

BEHAVIORAL PROBLEMS AMONG SCHOOL CHILDREN PRENATALLY EXPOSED TO SMOKING

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Abstract: *A growing evidence of published results indicates that children and adolescents prenatally exposed to tobacco smoke may have higher rates of conduct disorders. In the European Longitudinal Study of Pregnancy and Childhood (ELSPAC) both the markers of conduct disorders, learning problems and antenatal exposure to maternal smoking are collected. The Czech sample includes the cohort of children born at the beginning of 90' in the City Brno and rural district Znojmo. The analyzed data described in this paper were taken from the teachers' reports and medical observations of individual children in their ages 8, 11, and 13 years. Differences between two groups (exposed and noexposed prenatally) were evaluated using the statistic program EPI INFO. In the Czech cohort of ELSPAC, the relationships between prenatal exposure to maternal smoking and higher frequency of conduct disorders during both younger and older school-age were confirmed.*

Key words: *antenatal exposure to smoking, conduct disorders, school age*

Introduction

A growing evidence of published results indicates that children and adolescents prenatally exposed to tobacco smoke may have higher rates of conduct disorders, including Attention Deficit Hyperactivity Disorder (ADHD), compared with un-exposed children (DiFranza, 2004; Linnert, 2003; Thapar, 2003; Weitzman, 1992). The review of literary controlled for an array of potential confounders showed that prenatal exposure to cigarette smoke increased the risk of behavioral problems during childhood, adolescence and early adulthood (Olds, 1997; Sourander, 2005).

Some longitudinal prospective studies showed that the conduct disorders are moderate stable over time (Campbell, 1995; Gray, 2004; Sourander, 2005).

These reasons have supported the recommendations of international examination of smoking as a preventable risk factors (Carter, 2007).

In the European Longitudinal Study of Pregnancy and Childhood (ELSPAC) both the markers of conduct disorders, learning problems and antenatal exposure to maternal smoking are collected. The Czech sample includes the cohort of children born

at the beginning of 90' in the City Brno and rural district Znojmo. The analyzed data described in this paper were taken from the teachers' reports and medical observations of individual children in their ages 8, 11, and 13 years.

Methods

For different times of children school age in which the repeated observation has been previously established, the teachers' special questionnaire was developed. During each age category, the different teachers have assessed the child. No teacher was informed about the health and/or social history of children during their antenatal period, as well as the results of physicians observations. Children for whom the data were available, were divided into two groups (exposed vs. nonexposed) according to their mothers smoking during pregnancy. Differences between those two groups were evaluated using the statistic program EPI INFO.

Results

Although the number of children assessed in different ages was not the same, the rate of prenatally exposed/ nonexposed remained the stable (10 %)

Repeatedly used markers of conduct disorders were concerned about the attention deficit and motoric hyperactivity: the frequency of these disorders were always significantly higher among the prenatally exposed children (tab 1).

Others manifestations of conduct disorders, such as instable moods, aggressivity, repeated telling lies, were predominantly reported about children aged 8 and 11 years more often in exposed group. However, in the groups of 13 years old the frequencies of these characteristics were much lower and similar.

Almost twice more exposed than nonexposed children needed the special pedagogical cure at age 8 years (27,7 % vs 16,4 %, $p < 0,001$).

Specific conduct disorders measured among older children (11 and 13 years) were almost always significantly enhanced in the prenatally exposed group: attention and concentration disorders, school rules admittions with consequent punishment, having friends who also are not willing to keep the social norms (Tab. 2).

Children with different prenatal exposure to smoking have also different social environment in their families: five times more often the parents inadequate interest about the children' school life and performances in the exposed group were reported by the teachers: for 2,2–2,5 % nonexposed vs. for 10,9–12,8 % exposed.

