

The Effect of Passive Smoking Exposure during Pregnancy on the Central Nervous System Structure and Behavior of the Hamster's Offspring

Students:

Waseem Khraim

Wathiq Sharqia

Supervisor:

Dr. Waleed Basha

Prof. Waleed Ajaj

Abstract:

Background:

Exposure to tobacco smoke is considered to be the single major preventable risk factor for morbidity and mortality of the mother and fetus. Although there are many epidemiological studies about passive smoking, a little animal-based researches focusing on the effect of tobacco on the nervous system development so that a quasi-experimental study is conducted.

Objective:

The main objective is to examine the effect of passive smoking exposure during pregnancy on structural integrity of central nervous system of the hamster's offspring, in addition to assess their neurobehavioral functions such as short term memory, anxiety and social interaction.

Methods: About 35 pregnant hamsters were divided into five groups, based on which pregnancy trimesters they were exposed to smoke (1st, 2nd/3rd) and duration of exposure (4 hours, 6 hours). Then, 78 of their babies were evaluated at age 4 weeks for memory function by T-maze test, anxiety by using marble burying test and social behavior by social dominance test. After that, the offspring of the five groups were examined by CT scan looking for gross structural abnormalities in the brain and spinal cord.

Results:

The collected data showed a significant correlation between exposure to passive smoke during 1st trimester and presence of short term memory impairment [$p=0.047$] as well as increasing anxiety level [$p=0.024$]. While exposure to passive smoke during 2nd/3rd trimesters were also associated with memory dysfunction, but without affecting anxiety level compared with the control group. On the other hand, research data cannot establish the dose-dependent effect of smoking as no significant difference was found between high and low doses. CT scan revealed the presence of lumbar spinal stenosis in the group that was exposed to 6 hours-smoking during 1st trimester of pregnancy.

Conclusions and recommendations:

There is a relation between exposure to passive smoking during pregnancy and presence of neurobehavioral changes, especially in short-term working memory and anxious behavior.

Therefore, the research recommends conducting more experimental studies focusing on 1st trimester to establish good evidence about these behavioral changes. In addition, the presence of structural abnormality like spinal stenosis indicates the need for brain and spinal cord dissection to examine the effect at tissue level.

