

Effect of Smoking during Pregnancy on Birth Weight, Placental Weight, and Time of Third Stage of Labor

Tariq A. Al-Shemmeri

Department of Cardiothoracic Surgery, Al-Sadder Medical City, Najaf Governorate, Iraq

Abstract

Background: Cigarette smoking of the mother during pregnancy is a well-known cause associated with adverse reproductive outcomes, including increase in the incidence of placenta previa, abruption-placentae, and double the risk of infant mortality from all causes. **Objective:** This study aims to demonstrate the effect of smoking, whether active or passive, on the newborn body weight, placental weight, and the time of the third stage of labor. **Materials and Methods:** This prospective study involves sixty patients, their ages range between 20 and 32 years, all of them underwent vaginal deliveries, and the lowest accepted packed cell volume (PCV) was 32%. The participants were classified into four groups: active smokers, passive smokers, mixed smokers, and the rest who are nonsmokers, representing the control group. The following data were collected from every: age, gravidity and parity, and number of cigarettes per day, and for each female, the newborn body weight, placental weight, the time of the third stage of labor, and PCV of the mother were estimated. **Results:** Among these sixty patients who involved in the study, 3% were active smokers, 31% were passive smokers, 27% were mixed smokers, and 39% were nonsmokers; the mean newborn body weight of nonsmokers (control group) was 3252 g; active smokers, 2430 g; passive smokers, 2819 g; and mixed smokers, 2407 g. The mean placental weight in nonsmokers was 527 g; active smokers, 640 g; passive smokers, 551 g; and mixed smokers, 599 g. The time of the third stage of labor in nonsmokers was 6.9 min; active smokers, 12 min; passive smokers, 5.8 min; and mixed smokers, 6.6 min. **Conclusions:** Cigarette smoking by pregnant women leads to a low birth weight and larger placenta and may interfere with the time of the third stage of labor.

Keywords: Pregnancy hazard, smoking and pregnancy, smoking effect, smoking with labor

INTRODUCTION

Cigarette smoking of the mother during pregnancy is a well-known cause associated with adverse reproductive outcomes, including increased incidence of placenta previa, abruption-placentae, bleeding during pregnancy, premature rupture of membranes, and reduced fertility. Exposed infants are more likely to be of low birth weight (<2500 g) and have double the risk of infant mortality from all causes, specifically from sudden infant death syndrome. Cigarette smoking contains many toxic components but nicotine, the main addictive compound, is a strong vasoconstrictor that reduces uterine and placental blood flow. Other toxic components include carbon monoxide and cyanide. Carbon monoxide attached to hemoglobin and decreases the availability of oxygen to the fetus, while cyanide depletes Vitamin B12, a necessary cofactor for fetal growth and development.^[1]

The level of nicotine and thiocyanate in the blood of pregnant women is 20%–30%. Continuation of smoking during

pregnancy causes decreased fertility as well as increased spontaneous abortion, preterm birth, perinatal mortality, and low-birth-weight infants 200 g decrease in birth weight for every 10 cigarettes smoked per day.^[2]

Smoking, poor nutrition and poor weight gain during whole pregnancy, and use of drugs such as cocaine or alcohol play important roles in the incidence and outcome of low-birth-weight infants, and some of this effect is due to restricted fetal growth as well as preterm birth.^[3]

Smoking and exposure to second-hand smoke during pregnancy directly increase the risk of each of the following: ectopic pregnancies, infantile colic, other birth and delivery

Address for correspondence: Dr. Tariq A. Al-Shemmeri, Department of Cardiothoracic Surgery, Al-Sadder Medical City, Najaf Governorate, Iraq.
E-mail: tariqaljuma@gmail.com

Access this article online

Quick Response Code:



Website:
www.medjbabylon.org

DOI:
10.4103/MJBL.MJBL_51_18

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Al-Shemmeri TA. Effect of smoking during pregnancy on birth weight, placental weight, and time of third stage of labor. *Med J Babylon* 2018;15:381-4.

