Available online at www.medicinescience.org

Medicine Science International Medical Journal

ORIGINAL ARTICLE

Medicine Science 2022;11(4):1548-52

Passive exposure to cigarette smoke of pregnants and the effect of passive exposure from cigarette smoke on newborn body sizes: A hospital focused cross-sectional study

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Received 22 July 2022; Accepted 06 November 2022
Available online 25.11.2022 with doi: 10.5455/medscience.2022.07.163

Abstract

Our aim is to examine the risk factors affecting the exposure of pregnant women to secondhand smoke. Sociodemographic, biodemographic, socioeconomic characteristics and newborn body measurements of pregnant women affected by cigarette smoke between January and November 2021 were evaluated. A study was conducted with 717 women in a second-level state hospital. Passive exposure to cigarette smoke; Compared to those with civil marriage, 1.519 (CI: 1.091-9499) times for those without a civil marriage, 4.625 (CI: 3.328-6.427) times for those who do not smoke a partner, 1.519 times for those with extended families compared to those with a nuclear family with income family type (CI: 1.091-2.114) times, it is 3.781 (CI: 1.960-7.292) times more for men who do not want pregnancy than for those who do not want to be pregnant. Health policies should not only inform the mother but also inform the whole society.

Keywords: Pregnancy, smoking, adverse pregnancy outcomes

Introduction

Smoking has been defined as bio-socio-psychological poisoning by the World Health Organization and is considered one of the most important global health problems [1]. According to WHO, 13% of women smoke worldwide, similarly, 13.1% of women in Turkey are smokers according to the data of the Turkish Statistical Institute (TUIK) [2,3].

Nicotine in cigarette smoke causes a decrease in uterine artery blood flow. In addition, it affects maternal and neonatal morbidity and mortality by inducing changes in umbilical artery blood flow, fetal oxygenation, and acid–base balance [4,5].

Passive smoking reportedly does not have a significant effect on birth outcomes; however, it is effective on postpartum complications [6]. The aim of this study was to examine the risk factors affecting exposure of pregnant women to secondhand smoke.

Material and Methods

Place of research

This study was conducted in a hospital in Eastern Turkey bordered by Iran, Georgia, Azerbaijan, and Armenia. The main livelihood of the region is agriculture and animal husbandry. Socioeconomic status of the region is below the national average of Turkey. A total of 11.7% of the local population are illiterate [7]. The infant mortality rate of the region is 11.2 per capita and maternal mortality rate is 24.5 per hundred thousand. Both are above the national average (infant mortality rate in Turkey is 6.8, maternal mortality rate is 14.6 per hundred thousand) [8].

Type of study

Hospital-based cross-sectional study

Population

The number of births in the hospital was 2183 in 2020. With the

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estimation that the same number of births would occur in 2021, study population was accepted as 2183.

Study Sample

With a known population, sample size was calculated with the following formula: n=Nt2 pq/d2 (N−1)+t2 pq. Here, N is the number of individuals in the population, n is the number of individuals to be sampled, p is the incidence (probability) of the event under investigation, q is 1−p, t is the theoretical value found in the t table at a certain degree of freedom and error level, and d is the desired standard deviation according to the incidence of the event. Accordingly, with p=0.50; q=0.50; t=1.96; and d=0.03, the sample size was determined as 717 women.

Exclusion criteria of the study

Smokers were not included in the study at the time of data collection. However, factors that may affect pregnancy outcomes were not included in the analysis. These factors were as follows: age of <18 or >35 years, lack of pregnancy follow-up, diabetes mellitus, chronic hypertension, autoimmune disease, anemia, uterine pathology, alcohol use, multiple pregnancy, and fetal anomaly.

Ethics committee and written/verbal approval

Ethical approval was obtained from the local ethics committee on 30/10/2020 with the number 81829502.903/99. In addition, written consent was obtained from the patients participating in the study. The study was conducted in accordance with the Declaration of Helsinki.

