Vaping and Pregnancy

Lacy Bayley

Margaret H. Rollins School of Nursing

Nursing N201

Dr. D. Blankenship and T. Lagano

11/03/2025

Vaping and Pregnancy

Pregnancy involves multiple appointments, tests, assessments, and education for a mom, especially first-time moms. A priority area of education is teratogens, or anything that causes harm to a fetus' development. Most people know that smoking causes many harmful effects on their body, especially to a vulnerable fetus in utero. Vaping is often leaned on as an alternative to quit smoking cigarettes yet still poses similar harm to the fetus as cigarettes. Abstaining from vaping and nicotine use is an ideal focus for patient centered care and evidence-based practice given 7% of women still vape during their pregnancy (CDC, 2024). Providing proper screening tools and resources to abstain from nicotine is essential. Vaping is often marketed as the safer option when it comes to nicotine yet still puts a fetus at a substantial risk for impaired development and exposure to chemicals, reinforcing the need for more public health education on the major dangers of vaping and pregnancy.

Vaping, also referred to as an electronic nicotine delivery system (ENDS), is a newer route to inhale nicotine and often thought of as the healthier alternative to smoking cigarettes. Both cigarettes and ENDS contain nicotine, which is very addictive and hard to quit. Nicotine creates a stimulant effect, increasing alertness, decreasing appetite, and improved concentration. Withdrawal from nicotine increases irritability, headaches, agitation, mood swings, and can least months to years (Habersham et al., 2025) ENDS are not regulated by the Food and Drug Administration (FDA) nor has been found effective to help quit nicotine use compared to in person or telephone counseling (CDC, 2024). This new form of nicotine is also quite popular with 9.1 million individuals using e-cigarettes and 2 million middle and high schoolers reported using e-cigarettes in 2021 (Vilcassim et al, 2023). A study through Duke

University found an increase of 4.5% of adults began using ENDS, and between the US and UK 15% more of pregnant women switched to ENDS believing in was safer than traditional cigarettes (Marbrey et al., 2025). Tobacco Cigarettes are known to have around 5,000 chemicals, 60 of them to be carcinogenic, leading to cardiovascular disease, pulmonary disease, lung cancer, and diabetes mellitus (Vilcassim et al., 2023). In comparison, vaping contains aerosols filled with nicotine, flavorings, and other chemicals. Vapors from ENDS still deliver carcinogenic substances inflaming bronchial epithelial cells and pulmonary disease (Ruffin et al., 2024). When comparing the list of ingredients, it is often misinterpreted that ENDS is the “healthier” option with less chemicals. However, the way ENDS produces the vapor still creates adverse health effects. ENDS are used by vaporizing nicotine salts, inhaling nicotine this way creates a more potent level and higher concentration than traditional tobacco cigarettes, creating a higher tolerance (Vilcassim et al., 2023). In addition to the higher potency, vapes can be used at an easier convenience. Smoking normal cigarettes is not allowed indoors in public places, within certain feet of most schools, hospitals, often lingers a smell so is typically done outside. Newer ENDS are not prohibited from most public places, can be done more discreetly, and since most contain flavoring do not leave the traditional strong smell, cigarettes do prevent people to wait to be alone or outside to smoke.

Vaping has been viewed as the healthier alternative, however, it still comes with profound consequences to one's health. There has been ENDS related cases of spontaneous pneumothorax, acute eosinophilic pneumonia, respiratory bronchiolitis-associated interstitial lung disease, hypersensitivity, organizing pneumonia, and acute exogenous lipoid pneumonia, these incidents led to hypoxemic respiratory failure hospitalizations (Oriakhi,

2020). Hypoxemia can lead to organ damage and death, detrimental to any human. The only way to avoid the harm of ENDS is to simply not use them, the research is ongoing about even more long-term effects of the modern way to inhale carcinogenic properties. In relation to the pregnant mom inhaling these uncertain carcinogens, further education on the importance of abstaining from nicotine use during pregnancy.

Nicotine Replacement Therapy (NRT) is a developing line of treatment to help pregnant mothers quit smoking. NRT includes nicotine gum, patches, nasal sprays, inhaling, and tablets. The idea is a quick fix to help curve the cravings that come from trying to quit nicotine and prevent a mother from caving to use a cigarette. The Food and Drug Administration (FDA) still has these forms of nicotine classified at categories C and D (Chun, 2024). Category C meaning adverse effects were found in studies on animals and Category D evidence of human fetal risk. Thus, placing emphasis that nicotine is a teratogen, there are still risks to the fetus despite if nicotine is through a cigarette, a patch, and especially through ENDS.

