

Article

The Impact of Maternal Smoking on Perinatal Complications in Iraq

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Abstract: Smoking is negatively associated with birth outcomes for Iraqi pregnant women, with the fetus being at risk of stillbirth, neonatal death, and severe complications. The present study aims to investigate and enrol the clinical outcomes of perinatal complications among Iraqi smokers who are pregnant. A total of 63 pregnant Iraqi women, aged between 25 and 45 years, who had given birth in maternity hospitals in Baghdad, Iraq, were recruited between March 2023 and April 2024. The study enrolled the women's intrapartum outcomes, their daily cigarette use, and the dose of cigarettes they consumed during pregnancy. The clinical data pertaining to both the women and the fetuses were determined in terms of complications, pain, obstetric outcomes, and quality of life assessment. The study revealed that women in the 25 - 30 age group were the most prevalent participants, with 24 cases. The daily cigarette consumption was classified into four categories: <10 cigarettes per day (29 cases), ≥ 10 cigarettes per day (20 cases), and ≥ 20 cigarettes per day (14 cases). A total of 14 cases were identified, with gestational age in ≥ 37 weeks representing 53.97% of the total patient population. The mode of delivery was predominantly caesarean section (28.57%), while the remaining 71.43% underwent vaginal delivery. Low birth weight was identified as a risk factor. Of the total number of cases, ten were identified as having perinatal complications, representing a rate of 41.27% among all patients. Additionally, 22 cases were classified as having a birth weight of less than 2500 g. There were four instances of stillbirth. Pregnancy outcomes perinatal ones are adversely affected by cigarette smoking based on the dosages.

Keywords: Smoking, Pregnancy, Perinatal Complications, Delivery Outcome, Birthweight

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1. Introduction

In developed countries, smoking use during pregnancy is the most important isolated modifiable risk factor for pregnancy-related morbidity and mortality because it doubles the probability that children may die at birth or during the first year of life and increases the probability of suffering from multiple diseases, mainly respiratory or otolaryngological. Fortunately, women who quit smoking at the beginning of their pregnancy have a similar risk as non-smoking women. Therefore, it is necessary to intervene on this problem [1 - 4].

Many women smokers spontaneously quit smoking when they know they are pregnant [5]. Between 25% and 60% of spontaneous dropouts have been reported in the USA.

Despite this, many other pregnant women continue to smoke and may require highly specialized medical attention [6].

According to the report of the National Center for Health Statistics (NCHS), in the United States, one in fourteen women reported having smoked during pregnancy; this rate decreased in relation to the increase in education in women who finished high school or more; smoking during pregnancy was more common between the ages of 20 and 24 [7, 8]. Maternal smoking encompasses a great challenge for public health since women represent 20% of smokers in the world, and it is precisely this that maternal smoking is one of the most important causes to be prevented to avoid secondary problems in offspring such as low birth weight, intrauterine fetal death, premature birth, among others [9].

Quitting smoking is difficult, even for the pregnant woman who may have a great motivation for it. In one study [2], only a quarter (25.1%) of women who smoked before pregnancy quit smoking during pregnancy. Of these, the majority (20.1%) did it spontaneously before the first antenatal check-up visit, although it is noteworthy that this drop-out rate is one of the lowest found in the literature. Of the pregnant women who quit smoking, just over a third would remain without smoking at six months postpartum, which would yield a “global” pregnancy effect of about 10% [10 – 13].

Martínez Frias et al. [5], using the data of 31,056 mothers of children without birth defects, have studied whether there has been any variation in smoking during pregnancy in Spain. They analyze the evolution of smoking by years, during the last 25 years, autonomous communities, characteristics and other maternal habits. There was a secular increase in the prevalence of smoking mothers between 2012 and 2013, later settling at 30 - 35% [14 – 15]. There is no secular reduction in the analyses by maternal ages, amounts, and autonomies. Only mothers with the highest level of education showed a decrease in smoking in 2014, stabilizing at around 23%. Mothers under the age of 25 are the ones who smoke the most [16 – 18].

In an interesting study carried out in 33 US states, it has been found that, between 2016 and 2017, the prevalence of smoking decreased both in pregnant women (from 34.6% to 42.4%) and in non-pregnant women (from 26.7% to 23.6%). Surprisingly, in this analysis, the decline in smoking among pregnant women was mainly due to the overall decline in initiation rates among young women rather than to an increase in the rate of pregnancy-related dropouts.⁶ In Spain, the data are discouraging [19]. A study carried out in the Valencian Community found that 62% of women who gave birth smoked before pregnancy, and 28% of them spontaneously quit [7]. Smoking cessation during pregnancy was observed more frequently in the case of older women (OR), with a higher educational level (OR) or with lower tobacco consumption: 1-9 cigarettes/day (OR) and 10-19 cigarettes/day (OR), compared to heavy smokers [20].

