

PASSIVE SMOKING IN THE ODESSA REGION, UKRAINE: PREVALENCE AND ASSOCIATION WITH RESPIRATORY DISEASES IN INFANTS

Tetiana Kuzmenko, John Lowe, Mykola Aryayev

(*t_kuzmenko@inbox.ru, jlowe@usc.edu.au, aryayev@mail.ru*)

ABSTRACT

Researchers have known for over 20 years that the concentration of toxic substances in the auxiliary jet of a tobacco cigarette (i.e. the jet that is emitted at the front of the lit cigarette) is much more harmful than in the smoke that is inhaled directly. This auxiliary jet is what causes the opportunity for passive smoking among individuals in the same environment. Furthermore mothers with new born infants who hold their child close, breathe out air that has toxic substances in the baby's face for the child to breathe in. This study investigated the prevalence of passive smoking exposure among infants in the Odessa region and to determine the frequency of infants-passive smokers with pneumonia of different severity among hospitalized infants to the Odessa Regional Children's Clinical Hospital. The questionnaire covered information on prevalence of smoking at home, mother nicotine dependence, frequency and severity of diseases in children. Two hundred infants were recruited from infants who visited the outpatient clinic № 6 of the Odessa region in "The Day of healthy child". The survey revealed an unexpectedly high prevalence of second hand smoke exposure among infants of the Odessa region (24.5%). The prevalence of IUGR, HIE, recurrent respiratory diseases among infants – passive smokers is significantly higher than among infants which are free from second hand smoke exposure.

Keywords: *Passive smoking; infants*

1.0 INTRODUCTION

The inhalation of tobacco smoke has a toxic effect on the human body. Especially alarming is the current popularity of smoking among youth and women of fertile age. In Ukraine, over the last 10 years there has been a tripling in smoking prevalence among the female population, which leads to pathology in pregnancy, childbirth, and the associated increase in perinatal mortality and morbidity in children.¹

Approximately 43 % of Australian, 33 % of Canadian and 41 % of British children daily are exposed to tobacco smoke at home.² In the United States each year from 150000 to 300 000 cases of bronchitis and pneumonia in children under 3 years of age were preceded by exposure to smoke.² The presence of smokers in the family is a risk factor for intrauterine fetal endothelial damage and, as a consequence, lung disease in the postnatal period of the child development. Second hand smoke exposure is a very significant risk factor for sudden infant death syndrome (SIDS).³ It was proven in the global European epidemiological study ECAS that both mother's and other family member's smoking may increase the risk of SIDS. The odd's ratio for mother's smoking was 4,38 (95 % CI 3,62 – 5,30) and for other family member's smoking – 3,13 (95 % CI 2,61 – 3,74).³ The probability of hospitalization of respiratory diseases has been investigated in 4486 infants whose mothers smoke.⁴ Compared with the children whose parents have never smoked in the room where the child could be present, smoking in the room when the child was present increased the absolute risk of hospitalization to 56%. If the mother smokes while holding a baby in her arms, the risk increased to 73%. If the

mother smokes while breastfeeding the baby, the risk of hospitalization increased to 95%.⁵ Due to the influence of paternal smoking, each year there are 500-2500 additional hospitalizations and 1000-5000 additional cases of respiratory infections per 100000 children.⁶ The higher frequency of respiratory diseases in children can, in part, be attributed to the mucous membranes of the upper respiratory tract taking the main burden of tobacco smoke toxins, while their cytomorphological and functional integrity appears important element of the first line of defense against the action of unfavorable environmental factors associated with exposure to tobacco smoke.

2.0 OBJECTIVE

The objective of the study was to estimate the prevalence of passive smoking exposure among infants and to examine the relationship between passive smoking exposure and respiratory diseases rate in the Odessa region, Ukraine.

3.0 METHODS

The project was approved by the Ethics Committee of the Odessa Regional Children's Clinical Hospital.

We conducted face to face interviews using a standardized questionnaire of 29 questions to assess the prevalence of passive smoking exposure among infants in the Odessa region and to determine the frequency of infants- passive smokers with pneumonia of different severity among hospitalized infants to the Odessa Regional Children's Clinical Hospital. The questionnaire covered information on prevalence of smoking at home, mother nicotine dependence, frequency and severity of diseases in children.