Data collection

The data were collected by the researcher between January 2021 and November 2021 in the delivery room during face-to-face interviews.

Dependent Variable

Passive exposure to cigarette smoke (PECS) was defined as exposure to

lit cigarette smoke and indirect exposure to cigarette smoke [9,10]. Passive exposure to cigarette smoke was defined as exposure to ≥10 cigarettes a day during pregnancy.

Independent Variables

Sociodemographic, biodemographic, and socioeconomic characteristics and body measurements of the newborn.

Newborn body measurements were recorded in the delivery room by the pediatrician within the first hour following birth.

Pilot Study

A pilot study was conducted with 7 women who gave birth. Necessary adjustments were made in the data collection form.

Statistical Analysis

All data were presented as mean ±standard deviation, median (minimum–maximum), or percentage. Chi-square test was used to compare numerical variables between the groups. Variables that were significant in Chi-square analysis were included in the logistic regression (backward:LR) analysis. P<0.05 was considered significant in all analyses. The Mann–Whitney U test and the independent t-test were used to perform intergroup comparisons of non-normally and normally distributed continuous variables, respectively.

Results

A total of 55.8% of pregnant women were exposed to passive smoking. Table 1 shows the effects of sociodemographic and biodemographic characteristics and health service use on PECS. As seen in Table 1, pairwise comparisons showed a significant difference in consanguinity between spouses (p=0.047), place of residence (p=0.019), family type (p=0.024), civil marriage (p=0.001), type of marriage (p=0.044), contribution of the mother to household income (p=0.001), health insurance (p=0.035), total income (p=0.007), woman intending pregnancy (p=0.001), man intending pregnancy (p=0.001), and smoking status of the husband (p=0.001) between PECS and non-PECS participants. No significant difference was found in age (p=0.850), size of household (p=0.134), education (0.904), number of pregnancies (0.131), antenatal examination by the family physician (p=0.952), and antenatal examination by the obstetrician (0.421) between PECS and non-PECS participants.

Table 2 shows the results of logistic regression analysis. Accordingly, PECS was 1.519 times

CI: 1.091–9499) more common in those without a civil marriage, 4.625 times (CI: 3.328–6.427) more common in those whose spouse did not smoke, 1.519 times (Cl: 1.091–2.114) more common in those with an extended family compared to those with a nuclear family, and 3,781 times (CI: 1.960–7.292) more common in those whose spouse intended the pregnancy.

When the effect of PECS on newborn parameters was evaluated, no statistically significant difference was found in terms of the mean week of gestation, head circumference, and height at the time of delivery (p=0.127, p=0.461, p=0.886, respectively). A statistically significant difference was found between PECS and low birth weight (p=0.008) (Table 3).

Discussion

Every year, 1.2 million people die worldwide owing to passive exposure to cigarette smoke [11]. The World Health Organization (WHO) has stated that all healthcare professionals should inform pregnant women about the complications that may occur as a result of exposure to cigarette smoke [12]. Therefore, investigation of PECS and prevention plans are among the important aspects of antenatal care.

In the study of Nakamura et al., 35.9% of pregnant women were exposed to passive smoking. In the study of Hamadneh et al. conducted in Jordan, this rate was 80%. In Turkey, different studies reported this rate as 69.2%, 64%, and 72.4% [13-16]. Consistent with the literature, 55.8% of pregnant women were passively exposed to cigarette smoke in the present study.

