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# Effect of Cigarette Smoking in Pregnancy on Infants Anthropometric Characteristics

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## ABSTRACT

**Aim:** The main goal of this research is to correlate anthropometric characteristics of newborns in pregnant women who consume cigarettes during pregnancy. The study was conducted at the Obstetrics Clinic of the Clinical Center, University of Sarajevo. **Methods:** The retrospective study covered a period of two years. Main inclusion criteria for the study was that pregnant women consume cigarettes during pregnancy. The research included respondents who had a singleton pregnancy, without pathological conditions that can affect the outcome and duration of pregnancy. **Results:** At the Obstetrics Clinic, Clinical Center University of Sarajevo in the period from January 1, 2012 to December 31, 2013. In that period 393 pregnant women completed labor who in the personal history had data on smoking during pregnancy. Of the total number of subjects enrolled in this study 38.17% smoked up to 10 cigarettes a day, 33.08% smoked up to 20 cigarettes a day, while up to 30 cigarettes per day smoked 28.75% of respondents. **Conclusion:** There was a significant difference in the average values of all anthropometric parameters, in relation to the number of cigarettes consumed by the subjects during the day. We also found negative correlation in the average values of anthropometric measures and the number of cigarettes consumed ( $p < 0.05$ ).

**Key words:** smoking, pregnancy, newborn.

## 1. INTRODUCTION

The purpose of the pregnancy is the creation of a new life. In moment when they find out that they are pregnant all expectant mothers have to decide whether or not to continue smoking. Pregnancy can be a powerful incentive for women to give up smoking because otherwise they inflict harm to the health of their baby, which completely depends on the body of the mother. Cigarette smoke contains more than 4,000 chemicals and at least 60 of them cause cancer (1). By smoking during pregnancy, the baby through a blood-flow receives a series of harmful substances and toxins, and the bloodstream of the mother is the only source of oxygen and nutrients for the baby. Although none of these 4,000 chemicals is not good for the baby, the two compounds are especially harmful—nicotine and carbon monoxide (2). Most serious complications, including low birth weight, premature birth and stillbirths, causing the effects of nicotine and carbon monoxide, which reduces the supply of oxygen for the baby. Nicotine causes constriction of blood vessels throughout the body, including those in the umbilical cord. It's like forcing the baby to breathe through a narrow straw. To make matters worse, the red blood cells, which carry oxygen, will begin to collect the carbon monoxide, which will expand through the entire body of the baby. According to data by the WHO in Europe 20-30% of women of childbearing age are

smoking (3). Only one-fifth to one-quarter of them will stop smoking during pregnancy and breast feeding and from them even two-thirds will start smoking again after this period (4).

## 2. GOAL

The main research goal is to correlate the anthropometric characteristics of newborns in pregnant women who smoke cigarettes during pregnancy.

## 3. MATERIAL AND METHODS

The study was conducted at the Obstetrics Clinic, Clinical Center University of Sarajevo. The retrospective study covered a period of two years. Basic inclusion criteria for the study was that pregnant women consume cigarettes during pregnancy. The research included respondents who had a singleton pregnancy, without pathological conditions that can affect the outcome and duration of pregnancy. Also, from respondents were required to know the first day of the last menstrual period to determine gestational age. For each newborn is determined birth weight and length, as well as head circumference. Data for this study were obtained from the protocol of the birth theater and respondents history. All data were entered into a statistical-mathematical program SPSS version 20 where they were processed, and the results are presented in tables and charts.

## 4. RESULTS

At the Obstetrics Clinic, Clinical Center University of Sarajevo in the period from January 1, 2012 to December 31, 2013 there was 393 completed births by pregnant women who had in the personal history data on smoking. During the admission and taking the anamnesis they answered how many cigarette they smoke daily. Of the total number of respondents covered by this study 38.17% (N=150) had smoked up to 10 cigarettes a day, 33.08% was smoking up to 20 cigarettes a day (N=130), while up to 30 cigarettes a day smoked 28.75% (N=113) of respondents. A statistically significant difference in the number of women in relation to the test groups was not found,  $\chi^2=5.332$ ;  $p=0.06$  (Table 1).