Discussion

The link between in utero exposure to tobacco smoke and conduct disorders/ attention deficit hyperactivity disorder has been described through meta-analyses of studies published over a 30-year period (Linnet, 2003), twin studies (Thapar, 2003), and studies controlling socioeconomic status and post-natal complications (Batstra, 2003). Greater excitability, tremors and startles can be frequently manifested even among newborns born to mothers smoking during pregnancy (Law 2003). Reviewed 17 studies

described strong associations of behavioral and cognitive problems in children exposed to passive smoking during prenatal period (Eskenazi, 1999).

Majority of investigators described that the conduct disorders in childhood were usually strongly associated with the retardant prenatal somatic development. Also in ELSPAC cohort the relationships of conduct disorders to low birth weight and lowered head circumference were stronger than those to self-reported maternal smoking.

Mechanisms of prenatal smoke exposure effects on behavioral development are not well understood yet: both the structural and functional changes within specific regions on the brain (Batstra, 2003). The possible biological mechanisms include chronic hypoxemia, alteration in the cholinergic, noradrenergic and dopaminergic neurotransmitter systems, influence on cell differentiation and their damage in cerebral cortex, as well as in basal ganglia.

Conclusion

In the Czech cohort of ELSPAC, the relationships between prenatal exposure to maternal smoking and higher frequency of conduct disorders during both younger and older school-age were confirmed.

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Tab. 1: Markers of conduct disorders occurred repeatedly (% of children)

Statistic significance: ** = p<0,01, *** = p<0,001

CHARACTERISTICS	AGE	PRENATAL EXPOSURE	
		YES	NO
Attention Deficit	8	68,4 ***	53,2
	11	44,5 **	27,9
	13	45,7 ***	25,3
Motoric hyperactivity	8	53,5 ***	38,5
	11	36,7 ***	22,1
	13	24,6 **	15,9
Instable moods	8	36,8 **	24,6
	11	14,8 **	7,7
	13	8,8	5,5
Aggressivity	8	37,7 **	26,8
	11	28,7 ***	11,3
	13	2,5	1,1
Repeated telling the lies	8	37,7 ***	19,1
	11	12,8 **	5,7
	13	3,8	2,6
History od pilfer	8	11,6 ***	3,6
	11	21,2 ***	8,5
	13	occasional cases	

Tab. 2 Behavioral characteristics of children aged 11 and 13 years (% of children)
 Statistic significancy: * = p<0,05, ** = p<0,01, *** = p<0,001

CHARACTERISTIC	AGE	PRENATAL EXPOSURE	
		YES	NO
Conduct disorders with punishment	11	30,3***	14,8
	13	31,7 ***	16,0
Problems with concentration	11	43,8 *	31,2
	13	50,0 ***	29,8
Problems with memory	11	37,8 ***	21,9
	13	21,0	16,8
Friends disrupting social rules	11	30,2 ***	12,3
	13	14,1 *	7,1
Strong negativism	11	6,4 *	2,3
	13	7,5	5,9

PROBLÉMOVÉ CHOVÁNÍ U DĚTÍ ŠKOLNÍHO VĚKU PRENATÁLNĚ EXPONOVANÝCH KOUŘENÍ

Souhrn: V posledních letech narůstá počet studií, jejichž výsledky naznačují, že děti a dospívající mladí lidé, kteří byli prenatálně exponováni tabákovému kouří, jsou častěji postiženi poruchami chování. V Evropské longitudinální studii těhotenství a dětství (ELSPAC) jsou shromažďovány údaje o vybraných znacích poruch chování a o prenatální expozici dětí kouřících matek. Český soubor zahrnuje kohortu dětí narozených počátkem 90. let v městě Brně a zemědělském okrese Znojmo. Jsou prezentovány výsledky údajů, které poskytli učitelé o dětech ve věku 8, 11 a 13 let. Rozdíly mezi oběma skupinami dětí (prenatálně exponované a neexponované) byly hodnoceny statistickými testy v programu EPI INFO. V české kohortě dětí sledovaných ve studii ELSPAC byly potvrzeny vztahy mezi prenatální expozicí dětí kouření jejich matek a vyšší frekvencí poruch chování během mladšího i staršího školního věku.

Klíčová slova: prenatální expozice kouření - poruchy chování – školní věk