



MEETING ABSTRACT

Open Access

Maternal tobacco use during pregnancy and risk of congenital heart defects in offspring: a systematic review

Aspasia Tzani^{1,2*}, Konstantinos P Economopoulos^{1,3}

From 11th Annual Conference of the International Society for the Prevention of Tobacco Induced Diseases (ISPTID)

Athens, Greece. 9-11 December 2013

Background

Numerous human studies have investigated potential teratogenic effects of maternal smoking during pregnancy, with conflicting findings [1,2]. One of the most common birth malformations is congenital heart defect (CHD) with a prevalence of around 1% of live births [3,4]. More specifically, several studies indicate that maternal tobacco use is related with increased risk of CHD, whereas other studies do not find any association [5,6]. The aim of this study is to systematically review the literature regarding the correlation between maternal smoking during pregnancy and the prevalence of CHDs in offspring.

Material and methods

A thorough up-to-date search of the English literature through PubMed identified studies of maternal smoking during pregnancy and CHD in infants. The selected Mesh terms included “maternal”, “tobacco”, “smoking”, “cigarette”, “pregnancy”, “cardiovascular”, “abnormalities” “congenital abnormalities”, “congenital heart defect”, “offspring”. The main parameters that were extracted from the eligible studies were maternal characteristics (age, weight, race, socioeconomic and health status), smoking habits (cigarettes per day, fetal exposure period) and CHD subtypes.

Results

The systematic search identified 874 articles, of which 37 met the inclusion criteria. Most studies have shown a strong correlation (OR: 2.06; 95% CI: 1.20–3.54) between mothers who reported medium and heavy smoking (≥ 1 pack per day) during the first semester of

pregnancy and infants with septal heart defects than women who did not smoke during this time period. Maternal age, weight and socioeconomic status are independent confounding factors for neonatal heart defects. Women who smoked ≥ 25 cigarettes per day had increased risk to have infants with right-sided obstructive defects compared with nonsmoking mothers. Infants with CHD were more likely to be premature and have lower birth weight than healthy infants.

Conclusions

Maternal cigarette smoking during pregnancy is associated with congenital heart defects, especially with septal and right-side obstructive defects [7]. Additionally, future studies should take place in order to understand all underlying mechanisms and set the starting point of population-based prevention strategies so as to encourage more women to quit smoking before or early in pregnancy resulting in decreased infant mortality and morbidity.

Authors' details

¹Society of Junior Doctors, Athens, 15123, Greece. ²Medical school, National and Kapodistrian University of Athens, Athens, 115 27, Greece.

³Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts, 02114, USA.

Published: 6 June 2014

References

1. Kallen K: Maternal smoking and congenital heart defects. *Eur J Epidemiol* 1999, **15**:731-737.
2. Karatza AA, Giannakopoulos I, Dassios TG, Belavgenis G, Mantagos SP, Varvarigou AA: Periconceptional tobacco smoking and isolated congenital heart defects in the neonatal period. *Int J Cardiol* 2011, **148**:295-299.

* Correspondence: aspasoukatz_14@hotmail.gr

¹Society of Junior Doctors, Athens, 15123, Greece

Full list of author information is available at the end of the article

3. Yerushalmy J: **Congenital heart disease and maternal smoking habits.** *Nature* 1973, **242**:262-263.
4. Hackshaw A, Rodeck C, Boniface S: **Maternal smoking in pregnancy and birth defects: a systematic review based on 173,687 malformed cases and 11.7 million controls.** *Hum Reprod Update* 2011, **17**:589-604.
5. **Perspectives in pediatric cardiology. Epidemiology of congenital heart disease. The Baltimore-Washington Infant Study 1981-1989.** New York: Futura Pub, Mount Kisco; Ferencz C, Rubin JD, Loffredo CA, Magee CA **4**:1993-last page.
6. Kuciene R, Dulskiene V: **Maternal socioeconomic and lifestyle factors during pregnancy and the risk of congenital heart defects.** *Medicina Kaunas* 2009, **45**:904-909.
7. Malik S, Cleves MA, Honein MA, Romitti PA, Botto LD, Yang S, Hobbs CA: **National Birth Defects Prevention Study: Maternal smoking and congenital heart defects.** *Pediatrics* 2008, **121**:e810-e816.

doi:10.1186/1617-9625-12-S1-A20

Cite this article as: Tzani and Economopoulos: **Maternal tobacco use during pregnancy and risk of congenital heart defects in offspring: a systematic review.** *Tobacco Induced Diseases* 2014 **12**(Suppl 1):A20.

**Submit your next manuscript to BioMed Central
and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

