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# LA RELAZIONE TRA ESPOSIZIONE ALL'INQUINAMENTO ATMOSFERICO NEI PRIMI 1000 GIORNI DI VITA E PATOLOGIA DELLA TIROIDE. UNA REVISIONE DELLA LETTERATURA

A cura del gruppo di lavoro **"I primi 1000 giorni"**

Questo documento nasce nell'ambito del progetto Coorti di nuovi nati, esposizioni ambientali e promozione della salute nei primi 1000 giorni di vita: integrazione dei dati di esposizione con dati molecolari ed epigenetici (CUP: C92F17003030001)
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## La relazione tra esposizione all'inquinamento atmosferico nei primi 1000 giorni di vita e patologia della tiroide. Una revisione della letteratura

**Tabella 1. Strategia di ricerca utilizzata in PubMed**

| **Database: Pubmed<br>Date 01/03/2019** | | **N° record** |
|---|---|---|
| Exposure terms | "air pollution"[tiab] OR "air pollutant"[tiab] OR "air pollutants"[tiab] OR "sulphur dioxide"[tiab] OR "SO2"[tiab] OR "nitrogen oxide"[tiab] OR "nitrogen oxides"[tiab] OR "NOx"[tiab] OR "NO2"[tiab] OR ozone[tiab] OR "O3"[tiab] OR "particulate matter"[tiab] OR (PM*[tiab] NOT ("prospective memory" [tiab] OR postmenopaus*[tiab] OR "phosphamide mustard" [tiab]) OR "pregnancy morbidity"[tiab]) OR ("PAH"[tiab] NOT ("pulmonary arterial hypertension"[tiab] OR "Phenylalanine hydroxylase"[tiab])) OR "Volatile Organic Compounds"[tiab] OR ("VOC"[tiab] NOT "vaso-occlusive crisis"[tiab]) OR "black carbon"[tiab] OR "elemental carbon"[tiab] OR "organic carbon"[tiab] | **182289** |
| Outcome | "thyroid hormone"[tiab] OR "thyroid hormones"[tiab] OR "hypothyroidism"[tiab] OR "hyperthyroidism"[tiab] | **73948** |
| Population | Infant[tiab] OR newborn[tiab] OR toddler[tiab] OR child*[tiab] OR "Child"[Mesh] OR "Infant"[Mesh] OR preschool*[tiab] OR prenatal[tiab] OR pregnancy[tiab] OR birth[tiab] OR perinatal[tiab] OR gestation[tiab] OR fetal[tiab] OR "Adolescent"[Mesh] OR adolescent*[tiab] OR teen*[tiab] | **4288925** |
| | ("Animals"[Mesh] OR "Plants"[Mesh] OR "Bacteria"[Mesh]) NOT "Humans"[Mesh] | **5485531** |
| | 1. 1 AND 2 AND 3 | **62** |
| | 2. 5 NOT 4 | **46** |

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**Tabella 2. Tavola sinottica con descrizione dell'articolo originale contenuto nella revisione non sistematica identificata relativo alla finestra di esposizione definita (gravidanza e primi anni di vita)**

| Author, year | Subjects | Type of study | Exposure | Outcome | Results |
|---|---|---|---|---|---|
| Gascon et al. (2011) | 482 pregnant mothers between 1997 and 1998. N = 332; Menorca-INMA | prospective birth cohort | polybromodiphenyl ethers (PBDEs), used as flame retardants. PBDE-47 Cord blood (N = 88). 2.10 (16.8) Median (max) – ng / g lipid <LOD = 48.9% | At 4 years, children were assessed for motor and cognitive function (McCarthy Scales of Children's Abilities), attention-deficit, hyperactivity and impulsivity (ADHD-DSM-IV) and social competence (California Preschool Social Competence Scale) | Levels of thyroid hormones were not associated to PBDE exposure. |

**Referenze**


- Gascon M, Vrijheid M, Martinez D, Forns J, Grimalt JO, Torrent M, et al. Effects of pre and postnatal exposure to low levels of polybromodiphenyl ethers on neurodevelopment and thyroid hormone levels at 4 years of age. Environ Int 2011; 37: 605–11.

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**Tabella 3. Tavola sinottica con descrizione degli studi primari posteriori alla data della revisione non sistematica identificata**

| Author, year | Subjects | Type of study | Exposure | Outcome | Results |
|---|---|---|---|---|---|
| Shang L (2019) | The offspring, China; from October 1, 2014 to October 1, 2015 from the Chinese Maternal and Child Health Surveillance Network. | National database based study | Air pollution. Total period of pregnancy, average exposure levels of PM2.5, PM10 and Air Quality Index (AQI) | Congenital hypothyroidism (CH) in the offspring. | The overall incidence of CH was 4.31 per 10,000 screened newborns in China from October 1, 2014 to October 1, 2015. Every increase of 1 mug/m(3) in the PM2.5 exposure during gestation could increase the risk of CH (adjusted OR = 1.016 per 1 mug/m(3) change, 95% CI, 1.001-1.031). But no significant associations were found with regard to PM10 (adjusted OR = 1.009, 95% CI, 0.996-1.018) or AQI (adjusted OR = 1.012, 95% CI,0.998-1.026) and the risk of CH in the offspring. The cut-off value of prenatal PM2.5 exposure for predicting the risk of CH in the offspring was 61.165 mug/m(3). |
| Oh KW (2014) | 2050 newborns (50.5% male), with a median (interquartile range) age of 20 (15-29) hours. The majority of newborns were Hispanic white (1202 [58.6%]) or non-Hispanic white (638 [31.1%]). Sixty-six (3.2%) were black and 144 (7.0%) were from other racial/ethnic groups. | cohort study | Prenatal monthly averages of ambient (PM diameter <2.5 mum [PM2.5] or <10 mum [PM10], nitrogen dioxide, and ozone) and traffic-related (freeway, nonfreeway, and total nitrogen oxides) air pollutant exposures | Newborn heel-stick blood spot total thyroxine (TT4) measures were acquired retrospectively from the California Department of Public Health. | The mean (SD) newborn TT4 measure was 16.2 (4.3) mug/dL. A 2-SD increase in prenatal PM2.5 (16.3 mug/m3) and PM10 (22.2 mug/m3) was associated with a 1.2-mug/dL (95% CI, 0.5-1.8 mug/dL) and 1.5-mug/dL (95% CI, 0.9-2.1 mug/dL) higher TT4 measure, respectively, in covariate-adjusted linear regression models. Other pollutants were not consistently associated with newborn TT4. Distributed lag models revealed that PM2.5 exposure during months 3 to 7 of pregnancy and PM10 exposure during months 1 to 8 of pregnancy were associated with significantly higher newborn TT4 concentrations (P < .05). |

**Referenze**


- Shang L et al. Maternal exposure to PM2.5 may increase the risk of congenital hypothyroidism in the offspring: a national database based study in China. BMC Public Health 2019;19(1):1412.
- Oh KW et al. Establishing a reference range for triiodothyronine levels in preterm infants. Early Hum Dev. 2014 Oct;90(10):621-4.