Pesticide Action Network Europe

CRIN Child Rights International Network

European Parliament

Link between exposure to pesticides and congenital malformations

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What are Pesticides

- Pesticides are chemical compounds used in public health to kill vectors of disease, such as mosquitoes, and in agriculture to kill pests that damage crops
- Over 1000 different pesticides are used around the world
- By their nature, pesticides are potentially toxic to other organisms, including humans, and need to be used safely and disposed of properly.
- They are **among the leading causes of death by self-poisoning, and this burden is felt disproportionately in low- and middle-income countries.**
- They have **adverse effects on larger parts of the ecosystem and can accumulate in the food chain**
- **People at higher risk of adverse health effects are those who work directly with pesticides**, such as agricultural workers, and those who are in the immediate area when pesticides are applied.
- But also the general population is exposed to low levels of pesticides through food and water.

WHO

Children are more vulnerable to pesticide exposure

- The connection between children's exposure to pesticides and diseases and disorders occurrence in early childhood and adolescence is now well documented.

- Children are smaller, compared to adults, yet, the same rules are applied for the protection of their health, as are for adults

- but children eat and drink more relative to their body weight than adults, therefore they can be exposed to a higher dose of pesticide residue per kilogram of body weight.

- moreover babies crawl on treated lawns and carpets with pesticide residues from the air. Crawling rubs pesticide residue onto a baby's skin. The baby also breathes in pesticide-laden dust, which might be more dangerous than pesticide residues in food, because toxins go directly to the bloodstream, bypassing the liver.

PAN

Congenital malformations (CM)

- Congenital disorders, also known as congenital abnormalities, congenital malformations or birth defects
- can be defined as **structural or functional anomalies**, that occur during intrauterine life and can be identified prenatally, at birth, or sometimes may only be detected later in infancy
- although little is still known about the origins of many CM, they are largely due to complex genes-environment (epigenetic) interactions

WHO

Congenital malformations and environment

- Congenital malformations (CM) have very high social and economic costs, so preventing them is an absolute priority for public health. 6% of newborns.

- As neonatal and under-5 mortality rates decline, congenital disorders become a larger proportion of the cause of neonatal and under-5 deaths. **The most common severe are heart defects (CHD) and neural tube defects(NTD).**

- Recently the importance of the environment as one of the major reproductive risk factors has been strengthened, pregnant women and developing fetuses are particularly vulnerable.

- Negative effects of exposures on men before conception, as well as the effects on women, due to changes involving gametes, that can be passed on from one generation to another, should not be underestimated.

Baldacci S, et al.. Environmental and individual exposure and the risk of congenital anomalies: a review of recent epidemiological evidence. Epidemiol Prev. 2018 May-Aug;42(3-4 Suppl 1):1-34.

Maternal and paternal exposure to toxic agrochemicals are associated with greater chances of children being born with congenital malformations

Literature Review • Texto contexto - enferm. 30 • 2021 • https://doi.org/10.1590/1980-265X-TCE-2020-0372 .
Exposure to toxic agrochemical and development of congenital malformations: a scoping review. Period under review 2005 and 2018

Environmental and individual exposure and the risk of congenital anomalies (CAs): a review of recent epidemiological evidence. Epidemiol Prev. 2018 May-Aug;42(3-4 Suppl 1):1-34. Period under review 2011-2016

Evidence in Europe

- Prenatal exposure to OCPs is associated with increased risk for NTDs in Hungary.

  Int Arch Occup Environ Health. 2021 Apr;94(3):515-527.

- Women should take preventive measures or avoid exposure to mineral and organic dust as well as metal dust and fumes early in pregnancy as this could possibly affect foetal heart development in Netehrland.

  Scand J Work Environ Health. 2020 Nov 1;46(6):599-608.

- possible increased risk of hypospadias associated with prenatal use of some domestic pesticide products, likely to contain insecticides, and of cryptorchidism with nearby orchard acreage

  Occup Environ Med. 2019 Sep;76(9):672-679.

Evidence out of Europe

1. Maternal and paternal exposure to pesticides is associated with **cleft lip and palate** in Mato Grosso State, Brazil. J Occup Environ Med. 2022 Nov 1;64(11):e751-e756.

2. In Northern China. Prenatal exposure to OCPs is associated with increased risk for **NTD**. Sci Total Environ. 2021 May 20;770:145284.

3. There are differing patterns of association for **birth defects** with residential exposure to seven pesticide active ingredients in North Carolina. Birth Defects Res. 2019 Apr 1;111(6):312-323.

4. Areas with higher use of pesticides have higher rates of abortion and **fetal malformations** than the others, in Brazil,Sao Paulo. J Occup Environ Med. 2023 Oct 1;65(10):820-825.

The case of Glyphosate

Atrial septal defects were positively associated with higher levels of exposure to glyphosate, cyhalothrin, S-metolachlor, mepiquat, and pendimethalin (ORs ranged from 1.22 to 1.35 for 50th to <90th exposures, and 1.72 to 2.09 for >90th exposures)

Rappazzo KM, et al. Birth Defects Res. 2019 Apr 1;111(6):312-323.

How we should reduce congenital malformations

- aetiology is predominantly multifactorial
- by complex interactions between genes and environment
- environmental factors can have preconceptional mutagenic action, postconceptional teratogenic effects, periconceptional endocrine disruption or epigenetic action
- socioeconomic factors of course are important
- but pesticides exposure can be avoided **especially in children and fetuses and gametes**

Environmental and individual exposure and the risk of congenital anomalies (CAs): a review of recent epidemiological evidence. Epidemiol Prev. 2018 May-Aug;42(3-4 Suppl 1):1-34. Period under review 2011-2016

Thank you for your attention