	Number	Percent %
Up to 10 cigarettes daily	150	38.17
Up to 20 cigarettes daily	130	33.08
Up to 30 cigarettes daily	113	28.75
Total	393	100.00

Table 1. Distribution of respondents according to the number of cigarettes consumed during the day

By analyzing the weight of newborns in relation to the number of cigarettes that the respondents consumed during the day it was found that respondents who consumed up to 10 cigarettes a day, mostly had newborns with body weight between 2201-2500 grams (90.67%), respondents who consumed up to 20 cigarettes a day in 57.69% cases bore infants with weight 2201-2500 grams, and 34.62% with body weight between 2001-2200 grams. The respondents who consumed 30 cigarettes per day in 75.22% of cases gave birth to newborns with weight of 1500-2000 grams (Figure 1).

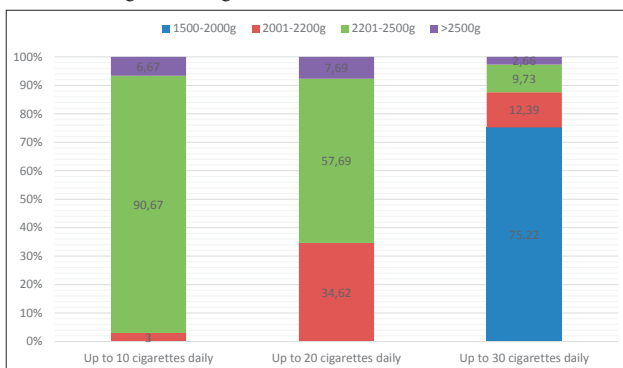


Figure 1. Body weight of the infants in relation to the number of cigarettes that their mothers consumed during pregnancy

Anthropometric characteristic (X±SD)	Up to 10 cigarettes daily	Up to 20 cigarettes daily	Up to 30 cigarettes daily
Body weight (grams)	2755.10±283.5	2330.50±145.5	2042±311.5
Body length (cm)	48.7±2.8	45.1±1.1	43.2±1.9
Head circumference (cm)	33.29±0.9	31.17±1.3	29.98±2.5
Average gestational age (weeks)			
Before term	34.11±1.9	33.00±0.7	31.98±1.0
In term	38.51±0.6	37.70±0.3	36.44±1.3
After term	41.20±1.1	0	0
P<0.05			

Table 2. Anthropometric characteristics of the newborn and smoking in pregnancy

Table 2 shows the average values of the anthropometric characteristics of newborns in comparison to the number of cigarettes that the mothers consumed during pregnancy. A statistically significant differences is determined in the mean

values of anthropometric parameters in relation to the number of cigarettes consumed by the mothers during the day. We also found a negative correlation between the average values of anthropometric measures and the number of cigarettes consumed ( $p<0.05$ ). It was also found that eight newborns of pregnant women who smoked up to 30 cigarettes a day had been diagnosed with anencephaly, while in two cases was found anomalies (shorter limbs and atresia of the anus).

## 5. DISCUSSION

By smoking during the pregnancy the toxins from tobacco enters into the bloodstream, which is the baby's only source of oxygen and nutrients (4). Nicotine in pregnancy damages the DNA of the fetus and causing genetic abnormalities—carbon monoxide and other chemicals in cigarettes entering the fetus blood, endangering the baby's health and have the impact on its growth and development (5). Numerous studies have determined that cigarette smoking leads to the birth of children with low birth weight, increased perinatal and neonatal morbidity and mortality (6). Studies have shown that smoking during pregnancy can lead to obesity of the child during teenage years. Teenagers whose mothers smoke have on average 26% more fat in the body than teenage mothers non smokers (7). In studies it has been found that nicotine affects the brain functions related to metabolism and motivation for food. As a result of changes in brain function, teenage obesity may have led to a variety of health problems including diabetes, hypertension and cardiovascular diseases. Compared with women who did not smoke, women who smoked before pregnancy have twice as many chances to experience difficulty in conception and are 30% more likely to be infertile. Women who smoke during pregnancy are twice more likely to experience premature rupture of the membrane and tear off the placenta during pregnancy. Babies whose mothers smoked during pregnancy are about 30% more likely to be born prematurely. There is a greater likelihood that their children are born with low birth weight (less than 2,500 grams), which makes the baby weak and increases the risk of many health problems (8). These babies have on average 200 grams lower body weight than newborns whose mothers did not smoke. There is also 1.4 to 3 times greater chance that the baby will die of sudden infant death syndrome (SIDS) (9).

## 6. CONCLUSION

This research has proven the harmful effects of cigarette smoking during pregnancy on anthropometric characteristics of newborns. The number of cigarettes consumed by pregnant women during the day directly affects the weight of newborns, and there is a statistically significant negative correlation with the gestation duration.

CONFLICT OF INTEREST: NONE DECLARED.

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