2. Patients and Methods

Our database system was used at the Maternity Hospital of Baghdad-Iraq in this cross-sectional study, where 63 women gave birth in the period from 2023 to 2024. Among them are demographic information, maternal and neonatal outcomes, and delivery details. At the moment of admission into the hospital, information about the patient’s health and pregnancy was collected, mainly occurring during labor or else for some upon admission into the antepartum unit due to complications. Obstetrical care took each patient’s medical history who came to hospital. If urgent care was required, taking it would be delayed to a suitable time during the hospital stay. The information here comes from oral questions such as: “Do you smoke cigarettes daily?” (the answer could be either “Yes” or “No”).

The comp. System would then ask for the exact number of cigarettes being consumed presently if a user gave a 'yes' answer. As such, this number indicates smoking during the late pregnancy period only but does not reflect variations in smoking patterns within gestation. Neonatal data were included in our database at the conclusion of their period of stay by the neonatologists and/or the obstetricians. Nobody who can be included has undergone delivery through any means; hence, all females whose records had every required input in our study were selected. The exclusion criteria included some women below twenty-five years or with severe medical conditions.

The database included the following characteristics: daily cigarette use, maternal age, country of birth, marital status, parity, previous pregnancy loss, education, professional status, health insurance, and presence of psychosocial problems. Women with challenging psychosocial situations before getting associated with problematic psychiatric pathologies or alcohol/drug abuse were defined as those asking for consultations according to strict criteria during pregnancy. We evaluated following outcomes for obstetrics and neonates: mode of delivery, pre-eclampsia, intrauterine deaths, neonatal mortality, preterm deliveries (PTD), growth restriction, birth weight (BW), umbilical cord arterial pH (UCAP), 5-minute Apgar scores (5MAS), neonatal infections (NI), hypoglycemic episodes (HE), cerebral hemorrhages or convulsions (CHC), jaundice (J), neonatal anemia (NA), respiratory illnesses such as pneumonia, pneumothorax, apneas and hyaline membrane disease (RE), gastrointestinal diseases including feeding difficulties syndromes (FD), occlusive syndrome (OS), digestive hemorrhages (DH), necrotizing enterocolitis (NEC), diarrhea (D) and vomiting (V), transfers into our neonatal intensive care unit (NICU), NICU admission durations longer than eight days were reviewed.

In this study, a few things were compared between pregnant women who smoke and pregnant women who don't smoke. The smoking pregnant women group was also divided into subgroups depending on how many cigarettes they usually consume per day (<10/day, ≥ 10 /day, and ≥ 20 /day). Chi-squared test determined the p-value for every smoker's clinical and social characteristic. To determine the effects of smoking on obstetric and neonatal outcomes, models based on logistic regression were analyzed and aOR adjusted for maternal age, country of birth, marital status, parity, previous pregnancy loss, education levels, professional status as well as psychosocial issues. Certain outcomes like birth weight, intrauterine growth restriction, umbilical cord arterial pH, APGAR score at 5 min, respiratory diseases, gastrointestinal diseases, neonatal infection, hypoglycemia, cerebral hemorrhage or convulsion, jaundice, neonatal anemia, responses to neonatal intensive care unit transfers or stay were also adjusted for gestational age as they tend to prevail more among preterm neonates. In the models of multivariate logistic regression for calculated adjusted estimators, baseline variables that were significantly different in respect to smokers or those identified risk factors attributed to a bad outcome were included.

3. Results

Table 1. Enrol basics data of participant characteristics

MATERNAL AGE	NO. OF PARTICIPANTS [N = 63]	PERCENTAGE [%]
Maternal age		
25 – 30	24	38.10%
31 – 35	18	28.57%
36 – 40	12	19.05%

41 – 45	9	14.29%
No. of comorbidities		
Yes	38	60.32%
No	25	39.68%
1	23	36.51%
2	8	12.70%
3	5	7.94%
4	2	3.17%
Pregnancy loss		
No abortion	46	73.02%
Previous abortion	17	26.98%
Maternal education		
Secondary school	8	12.70%
College	10	15.87%
Bachelor's degree	14	22.22%
Postgraduate degree	31	49.21%
Professional Status		
Employed	40	63.49%
Unemployed	23	36.51%
Family monthly income, \$		
< 450	43	68.25%
450 – 750	13	20.63%
> 750	7	11.11%
Antenatal care (more than three visits)		
Yes	48	76.19%
No	15	23.81%
Psychosocial difficulties		
No	10	15.87%
Yes	53	84.13%

Comorbidities: Hypertension, Diabetes, Obesity, and Anemia.