problems, childhood wheezing, respiratory disorders in childhood, brain damage during gestation, growth retardation, eye problems during childhood, later overweight in children, mental retardation, abnormal blood pressure in infants, attention deficit disorder, infant death from perinatal disorders, behavioral problems, cleft palates and lips, youth and adult violence and criminality, cancer-causing agents in infants' blood, smoking during adolescence, and potentially carcinogenic genetic mutations such as childhood leukemia.^[4]

Smoking during pregnancy doubles the risk of having a low-birth-weight baby and significantly increases the rate of perinatal morbidity and several other adverse pregnancy outcomes.^[5]

About 21% of American adults (44.5 million people) smoke and more than 440,000 Americans die from tobacco-related causes each year; in other words, one from five deaths is related to tobacco use; the Centers for Disease Control and Prevention estimates that 18.3% of American women used cigarettes in 2008.^[6]

Education during pregnancy to stop smoking is strongly effective; elimination of smoking during pregnancy would decrease the perinatal mortality rate by 5%.^[7]

Every one cigarette you smoke harms your baby; cigarettes restrict the essential oxygen supply to your baby, so their tiny heart has to beat harder every time you smoke, cigarettes contain over 4000 chemicals, and protecting your baby from tobacco smoke is one of the best things you can do to give your child a healthy start in life.^[8]

Women who smoke have a good understanding that smoking can have harm on the lungs, and on breathing, women across the subgroups in this study feel that the main impact of smoking during pregnancy relates to lung problems, asthma, and breathing issues for the baby. Other effects mentioned by women include poisoning the baby, toxins present, deformities, cot death, and low birth weight.^[9]

The mechanism behind the decrease in fetal growth caused by maternal smoking has not been clarified, but it probably results from a combination of factors such as reduced intervillous blood flow, the effect of carbon monoxide and thiocyanate on the fetus, and reduced prostacyclin production.^[10] Maternal smoking increases the risk of developing chronic diseases in adulthood, such as hypertension, type 2 diabetes, and coronary heart disease.^[11]

This study aims to demonstrate the effect of smoking, whether active or passive, on the newborn body weight, placental weight, and the time of the third stage of labor.

MATERIALS AND METHODS

This prospective study involves sixty patients, their ages range between 20 and 32 years, all of them underwent vaginal deliveries, none of them had any medical or surgical disorders, and the lowest accepted packed cell volume (PCV) was 32%.

The participants were classified into four groups: active smokers (only mother), passive smokers (their husbands are smokers), mixed smokers (both parents are smokers), and the rest who are nonsmokers, representing the control group.

The following data were collected from each patient: age, gravidity and parity, and number of cigarettes per day. Moreover, for every female, we estimated the newborn body weight, placental weight, and the time of the third stage of labor.

PCV of the mother was measured by capillary tube which was sealed by a sealing material, centrifuged by a microcentrifuge for 5 min (3000 rpm), and then read by the scale.

For evaluation of the significance of smoking as a risk factor for pregnant women, the *t*-test function with nonequivalent array was used to estimate the *P* (probability) value, using Microsoft Excel 2010; *P* < 0.05 was considered statistically significant, and if lower than this value, the relation is considered stronger.

RESULTS

Figure 1 demonstrates the groups of our study, showing that the majority of mothers were nonsmokers (23 mothers, [39%]), while majority of smoking mothers were passive smokers (18 mothers, [31%]), 16 mothers were mixed smokers (27%), and the active smokers were the least group (only 2 mothers, [3%]).

