



The Relationship Between Maternal Passive Smoking During Pregnancy and Preterm Delivery

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ABSTRACT

Background: Maternal passive smoking or exposure to environmental tobacco smoke may be a risk factor for maternal and newborn morbidity.

Objectives: The current study aimed to assess the relationship between preterm delivery and tobacco smoke exposure in pregnant woman referring to the Shabih-Khani maternity hospital in Kashan, Iran.

Patients and Methods: An analytical retrospective cohort study was conducted on 300 non-smoker pregnant women in two groups of passive smoking and non-passive smoking. Passive smoking was defined as exposed to smoking of 5 or more cigarettes per day during pregnancy at home. Preterm delivery compared between passive smoking and non-passive smoking groups.

Results: Preterm delivery in the passive smoking group was more than non-passive smoking group (10% versus 6%, $P = 0.2$), this difference was not significant. Gestational age was similar in the two groups (38.96 ± 1.56 and 38.99 ± 1.42 weeks in the passive and non-passive smoking groups respectively).

Conclusions: Preterm delivery in the exposed group was more than non-exposed group, but difference was not significant.

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► Implication for health policy/practice/research/medical education:

The health educators should inform pregnant women about the hazards of passive smoking at home.

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1. Background

There is a growing awareness of the harmful effects of smoking during pregnancy. Exposure to substances like nicotine and carbon monoxide, is associated with a number of serious complications during pregnancy (1), increased rates of spontaneous abortion, preterm birth, placental abruption, growth restriction, premature rup-

ture of membranes, miscarriage and stillbirth are some of the consequences of environmental tobacco smoke exposure (ETSE) and may result in increased perinatal morbidity and mortality (2-4). ETSE during pregnancy also increases the risk of developmental deficiencies, adult chronic illnesses such as heart disease, diabetes, cancer and reproductive disorders (5). Such effects are

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dose-responsive (6). Based on a research in Iran, 29.3% of pregnant women were passive smokers (7). Preterm birth (< 37 weeks) has considerable impacts on infant (8, 9). Many maternal and fetal diseases can be identified in the etiology of preterm labor. The socioeconomic factors and the presence of harmful lifestyles such as active or passive smoking, pregnancy complications (hypertensive disorders and ante partum hemorrhage, lack of antenatal care, premature rupture of membranes, infection) are also related to preterm birth (10-13). Several studies were carried out to explore the role of passive smoking on preterm birth. A case control-study, showed no association between cotinine, cortisol and preterm births (14). In a review article, results showed that duration of gestation and preterm delivery were similar in ETSE group (exposed group) and non-exposed groups (15). In another study, women with hair nicotine levels greater than 0.35 ng/mL were more likely to deliver earlier (1 week) (16). A cross-sectional study in Jordan showed that the rate of preterm delivery among the exposed group was significantly higher than that of non-exposed group (17).

2. Objectives

Due to controversies in results of previous studies on the impact of passive smoking on preterm labor; the current study was performed in order to evaluate the relationship between passive smoking during pregnancy and preterm labor in women referred to Shabih-khani hospital in Kashan, Iran.

3. Patients and Methods

An analytic retrospective cohort study was conducted on 300 non-smoker women who delivered at Shabih-khani maternity hospital in Kashan city, Iran. Subjects consisted of two groups with the equal number of passive smokers and non-passive smokers. Passive smoking during pregnancy was defined as maternal exposure to five or more cigarettes smoking per day at home based on maternal self-report. The exposed group was selected by the sequential method. Non-exposed group was selected by taking the first patient in the ward who delivered after a patient in the exposed group, if women were not exposed to cigarette smoking at home during pregnancy. A checklist was used for data collection and it consisted of questions regarding demographic characteristics; obstetric history, gestational age and ETSE (number of cigarettes exposed to per day, passive smoking by husband or others). Content validity of the checklist was confirmed by midwifery faculty members and test-retest was performed to assess reliability of the check list. The sample size assuming α of 0.05, a β of 0.20 (power = 80%) and a prevalence of ETSE estimated at 15% based on a pilot study was calculated. Then, 150 subjects were estimated to be needed in each group. Inclusion criteria were starting prenatal care before 20 weeks of gestation, not having:

pre-existing diseases, pregnancy complications, twin pregnancy, preterm delivery due to medical conditions, fetus abnormality, and fetal death. Gestational age was estimated by valid LMP or Sonography. Data was recorded through interviews by trained midwives after delivery and using medical records. Preterm labor (gestational age < 37 weeks) and the mean of gestational age between the two groups were compared. SPSS software (version 16) was employed to analyze the data. Differences in means were analyzed using independent sample t-test and Mann-Whitney U-test. Chi-square test was also applied to nominal variables. *P*-value of less than 0.05 was regarded to be significant. The study protocol was approved by the local research council in Kashan University of Medical Sciences. All women were free to participate and they were assured of confidentiality of their personal information, also this study was approved by the research ethic committee in Kashan University of Medical Sciences

4. Results

Demographic characteristics of exposed and non-exposed groups were not significantly different (Table 1). Preterm delivery in the exposed group was more than non exposed group (10% vs. 6%, $P = 0.2$), no significant relationship was observed between preterm delivery and passive smoking. Gestational age was similar in the two groups (38.96 ± 1.56 and 38.99 ± 1.42 weeks in exposed and non exposed group respectively) (Table 2).

5. Discussion

Results indicated that preterm delivery in the exposed group was more than the non-exposed group, but the difference was not significant. Also no significant difference was observed between the two groups based on mean gestational age. While active maternal tobacco smoking has well known adverse perinatal effects, the effects of passive maternal smoking are less studied and less consistent. The current study results are consistent with several studies (3, 4, 17, 18) and against some others (14, 15). In the epidemiologic study, result showed an adverse effect of ETSE on preterm delivery (13). In a review study by Salmasi *et al.*, seventy-six articles were included with ETSE women and unexposed women. ETSE infants had lower weight, though the duration of gestation and preterm deliveries were similar (0.02 weeks) (15). Aliyu *et al.* have shown that women who smoked during pregnancy were at an increased risk for preterm birth (19). A case-control study conducted on pregnant Italian women also showed a relationship between active and passive smoking during pregnancy and preterm delivery (20). In conclusion, although the exposure of non-smoking pregnant women to ETSE increased the prevalence of preterm labor, but this association was not statistically significant. This information is important for women, their families and healthcare providers, and reinforces

Table 1. General Characteristics of Patients Studied in two Groups

	Exposed, No. (%) (n =150)	Non- Exposed, No. (%) (n = 150)	P value
Maternal age, y			0.74
< 20	24 (16)	27 (18)	
20 - 30	92 (61.3)	94 (62.7)	
30 - 40	34 (22.7)	29 (19.3)	
Gravid			0.34
1	54 (36)	62 (41.3)	
≥ 2	96 (64)	88 (58.7)	
Unwanted pregnancy			0.38
Yes	21 (14)	16 (10.7)	
No	129 (86)	134 (89.3)	
Gender of fetus			0.75
Female	76.2 (50.7)	73 (48.7)	
Male	74.8 (49.3)	77 (51.3)	
Level of education			0.35
Illiterate	11 (7.3)	6 (4)	
Primary school	41 (27.3)	48 (32)	
Middle school	45 (30)	33 (22)	
High school	39 (26)	46 (30.7)	
College education	14 (9.3)	17 (11.3)	
Occupational status			0.65
Employed	13 (8.7)	15 (10)	
Unemployed	137 (91.3)	135 (90)	
Type of delivery			0.72
Vaginal	84 (56)	81 (54)	
Caesarean	66 (44)	69 (46)	

Table 2. Distribution of Preterm Labor in Two Groups

	Exposed Group, No. (%) (n = 150)	Non-Exposed Group, No. (%) (n = 150)	P value
Preterm birth^a			0.20
Yes	15 (10)	9 (6)	
No	135 (90)	141 (94)	
Mean gestational age, y	38.96 (1.56)	38.99 (1.42)	0.86

^a Preterm birth defined as gestational age < 37 weeks

theneed for increased public education on prevention of exposure to ETSE.

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Authors' Contribution

Zohreh Sadat designed the research and performed

data analysis and prepared the first draft of the manuscript, Zahra Karimian and M. Abedzadeh Kalahroudi collected the data and made critical revisions on the final draft of the manuscript F. Bazarganipour and Z. Sehat contributed in data collection.

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The authors declare that they have no competing interests.

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