

Risk and Benefit of Drug use during Pregnancy

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Drug development in obstetrics occurs via an informal process of migration from use in adults into use during pregnancy. Very few treatments have been specifically developed for use in pregnancy irrespective of the focus of therapeutics –mother, placenta or fetus. This informal process means that use during pregnancy is off-label, with dosing, pharmacokinetics, pharmacodynamics, safety and efficacy not described in regulatory documents, product labels, textbooks, or the literature. The physiological, cellular and molecular changes across pregnancy and the impact of the drug disposition between mother, placenta and fetus provide the important role of the placenta in drug delivery between these compartments. The current presentation will address many questions regarding drugs in pregnancy such as: 1) How do we know which prescription drugs and over-the-counter medications are harmful? 2) Which medications should be avoided? 3) If a father takes drugs/medications, will this affect the baby? 4) What kinds of illegal drugs are harmful to fetuses? 5) Is smoking/tobacco and caffeine use or drink alcohol during pregnancy harmful?

Pregnancy and fetal development progress through various changes. The period of one week from fertilisation to implantation of the fertilized egg is called the preimplantation period. This is an 'all or none' period, i.e. an insult can either cause death or complete recovery can occur. The period from the eighth day to the end of eighth week is the period of organogenesis during which the organs are formed in the fetus. This is the most crucial time with regards to 'structural malformations' and concern over teratogenicity of drugs. From the third month to the end of nine months is the period of fetal maturation. Intake of drugs during this period may modify the 'function' of the fetal organs rather than causing gross structural malformations in the fetus; for example, aminoglycosides can affect the functioning of the kidneys as well as the hearing mechanism.

Many physicians prefer not to prescribe drugs for pregnant women due to concerns over teratogenicity. The apprehension is not necessarily data driven and is a cautionary response to the lack of clinical studies in pregnant women. The indication is a trade-off between the adverse effects of the drug, the risks associated with intercurrent diseases and pregnancy complications, and the efficacy of the drug to prevent or ameliorate such risks.

In some cases, the use of drugs in pregnancy carries benefits that outweigh the risks. For example, high fever is harmful for the fetus in the early months, thus the use of paracetamol (acetaminophen) is generally associated with lower risk than the fever itself. Similarly, diabetes mellitus during pregnancy may need intensive therapy with insulin to prevent complications to mother and baby. Pain management for the mother is another important area where an evaluation of the benefits and risks is needed. NSAIDs such as Ibuprofen and Naproxen are probably safe for use for a short period of time, 48-72 hours, once the mother has reached the second trimester. If taking aspirin for pain management the mother should never take a dose higher than 100mg.

Potential problems during pregnancy:

- Decreased fetal breathing
- Delayed development of the nervous system ^[4]
- Facial feature abnormalities, especially during the third through sixth weeks following fertilization
- Beginning in the fourth week - rapid cardiac development. Exposure to alcohol may result in atrial and/or ventricular abnormalities, issues with valve formation, and a potential increase in the risk for heart disease in adulthood.
- Sixth and seventh weeks - the [corpus callosum](#), the structure that divides the left and right hemispheres of the brain and is responsible for communication between the two hemispheres, is most vulnerable to alcohol exposure. Exposure to alcohol may lead to its incomplete development, thus resulting in issues with neural communication.
- After 8 weeks gestation, the fetus is not as vulnerable to organ-specific birth defects. The [central nervous system](#) overall, however, remains vulnerable, as well as the overall growth of the fetus.
- Infertility, miscarriage, stillbirth, low birth weight, preterm delivery.

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