Nicotine is a teratogen. A teratogen is defined as any substance that can impact fetal development through ingestion or environmental exposure. Nicotine crosses through the placenta easily, which means it can enter fetal circulation just as easily. Toxins in ENDS include heavy metals, carbonyl compounds, and flavorings, all to be termed as either an irritative or carcinogenic, the leading risk from e-cigarettes is nicotine because is can easily pass through the placenta (Zhang et al., 2022). In this scenario, not only does the use of ENDS affect the fetus but the mother. Nicotine use during pregnancy is associated with miscarriage, stillbirth, fetal growth restriction, and sudden infant death syndrome (SIDS). Other risks regarding the mother include placental abruption, placenta previa, and ectopic pregnancy. (Habersham et al., 2025). Placental abruption, previa, and ectopic pregnancy each put

the mother at higher risk for hemorrhage and infection. Ectopic pregnancies if not found in a timely matter can also result in infertility. Other effects on the placenta due to nicotine include vasoconstriction. Duke university investigated the effects of vaping and function of the placenta and found control groups that used vapes throughout their pregnancy and found the nicotine exposed group had a significant lower embryo and placental weight ratio in addition to decreased fetal absorption from the placenta. (Marbrey et al., 2025). The placenta is essentially what keeps the fetus alive, providing nutrients and adequate perfusion. If the fetus cannot absorb enough, it will not be able to grow and thrive, placing the fetus at risk for impaired growth and development. During the postpartum period cessation of ENDS is also important for the breastfeeding mother, nicotine was found in the breast milk three times higher than in the maternal blood plasma with a delayed clearance rate, still leaving the baby vulnerable to the delayed development related to nicotine (Habersham et al., 2025). The safest way to avoid these outcomes is to abstain from ENDS throughout the pregnancy for the mother and fetuses' health.

Fetuses are most vulnerable to teratogens during the first 8 weeks (about 2 months) of development. Teratogens can begin to cause harm during embryo development, the first 10-14 days after conception, and if especially if exposed during 3.5 - 4.5 weeks puts the fetus at risk for neural tube defects (Mauldin, 2025). Use of ENDS had significant effects on fetal lung development, nicotine was found to interact with nicotinic acetylcholine receptors which are found in fetal lung tissue, use of nicotine affected these receptors resulting in decreased lung weight, volume, and an increased airway resistance. (Habersham et al., 2025) The American Journal of Obstetrics and Gynecology performed on human and animals using various forms of ENDS. A common denominator of the use of ENDS resulted in low birth weight, SGA, preterm

births, low APGAR scores, and low Neonatal Behavioral Assessment Scales (NBAS). Neurologically in the human trial infant effects by use of ENDS presented with compromised abnormal reflexes, decreases motor maturity, and decreased ability to regulate and soothe behaviors (Zhang et al., 2022).Compared to the animal study not only did the birth outcomes involve those previously mentioned but also included neuronal death, brain injury, impaired glucose utilization, memory deficits, and in adult hood found hyperactive behavior (Zhang, Angley, Qi, D'Alton, Kahe, 2022). In sum ENDS produce a systemic effect to the mom and fetus, with 7% of pregnant women reporting use of vape at some point throughout their pregnancy education is the best practice to prevent these complications and needs to be implemented early given the rapid fetal development in the first trimester.

As any health condition goes, the best prevention is education. As previously mentioned, ENDS are the leading modifiable cause of preterm delivery yet are still being used, emphasizing the need for more education and resources. Through prenatal screening, health care providers are able to identify lifestyle choices that can be avoided to promote a healthy pregnancy and baby. A typical initial pregnancy visit includes a pelvic exam, estimated due date, blood typing, antibody screening, folic acid, urinalysis, nutrition assessment, psychosocial, and health and risk assessment. A health and risk assessment reviews lifestyle choices that could alter the pregnancy or fetuses' development.

Surveys showed 79% of obstetric gynecologists reported screening for substance use, but only 11% actually utilized a true screening tool. Some screening tools used are the National Institute on Drug Abuse (NIDA) Quick Screen-ASSIST and the Substance Use Risk Profile-Pregnancy (SURP-P). The NIDA Quick Screen-ASSIST asks how often in the past year has alcohol, tobacco, prescription drugs for recreational use, and illegal drugs been used. If "never"

has been answered for all categories, the screening is complete, for any “yes” for use in the past year a resource is provided about quitting for the correlated substance. Compared to the SURP-P model where 16 questions are asked about various substance use. A score of 2-3 is considered high and a positive screen for further intervention to be done (Habersham et al., 2025). However, neither screening tool included questions specific to ENDS, both only included tobacco or traditional cigarettes. Not only are there gaps in current screening tolls but not even a quarter of providers are utilizing proper and consistent screening techniques to assess for nicotine use for a pregnant woman. A heavier focus on clarifying vaping versus cigarettes and how to quit is crucial in this case.

