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CORELATION OF AVERAGE ANNUAL CONCENTRATION OF SO2 AND INHALATION BRONCHODILATATION THERAPY USE IN CHILDREN UP TO 6 YEARS OF AGE (2000. – 2011.)

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ABSTRACT

Introduction: *Setting the town of Zenica, with high concentrations of pollutants in the air, as a consequence of the technological process of production of ferrous metals, a large number of motor vehicles, local furnace with uncontrolled combustion processes, in geographically closed basin, the cause of the high risk of emergence and worsening of obstructive pulmonary diseases in population of Zenica, especially in children younger than 6 years as a high-risk groups.****Objective:*** *The main objective of this work was to determine the correlation between average annual concentration of SO2 at a rate prescribed inhalation bronchodilation therapy, in the year 2000. - 2011.* **Methods:** *We analyzed the movement of average annual concentrations of sulfur dioxide in the town of Zenica and the rate for inhalation bronchodilation therapy, and the statistical correlation between these two health-statistics appear in the year 2000. - 2011. year.* ***Results:*** *The observed preiod 2000th - 2011. years, we found that the average annual concentration of sulfur dioxide recorded in Zenica ranged: from 47μg/m3 air in 2000. year to 139 μ g/m3 air in 2011. year. The annual rate for inhalation bronchodilation therapy in 100 examinations of children ranged from 2.1% in 2000. year to 13.4% in 2011. year. Pearson's correlation coefficient between the average annual concentration of SO2 in μg/m3 air rate for inhalation bronchodilation therapy is r = 0.818, which means that there is a significant positive correlation between these two phenomena and that this correlation is significant (p <0.05).* ***Conclusion:*** *Increased average annual concentration of SO2 in ambient air, affecting the rate increase application inhalation bronchodilation therapy in children aged under 6 years.*

Key words: air quality, Zenica, children, bronchodilation therapy, correlation.

1.INTRODUCTION

Setting the town of Zenica, with high concentrations of pollutants in the air, as a consequence of the technological process of production of ferrous metals, a large number of motor vehicles, local furnace with uncontrolled combustion processes, in geographically closed basin, the cause of the high risk of emergence and worsening of obstructive pulmonary diseases in population of Zenica, especially in children younger than 6 years as a high-risk groups. [1,2,3,4,5] Sulfur and sulfurous acid generated from sulfur oxides in the presence of water steam, irritates mucosa at the concentrations as low as 0.02 mg/l, and at 0.1 mg/l it leads to grave impairments of pulmonary parenchyma .[6,7,8]. The greater frequency was found of respiratory symptoms in relation to comparative environment.[9,10,11,12] More recent studies show correlation between short-term exposure to increased concentration to suspended particles and sulphurdioxide in the air and deteriorated respiratory functions, deteriorated respiratory organs irritation symptoms, increased consumption of drugs for treating breathing organs diseases and increased number of admission to health care facilities. Health workers can contribute to reduced air pollution by waste material communicating to general public information on harmful impacts of pollutants on children and adults health. .[13,14,15]

2.OBJECTIVE

The main objective of this work was to determine the correlation between average annual concentration of SO2 at a rate prescribed inhalation bronchodilation therapy, in the year 2000. – 2011.

3. METHODS

We analyzed the movement of average annual concentrations of sulfur dioxide in the town of Zenica and the rate for inhalation bronchodilation therapy, and the statistical correlation between these two health-statistics appear in the year 2000. - 2011. year.

4.RESULTS

4.1.The annual rate of application of bronchodilation therapy, and the average annual concentration of sulfur dioxide (SO2) in the period 2000 - 2011. year

Table 1. The annual rate of application of bronchodilation therapy, and the average annual concentration of sulfur dioxide (SO2) in the period 2000 - 2011. year

Year of observation	The annual rate bronhodilatatornih therapy in 100 medical examinations (%)	The average annual concentration of SO2 in µg/m3 of air
2000	2,1	47
2001	4,9	42
2002	4,79	53
2003	5,19	55
2004	8,1	53
2005	9,02	67
2006	12,9	73
2007	12,2	98
2008	12,9	98
2009	11,0	126
2010	13,1	114
2011	13,4	139

The observed preiod 2000th - 2011. years, we found that the average annual concentration of sulfur dioxide recorded in Zenica ranged: from 47µg/m3 air in 2000. year to 139 µ g/m3 air in 2011. year. The annual rate for inhalation bronchodilation therapy in 100 examinations of children ranged from 2.1% in 2000. year to 13.4% in 2011. year.

4.2. Correlation of average annual concentrations of SO2 and inhalation bronchodilatation therapy use in children up to 6 years of age in area Zenica (2000. – 2011.)

Table 2. Correlation of average annual concentrations of SO2 and inhalation bronchodilatation therapy use in children up to 6 years of age in area Zenica (2000. – 2011.)

		The average annual concentration of SO2 in µg/m3 of air
The annual rate bronhodilatatornih therapy in 100 medical examinations (%)	Pearson Correlation	0.818**
	Sig. (2-tailed) **p**	0.001
	Sum of Squares and Cross-products	1207.293
	Covariance	109.754
	N	12

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson's correlation coefficient between the average annual concentration of SO2 in µg/m3 air rate for inhalation bronchodilation therapy is r = 0.818, which means that there is a significant positive correlation between these two phenomena and that this correlation is significant ($p < 0.05$).

5.DISCUSSION

The average annual concentration of SO2 in the municipal center of the city of Zenica in the year 2000. - 2011. years ranged from 47µg/m3 air in 2000. year to 73 µg/m3 air in 2006. year, which is below the limit values for SO2 in the municipal center (90µg/m3 air), and SO2 concentrations were close to the target value (60 µg/m3 of air). Since 2007. The average annual concentration of SO2 in the town of Zenica increase of 98 µg/m3 of air in 2007. year to 139 µg/m3 air in 2011. year. Following the annual rate of application bronchodilation therapy in children aged under 6 years, we increase the rate of change of therapy and correlation application bronchodilation therapy with a mean annual concentrations of SO2 in the municipal center of the town of Zenica. Sparse data in the literature on this subject in recent testing period. This research is consistent with research on the effects of the concentration of SO2 in the air with a utility other phenomena related to the health of children in this age group.

6.CONCLUSIONS

Iron and steel industry has always been intrinsically related to human environment. Due to emissions of large quantities of sulfur dioxide and other pollutants into atmosphere, the air quality in Zenica had a negative impact on public health. A deep geographical ravine of Zenica's relief has poor air ventilation which makes the pollutants remain in the lower atmospheric layers for a prolonged time. Meteorological conditions for pollutants dispersion in Zenica are very poor. With the renewed start-up of the black metallurgy facilities, one could reasonably expect frequent episodes of high-level pollution under adverse weather conditions, particularly in late autumn or in winter time. In view of health and medical-ecological aspects, restarting of the black metallurgy facilities threatens to jeopardize the health of Zenica's inhabitants once again. Increased average annual concentration of SO2 in ambient air, affecting the rate increase application inhalation bronchodilation therapy in children aged under 6 years.

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