Two hundred infants were recruited from infants who visited the outpatient clinic № 6 of the Odessa region in “The Day of healthy child”. The day of the healthy child is the day when once a week mother brings her infant to the outpatient clinic for the regular checkup. Another one hundred and ninety six infants were recruited from the Odessa Regional Children’s Clinical Hospital. Presenting with pneumonia of different severity, according to the classification of pneumonia in children, adopted by the 12th Congress of Pediatricians of Ukraine. This represented 57% of all infants who are registered in the outpatient clinic №6 and 19.5% of all infants with respiratory diseases who was admitted to pediatric department in the Odessa Regional Children’s Clinical Hospital.

3.1 Statistics

The data were processed using statistical software (STATISTICA 7.0)⁷ and the statistical component of Microsoft ExcelTM 2003 with the integration program Atte Stat 13.5, Internet-calculator SISA (Simple Interactive

Statistical Analysis). In addition, 95% confidence intervals (CIs) are presented. In all procedures of statistical analysis when testing the null hypotheses, critical level of significance of P was taken equal to 0.05. Check for normal distribution was carried out by three methods: graphics, Kolmogorov-Smirnov and Shapiro-Wilkie. Study of the relationship between pairs of discrete quantitative features was performed using analysis of paired contingency tables, where the estimated values of the statistic Pearson chi-square (χ^2) achieved the level of significance (P) and odds ratio (OR) with 95% CI.

4.0 RESULTS

The prevalence of passive smoke exposure in infants who visit outpatient clinic in ‘The Day of Healthy child’ is presented in Table 1. Girls were more often born in families where the mother smoked during the pregnancy, the odd’s ratio was 1.71 (95 % CI 1.01 – 3.78), as well as in families where only father smoked – 1.33 (95 % CI 1.24 – 3.17). There was not a family in which the mother smokes only.

Table 1. The prevalence of second hand smoke exposure in infants who visit outpatient clinic in ‘The Day of Healthy child’

Parental smoking	Infants	
	Baby-boys, (n = 108) (n / %) (95 % CI)	Baby-girls, (n = 92) (n / %) (95 % CI)
Parental smoking, including mother's and father’s smoking	11 / 10 (10.62 – 29.37)	11 / 12 (11.48 – 31.34)
-exposure during the pregnancy	6 / 5 (5.45 – 15.34)	7 / 8 ^a (6.37 – 26.5)
-exposure during the pregnancy and after baby's birth	5 / 5 (3.04 – 11.45)	4 / 4 (2.46 – 9.43)

Father's smoking	13 / 12 (11.34 – 29.64)	14 / 15 ^a (14.19 – 40.71)
Total number of smokers in the family	24 / 22 (16.5 – 37.4)	25 / 27 ^a (26.36 – 56.74)
Not second hand smoke exposure in the family	84 / 78 ^a (62.59 – 83.40)	67 / 73 (54.57 – 76.82)

^a Significantly different from another group (p < 0.05)

The prevalence of IUGR, HIE, recurrent respiratory diseases among infants in outpatient clinic is represented in Table 2. If both parents were smokers, the prevalence of IUGR increased in

comparison with families who parents did not smoke, the odd's ratio was 7.71 (95 % CI 2.31 – 25.78). If only the father smoked in the family, the odds ratio for IUGR was 3.58 (95 % CI 0.97 – 13.19).

Table 2. The prevalence of IUGR, HIE, recurrent respiratory diseases among infants in outpatient clinic

Infants	Parental smoking		
	Both parents are smokers, (n / %) (95 % CI)	Only father is a smoker, (n / %) (95 % CI)	Nobody smokes in the family, (n / %) (95 % CI)
	1	2	3
Total number	22 / 11 (2.25 – 22.74)	27 / 14 (14.59 – 37.4)	151 / 75 ^a (62.59 – 83.40)
The prevalence of IUGR	6/ 27 ^{ab} (14.66 – 42.33)	4/ 15 ^a (10.41 – 27.58)	7 / 5 (1.96 – 13.03)
The prevalence of HIE	10 / 46 ^a (34.04 – 57.37)	9 / 33 ^a (22.49 – 50.5)	11 / 7 (0.70 – 17.29)
The prevalence of recurrent respiratory diseases	16/ 73 ^{ab} (58.76 – 86.33)	13/ 48 ^a (37.02 – 67.97)	26 / 17 (9.62 – 27.37)

^aSignificantly different in groups 1 – 3, 2 – 3 (p < 0.05)

^bSignificantly different in groups 1 – 2 (p < 0.05)

The prevalence of HIE increased in those families where both parents were smokers, the odd's ratio was 10.61

(95 % CI 3.75 – 30.01). If father smoked the odds ratio for HIE was 6.36 (95 % CI 2.32 – 17.45). The prevalence of recurrent respiratory diseases was

significantly higher in families, where both parents a were smokers, the odd's ratio was 12.82 (95 % CI 4.58 – 35.88). If only father smoked, the prevalence of recurrent respiratory diseases increased, the odd's ratio was 4.46 (95 % CI 1.88 – 10.60).