In addition to proper screening tools to identify use of ENDS during pregnancy, it is important to create a cessation plan. Some current first line methods are often psychologically based, focused on educating health benefits versus risks to the mother and fetus, motivational interviewing, and cognitive behavioral therapy (CBT). CBT includes self-monitoring, acknowledging cravings, coping with cravings, and coping with anxiety (ACOG, 2020). Not only does consistency of motivational interviewing and CBT throughout the pregnancy help keep the mother accountable from abstaining from nicotine use but provides opportunity into the postpartum to period to maintain nicotine free, eliminating secondhand inhalation to the newborn, risk of crossing during lactation, and for overall well-being of the mother. A second line option is pharmacological, utilizing the medications of varenicline and bupropion. Varenicline acts as a partial agonist for nicotine receptors and has not shown teratogenicity to the fetus. Bupropion is an antidepressant that also shows no teratogenicity (ACOG, 2020). Given neither medication show adverse effects to the fetus it is important after

first identifying adjunct therapy is needed to assist in cessation but also can be used postpartum to continue cessation at home providing a more patient centered care approach.

In conclusion, ENDS are harmful to any human, whether they are pregnant or not. Given ENDS are still such a new form of nicotine, the research is developing and continues to find more health risks throughout. In order to provide quality patient centered care, effective education and resources need to be available about the harm and process of abstaining from ENDS. Vaping is often marketed as the safer option when it comes to nicotine yet still puts a fetus at a substantial risk for impaired development and exposure to chemicals, reinforcing the need for more public health education on the major dangers of vaping and pregnancy.

Resources

Centers for Disease Control and Prevention. (2024, May 20). *E-cigarettes and pregnancy*. Centers for Disease Control and Prevention. https://www.cdc.gov/maternal-infant-health/pregnancy-substance-abuse/e-cigarettes.html

Chun, J. (2024). Use of nicotine-containing products during pregnancy: Effects on fetal development. *International STEAM Communications*, *5*(1). https://doi.org/10.37906/isteamc.2024.1

Habersham, L. L., Townsel, C., Terplan, M., & Hurd, Y. L. (2025a). Substance use and use disorders during pregnancy and the postpartum period. *American Journal of Obstetrics and Gynecology*, *232*(4). https://doi.org/10.1016/j.ajog.2025.01.007

Marbrey, M. X., Cripps, S. M., Huang, R., Kistner, B. M., Somany, A., Douglas, E. S., & Caron, K. M. (2025, August 28). *Flavored e-cigarettes modulate embryo development, fetal growth, and potentiate early fetal demise without nicotine*. Communications medicine. https://pubmed.ncbi.nlm.nih.gov/40877576/

Mauldin, A. (2025, January 6). *Teratogen: What is it, examples, and more | osmosis*. Osmosis. https://www.osmosis.org/answers/teratogen

Oriakhi, M. (2020, March 26). *Vaping: An emerging health hazard*. Cureus. https://pmc.ncbi.nlm.nih.gov/articles/PMC7186084/

Ruffin, L., Swilley, B. R., Berg, J. A., Douglass, B., Ruffin, W., & Padden-Denmead, M. (2024). The chronic nature of smoking and vaping: A comprehensive analysis. *The Journal for Nurse Practitioners*, *20*(2), 104903. https://doi.org/10.1016/j.nurpra.2023.104903

Tobacco and nicotine cessation during pregnancy. ACOG. (2020, May). https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2020/05/tobacco-and-nicotine-cessation-during-pregnancy

Vilcassim, M. J. R., Stowe, S., Majumder, R., Subramaniam, A., & Sinkey, R. G. (2023, March 18). *Electronic cigarette use during pregnancy: Is it harmful?*. MDPI. https://www.mdpi.com/2305-6304/11/3/278

Zhang, Y., Angley, M., Qi, X., Lu, L., D'Alton, M. E., & Kahe, K. (2022). Maternal electronic cigarette exposure in relation to offspring development: A comprehensive review. *American Journal of Obstetrics & Gynecology MFM*, *4*(5), 100659. https://doi.org/10.1016/j.ajogmf.2022.100659