Table 1. The effect of the sociodemographic, biodemographic, and healthcare use of pregnant women on PECS

Independent variables		Dependent variable: PECS			X2	P
		No	Yes			
		Number (%)	Number (%)	Number (%)		
Residence	Town/Village	140 (39.8)	212 (60.2)	352 (49.1)	5.525	0.019
	City/County	177 (48.5)	188 (51.5)	365 (50.9)		
Age	≤19	36 (41.4)	51 (58.6)	87 (12.1)	0.326	0.850
	20-34	233 (44.6)	290 (55.4)	523 (72.9)		
	35≥	48 (15.1)	59 (14.8)	107 (14.9)		
Family type	Extended family	139 (39.8)	210 (60.2)	349 (48.7)	5.120	0.024
	Elementary family	178(48.2)	190 (51.8)	368 (51.3)		
People living in the house	≤4	138 (47.6)	152 (52.4)	290 (40.4)	2.248	0.134
	≥5	179 (41.9)	248 (58.1)	427 (59.6)		
Relation with the spouse	Yes	61 (37.4)	102 (62.6)	163 (22.7)	3.942	0.047
	No	256 (46.2)	298 (53.8)	554 (77.3)		
Civil marriage	No	8 (14.8)	46 (85.2)	54 (7.5)	20.461	0.001
	Yes	309 (46.6)	354 (53.4)	663 (92.5)		
Marriage type	Arranged marriage	183 (46.3)	198 (59.8)	381 (53.1)	4.050	0.044
	By agreeing	134 (41.2)	202 (52.3)	336 (46.8)		
Formal education	No	108 (43.9)	138 (56.1)	246 (34.3)	0.015	0.904
	Yes	209 (44.9)	262 (55.6)	471 (65.7)		
Contribution of the woman to the living of the family	No	271 (42.1)	373 (57.9)	644 (89.8)	11.648	0.001
	Yes	46 (63.0)	27 (37.0)	73 (10.2)		
Health insurance	No	23 (32.4)	48 (67.6)	71 (9.9)	4.462	0.035
	Yes	294 (45.5)	352 (54.5)	646 (90.1)		
Total income	Not sufficient	40 (33.1)	81 (66.9)	121 (16.9)	7.343	0.007
	Sufficient	277 (46.5)	319 (53.5)	596 (83.1)		
Pregnancy count	1-2	182 (46.8)	207 (53.2)	389 (54.3)	2.285	0.131
	≥3	135 (41.2)	193 (58.8)	328 (45.7)		
Desire of the woman for the pregnancy	No	30 (27.3)	80 (72.7)	110 (15.3)	15.116	0.001
	Yes	287 (47.3)	320 (52.7)	607 (84.7)		
Desire of the husband for the pregnancy	No	13 (17.6)	61 (82.4)	74 (10.3)	23.750	0.001
	Yes	304 (47.3)	339 (52.7)	643 (89.7)		
Smoking status of the husband	Yes	102 (26.8)	278 (73.2)	380 (53.0)	23.750	0.001
	No	215 (63.8)	122 (36.2)	337 (47.0)		
AH. prenatal examination	No	36 (43.9)	46 (56.1)	82 (11.4)	0.004	0.952
	Yes	281 (44.3)	354 (55.7)	635 (88.6)		
KDUz. Prenatal Examination	No	32 (40.0)	48 (60.0)	80 (11.2)	0.648	0.421
	Yes	285 (44.7)	352 (55.3)	637 (88.8)		
Total		**317 (44.2)**	**400 (55.8)**	**717 (100.0)**		

Table 2. The effect of the sociodemographic, biodemographic, and healthcare use of pregnant women on PECS

Independent variables		B	SE.	Wald	Odds Ratio	95% CI(Min-Max value)*
Civil marriage	No	1.418	0.169	6.130	1.519	1.091-9.499
	Yes				1(Reference)	
Partner's smoking status	No	1.531	0.168	83.224	4.625	3.328-6.427
	Yes				1(Reference)	
Family type	Insufficient	0.418	0.169	6.130	1.519	1.091-2.114
	Sufficient				1(Reference)	
Husband's desire for the pregnancy	Does not want	1.330	0.335	15.751	3.781	1.960-7.292
	Wants				1(Reference)	

Table 3. Distribution of PECS over the newborn's parameters

Newborn's parameters		No PECS	PECS	P
Pregnancy week	Mean±	38.31±2.06	38.02±2.37	0.127
Head circumference	Mean±	35.48±1.50	35.57±1.47	0.461
Stature	Mean±	49.84±2.79	49.81±2.59	0.886
Birth weight	2499≤	30 (32.6%)	62 (67.4%)	0.008
	2500≥	224 (47.6%)	247 (52.4%)	

According to literature evidence, PECS was higher in pregnant women living in villages. Although the binary comparisons in the present study were consistent with the literature, no significant difference was found in logistic regression analysis. This may be attributable to the fact that the region where the study was conducted is a rural area even though it includes villages and city centers [17,18].