Smoking with newborn body weight

Table 1 shows the relation of newborn body weight (in gram) and the smoking of the pregnant mothers. In the first group of nonsmokers (control group), the results found that the mean newborn body weight was 3252 g, with standard deviation of 337 g. In the second group of active smokers, the mean newborn body weight was 2430 g with standard deviation of 330 g and *P* < 0.05, which means highly significant relationship. In the third group of passive smokers, the mean newborn body weight was 2819 g with standard deviation of 420 g and *P* < 0.001, which means highly significant relationship. In the fourth group

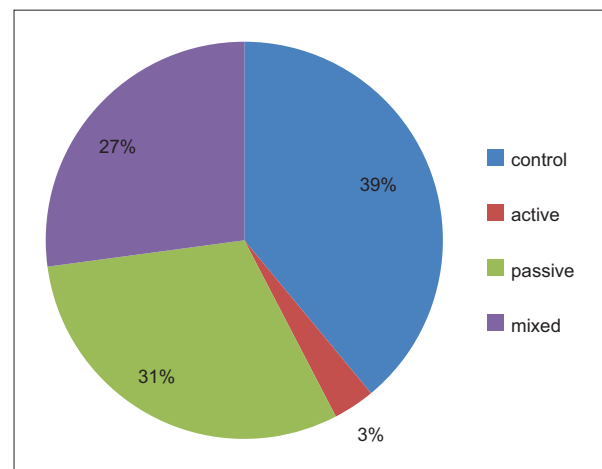


Figure 1: Groups of the study

of mixed smokers, the results found that the mean newborn body weight was 2407 g with standard deviation of 494 g and $P < 0.001$, which means highly significant relationship.

Smoking and placental weight

In the first group of nonsmokers (control group), the results found that the mean placental weight was 527 g with standard deviation of 34 g. In the second group of active smokers, the mean placental weight was 640 g with standard deviation of 170 g and $P < 0.001$, which means highly significant relationship. In the third group of passive smokers, the mean placental weight was 551 g, with standard deviation of 58 g and $P < 0.05$, which is a significant relationship. In the fourth group of mixed smokers, the results found that the mean placental weight was 599 g, with standard deviation of 28 g and $P < 0.001$, which means very high significant relationship [Table 2].

Smoking with the time of the third stage of labor

In the first group of nonsmokers (control group), the results found that the mean duration was 6.9 min with standard deviation of 2 min. In the second group of active smokers, the mean duration was 12 min with standard deviation of 2 min and $P < 0.05$, which means relationship. In the third group of passive smokers, the mean duration was 5.8 min with standard deviation of 2 min and $P = 0.08$. In the fourth group of mixed smokers, the results found that the mean duration was 6.6 min with standard deviation of 2.8 min and $P = 0.334$ [Table 3].

The above results concluded that there was no relation between increasing the time of labor and increasing the strength of the smoking.

Table 1: Smoking with newborn body weight

Group	Control	Active	Passive	Mixed
Newborn body weight (g)	3252	2430	2819	2407
SD	337.0196	330	420.0327	494.0648
P		0.017742	0.000753	1.83E-06

SD: Standard deviation

Table 2: Smoking with placental weight

Group	Control	Active	Passive	Mixed
Placental weight (g)	527	640	551	599
SD	34.4824	170	58.82859	28.17911
P		8.96E-09	0.017321	1.9E-09

SD: Standard deviation

Table 3: Smoking with the third stage of labor

Group	Control	Active	Passive	Mixed
Third stage of labor (min)	6.9	12	5.8	6.6
SD	2.17652	2	2.424158	2.872281
P		0.011054	0.08152	0.334121

SD: Standard deviation

DISCUSSION

Regarding smoking and newborn body weight, the results of this study showed that the newborn body weight of smoker mothers whether active or passive or mixed was less than that of nonsmokers (control group) with $P < 0.001$, which means that there was a highly significant relationship between smoking and decreasing the weight of the newborn baby, as shown in Table 1. These results were similar to many studies analyzed the effect of smoking on birth weight, fetal growth retardation, and prematurity, in over 17,000 pregnancies, which confirmed that smoking lower the birth weight both by decreasing fetal growth and by decreasing gestation age at delivery.^[1,2,3,6,8,10]

