence of Thai women who smoke was much lower, compared to western countries. However, an upward trend of Thai teenage smokers from 0.3 to 0.6% was observed in the year 2002. Given its magnitude and prevalence, the topic of smoking concerning women's health was included in the scientific program of the 1st International Congress on Women's Health and Unsafe Abortion, which was held in Bangkok, Thailand in January 2010. This invited commentary is to summarize the content presented at this didactic meeting.

Health consequences

Tobacco can do harm to both men and women alike. Women can be exposed to smoke from 3 venues; first-hand smokers, passive smokers, and *in-utero* exposure. These **general impacts** include an increased risk of pulmonary/respiratory disorders such as chronic obstructive pulmonary diseases (COPD). It also increases the chance of having cardiovascular problems, especially ischemic heart disease. Several non-gynecologic malignancies, such as cancers of the lung, esophagus, and pancreas, are

linked to smoking.⁽³⁾ Female smokers are more likely to develop osteoporosis at the younger age. This is partly due to toxic chemicals in tobacco affecting the ovary, resulting in lower level of serum estrogen and early menopause.

Reproductive impacts are of special concerns, especially in young smokers. Women who smoke are more likely to have a difficulty getting pregnant, due to a decreased ovarian response and implantation rate.⁽⁴⁾ Specifically, cadmium and nicotine in cigarette fume can interfere maturation of the oocytes, leading to unsuccessful fertilization.⁽⁵⁾ Impaired ciliary function of the Fallopian tube increase the chance of having an extrauterine pregnancy. A life-time risk of having gynecologic cancers is also elevated. Cervical, vulvar, and breast cancers can significantly alter the reproductive outcomes. There is also a concern that concurrent usage of combined oral contraceptive pills in women who smoke, especially if they are older than 40 years of age, can increase risk of stroke and deep vein thrombosis.⁽⁶⁾

Pregnancy and smoking

The fetus is exposed to more than 3,000 chemicals via cigarette smoke.⁽⁷⁾ Toxic compounds than can directly harm the fetus include nicotine, carbon monoxide, ammonia, nitrogen oxide, hydrogen cyanide, and lead. Nicotine can readily cross the placenta, as evident from its virtually presence in amniotic fluid and in the umbilical cord of the babies.⁽⁸⁾

Therefore, the prevalence of birth defects is increased in pregnant women who smoke.⁽⁹⁾ The risk of having a miscarriage is also elevated. The pregnancy could also be complicated by preterm delivery, premature rupture of the membranes, placenta previa, and still birth.

Babies born from women who keep smoking throughout the pregnancy tend to be small. Fetal growth restriction is the most strongly documented adverse effect of smoking during pregnancy. It is also the most important single determinant of neonatal and infant morbidity and mortality.⁽¹⁰⁾ The impediment of fetal growth from smoking can be ameliorated if cessation of smoking is accomplished before the completion of the first trimester.⁽¹¹⁾

In western countries, 20% of low birth weight infants (birth weight less than 10th percentile) are linked to smoking during pregnancy.⁽¹²⁾ Smoking is also responsible for 8% of spontaneous preterm deliveries and 5% of fetal deaths.⁽¹²⁾

Smoking can slow down fetal growth through many pathways. Nicotine directly constricts blood vessels throughout the body, including uterine vessels. Carbon monoxide in cigarette fume can cross the placenta and tightly bind with fetal hemoglobin, forming carboxyhemoglobin which will not deliver oxygen to the cells. The combination of fetal tissue hypoxia and obstruction of nutritional elements transfer make the fetus unable to achieve its full genetic growth potential. Maternal tachycardia (from elevated circulating catecholamine levels) and elevated blood pressure additionally provide suboptimal environment for the fetus to grow.⁽¹³⁾

Many publications agreed that passive smoking, an exposure through other members in the households or workplaces, can also contribute to fetal growth restriction.⁽¹⁴⁻¹⁶⁾ This issue may be of more concern in Thailand, where active female smokers are not very common.

Consequences in neonatal and childhood period

Babies born from mother who smoke throughout the pregnancy might express withdrawal symptoms,

such as irritation and feeding difficulties. There is a higher incidence of sudden infant death syndrome (SIDS) if the mother keeps smoking during breast feeding period. The babies can passively inhale tobacco smoke from their mother. Therefore, chronic airways and lung conditions are also more prevalent among these babies. Nicotine can easily be excreted in the breast milk, along with other toxic substances. This, in part, could be responsible for several deficits in long-term development of these babies.

Entering childhood period, certain learning disabilities, such as attention deficit disorder, are more commonly found in children born from mother who smoke. Also, severe antisocial behaviors, such as conduct disorder and delinquency, have been linked to *in-utero* exposure to smoke.^(17,18)

Poor cognitive performances, along with delayed physical growth, can be found up to 3 years of age. Nicotine directly damages brain cell quality. It reduces the thickness of cerebral cortex through the shrinkage of neurons and diminished dendritic branching.⁽¹⁹⁾ The deleterious effects of prenatal exposure to smoke could last until early puberty. These children, up until the age of 14, are at a 50% increase in chance of being hospitalized for asthma.⁽²⁰⁾

Fetal growth restriction, a common complication of prenatal smoke exposure, can lead to several degenerative diseases in adult life. These include coronary diseases, stroke, hypertension, and type-2 diabetes.⁽²¹⁾ This “**fetal programming**” suggests that the body’s plasticity during development can be permanently changed by intrauterine and early postnatal incidences.

Conclusion

Smoking negatively affects the well-being of both women and their babies. The consequences of intrauterine and neonatal exposure could be permanent. Ongoing promotion for public awareness remains much needed. This is to provide smoke-free environment for pregnant women. As the conception is increasingly planned in modern families, obstetricians should play an active role in giving an advice to these couples.

Including the personal history of smoking into the list of questions and intervention when needed, will make us better at improving the outcomes of pregnancy.⁽²²⁾

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