The prevalence of passive smoke

exposure in infants with different severity of pneumonia in Pediatric Department of the Odessa Regional Children's Clinical Hospital is presented in Table 3. Infants with severe pneumonia was higher in families where both parents were smokers, the odd's ratio was 4.00 (95 % CI 1.06 – 15.08). The prevalence of

pneumonia of moderate severity was higher among infants where only the father smoked in comparison to infants with severe pneumonia. The prevalence of passive smoking was higher among infants with severe pneumonia, the odd's ratio was 1.76 (95 % CI 0.64 – 3.78).

Table 3. The prevalence of passive smoking in infants with different severity of pneumonia in Pediatric Department

Infants	Pneumonia with different severity	
	Severe pneumonia (n = 154) (n / %) (95 % CI)	Pneumonia of moderate severity (n = 42) (n / %) (95 % CI)
Infants in which families both parents are smokers	36 / 24 ^a (11.58 – 38.41)	4 / 10 (1.75 – 11.75)
Infants in which families only father is a smoker	18 / 12 (0.70 – 18.29)	8 / 19 ^a (12.62 – 31.37)
Total number of infants, which are exposed to passive smoking	54 / 36 ^a (26.47 – 48.92)	12 / 29 (9.55 – 35.44)
Total number of infants, which are free from tobacco smoke	100 / 64 (50.29 – 79.78)	30 / 71 (59.26 – 80.73)

^aSignificantly different from another group (p < 0.05)

5.0 DISCUSSION

This study provides the first analysis of the prevalence of passive smoking among infants with respiratory diseases in the Odessa region. The survey revealed an unexpectedly high prevalence of second hand smoke exposure among infants of the Odessa region (24.5%). Among families of infants – passive smokers those families dominated in which

only father smokes. The prevalence of IUGR, HIE, recurrent respiratory diseases among infants – passive smokers is significantly higher than among infants which are free from second hand smoke exposure. There were a number of limitations to this study. Firstly, it was only conducted in the Odessa region and we cannot make references to the rest of Ukraine, however, the frequency of respiratory diseases among infants does not

differ greatly between regions in Ukraine. The study also investigated the prevalence of passive smoking only among infants and not young children. However, the study did demonstrate that the frequency of passive smoking among infants with pneumonia of different severity was higher than the frequency of second hand smoke exposure in the general population (32.7% vs 24.5%). Therefore it is expedient to study the gene polymorphism that encode pro-inflammatory and anti-inflammatory proteins in infants who are exposed to the adverse effects of passive smoking which will give an opportunity to predict the course, duration and outcome of pneumonia among such children.

5.1 Key points

The level of passive smoking among infants in the southern part of Ukraine is unexpectedly high.

Newborn girls appear to be exposed at a higher rate to passive smoking than in the families which are free from second hand smoke exposure.

Passive smoking leads to the increased frequency of morbidity among infants, which are exposed to tobacco smoke

6.0 FUNDING

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7.0 CONFLICTS OF INTEREST

None declared

8.0 SOURCES OF FUNDING

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REFERENCES

1. Andreeva TI, KrasovskyKS. Changes in smoking prevalence in Ukraine in 2001 – 2005. *Tob Control* 2007; 16:202 – 6.
2. Children's Health and the Environment. WHO Training Package for the Health Sector www.who.int/ceh.
3. Aryayev N., Zaporozhan V., Bredeleva N. Prenatal Risk Factors, Associated with SIDS in Odessa (Ukraine) // *Pren. and Neon. Med.* – 1996. – suppl.1, vol.1. – P.293.
4. Courage CM. Environmental tobacco smoke. In: *Children's health and environment: A review of evidence. A joint report from the European Environment Agency and the WHO Regional Office for Europe.* Tamburlini G, von Ehrensteing O, Bertollini R, eds. WHO Regional Office for Europe, Copenhagen 2002. Available at www.euro.who.int/data/assets/pdf_file/0007/98251/E75518.pdf - accessed March 2011
5. Lando HA, et al. Tobacco is a global pediatric concern. *Bulletin of the World Health Organization*, 2010, 88:2- 2.
6. Conrad A, et al. German environmental survey IV: children's exposure to environmental tobacco smoke. *Toxicology Letters*, 2010, 192(1):79-83.
7. Statistica 7.0. Microsoft Excel™ 2003 USA