Another prospective studies showed a mean birth weight reduction of 400 g in the smoking group; the patients have been matched for height, weight, socioeconomic status, and gestational age. Each patient in this study was in addition, free from all significant medical and obstetric disorders. Very few authors who disagreed with the above views, arguing that particular type of woman (both smokers and nonsmokers), gave birth weight of small children, since such an association could be demonstrated in women who did not start to smoke until the child was born.^[2,7,8,10]

Regarding smoking and placental weight, the results of this study showed that the placental weight of smokers whether active or passive or mixed was more than that of nonsmokers (control group) with $P < 0.01$, which means that there was a highly significant relationship between smoking and increasing the weight of the placenta, as shown in Table 2. These results were similar to those obtained by researches, how found that the extensive placental calcification at 37 weeks was doubled (36% vs. 14%), in smokers, which subsequently leads to heavier placenta.^[7,8] This could explain the increase in the placental weight either by the effect of relative hypoxia or due to the more calcification, and in both conditions, there is a compensatory increase in the size of the placenta.

Regarding smoking and the third stage of labor, the results of this study showed that although the time of the third stage of labor is about 10 min, which is considered to be relatively short in relation to the duration of whole labor, it carries almost the highest risk of complications. In this study, there was no significant relationship between smoking and time of the third stage of labor ($P > 0.05$) [Table 3]. This could be explained as the larger placenta of smokers, the premature placental calcification, and aging process, all lead to a wider and more attached placenta which require a longer time for separation.

The incidence of abortion is more in smoking women than nonsmokers, but this does not conclude that this increase is due to the effect of smoking because we did not exclude the other causes of abortion.

CONCLUSIONS

Cigarette smoking by pregnant women leads to a low birth

weight and larger placenta and may interfere with the time of the third stage of labor.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Bashiri A, Harlev A, Agarwal A. Recurrent Pregnancy Loss. 1st ed. Switzerland: Springer International Publishing; 2016. p. 137.
2. Norwitz E, Schorge J. Obstetrics and Gynecology at a Glance. 4th ed. Oxford, UK: British Library, A John Wiley & Sons, Ltd.; 2013. p. 107.
3. Leveno K, Alexander J, Andujo O, Bloom S, Bryant M, Casey B, *et al.* Williams Manual of Pregnancy Complications. 23rd ed. United States: The McGraw-Hill Companies; 2013. p. 278.
4. Schmidt L. Campaign for Tobacco-Free Kids, Where Do Youth Get Their Cigarettes? 2013. Available from: <http://www.tobaccofreekids.org/research/factsheets/pdf/0073.pdf>. [Last accessed on 2018 Jun 03].
5. Amasha H, Jaradeh M. Effect of active and passive smoking during pregnancy on its outcomes. Health Sci J 2012;6:336.
6. Curtis M, Linares S, Antoniewicz L. Glass Office Gynecology. 7th ed. USA: Library of Congress Cataloging, Wolters Kluwer Health Lippincott Williams & Wilkins; 2013. p. 385.
7. Pfeifer S, Adamczak J, Albright D, Arya L, Asher J, Bader T, *et al.* NMS Obstetrics and Gynecology. 7th ed. Philadelphia, USA: Lippincott Williams & Wilkins, a Wolters Kluwer Business; 2012. p. 38.
8. Byrom S, Cooper J, Edington A, Elliman D, Gutteridge K, Henry S. The Pregnancy Book. U.K: World Health Organization Guide, by COI for the Department of Health; 2009. p. 30.
9. Mitchelhill G, Dickinson D. Smoking and Pregnancy Audience Research. Vol. 1. Synovite, Health Sponsorship Council; 2009. p. 50.
10. Arias F, Daftary S, Bhide A. Practical Guide to High-Risk Pregnancy and Delivery. 3rd ed. New Delhi, India: Reed Elsevier India Private Limited.; 2008. p. 111.
11. Chiolero A, Bovet P, Paccaud F. Association between maternal smoking and low birth weight in Switzerland: The EDEN study. Swiss Med Wkly 2005;135:525-30.