Examination of the family type revealed that PECS was more common in women living in extended families. As a matter of fact, studies conducted in China and Iran, where the patriarchal family structure is dominant, as is the case in Turkey, have also shown that women could not object to family members and exposure to cigarette smoke was higher in the presence of older family members [19,20].

In the present study, PECS was 1.519 times more common among women with informal marriage compared to those with civil marriage. To the best of our knowledge, no study has reported on marriage type and its effect on PECS; however, Ergöl et al. reported that depression and smoking in women in the reproductive period were more common in informal marriage compared to civil marriages. We think that the reason for the increase in PECS in the absence of a civil marriage is related to higher incidence of depression and the woman generally feeling unwell [21].

In the present study, PECS was 3.781 times more common in women whose spouse or sexual partner did not want the pregnancy compared to those whose spouse or sexual partner wanted the pregnancy. Although evidence in the literature is insufficient, this may be attributable to stronger protective instincts toward wanting children. In fact, Cengizoğlu et al. showed that learning about pregnancy leads to an effort to quit smoking and staying away from environments where smoking is allowed, which is caused by protective instincts towards the fetus [8]. In addition, there is a one-child policy in China. Studies in China report that as the number of miscarriages increases, more care is given to pregnant women based on a protective instinct, and this decreases the rate of PECS [20].

Another interesting result of the present study is that while rate of PECS decreases when the spouse or sexual partner wants the pregnancy, no significant effect is observed when the mother wants the pregnancy. This may be attributable to the male-dominated patriarchal structure of the study population [19].

The results also showed that PECS rate increased when the spouse or sexual partner was a smoker. The indoor smoking ban excluding households came into effect in Turkey with the Law No. 5727 published on January 19, 2008. This led to a significant decrease in exposure to smoking in workplaces and the main site of exposure became the home. Therefore, it has become inevitable for women to be exposed to secondhand smoke when their husband is a smoker. This was also demonstrated in a study conducted in Spain with a similar smoking ban [22]. In addition, studies conducted in countries where the patriarchal family structure is dominant show that home is where the woman can spend time with her husband freely and women want their husbands to be with them at home. Therefore, the rate of PECS increases during pregnancy [20,22,23].

When other studies in the literature are examined, the rate of PECS appeared to decrease as women earn money and the economic status of the family improves. However, although pairwise comparisons revealed similar results in the present study, no significant results were obtained logistic regression analysis.

When newborn body measurement parameters were examined, a significant difference was noted in the rate of low birth weight between PECS and non-PECS women (p=0.008) (Table 3). Studies in the literature show the presence of a significant relationship between passive smoking and low birth weight, consistent with the results obtained in the present study [24-27]. This is attributed to fetoplacental respiration failure, fetal hypoxia, abnormal placentation and vasoconstriction in uteroplacental vessels after exposure to cigarette smoke [5].

Conclusion

Smoking and passive exposure to secondhand smoke are known to have long-term complications. However, pregnant women are continued to be exposed to cigarette smoke. To prevent this situation, measures should be implemented against effective risk factors.

One limitation of this study is that it was conducted in a single center and PECS was determined based on patient statements. However, it is important to note that, this is possibly the first study in the literature reporting data from this region.

Conflict of interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical approval
It was approved by the ethics committee of Kafkas University with the date of 30.10.2020 and number 81829502.903/99.

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