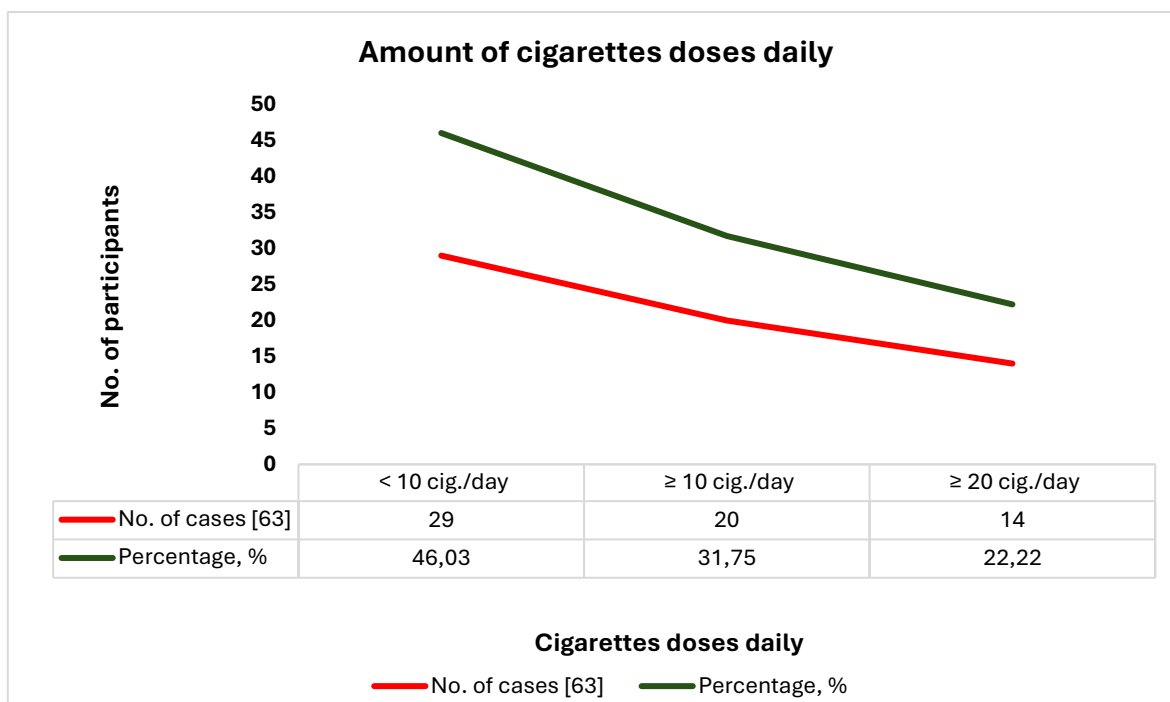


Figure 1. The distribution of daily cigarette consumption among pregnant women

Table 2. Enrolling obstetric data for pregnant Iraqi mothers and fetuses

FACTORS	NO. OF PARTICIPANTS [N = 63]	PERCENTAGE [%]
Gestational age		
< 32 weeks	9	14.29%
32-36 weeks	20	31.75%
≥ 37 weeks	34	53.97%
Mode of delivery		
Cesarean section	18	28.57%
Vaginal delivery	45	71.43%
Hospital classification		
Private	10	15.87%
Public	53	84.13%
Number of pregnancies		
0	35	55.56%
1	15	23.81%
2	10	15.87%
≥ 3	3	4.76%

Type of pregnancy		
Singleton	60	95.24%
Twin	3	4.76%
Birth weight		
< 2500 g	22	34.92%
≥ 2500 g	41	65.08%
Admission NICU		
Yes	26	41.27%
No	37	58.73%
Breastfeeding initiation		
Yes	41	65.08%
No	22	34.92%
Apgar score at 5 minutes		
<7	7	11.11%
≥7	56	88.89%
Length of stay, days		
< 4	49	77.78%
≥ 4	14	22.22%
Head circumference		
<32 cm	5	7.94%
≥ 32 cm	58	92.06%
Stillbirths and neonatal deaths		
Live birth	59	93.65%
Stillbirth	4	6.35%

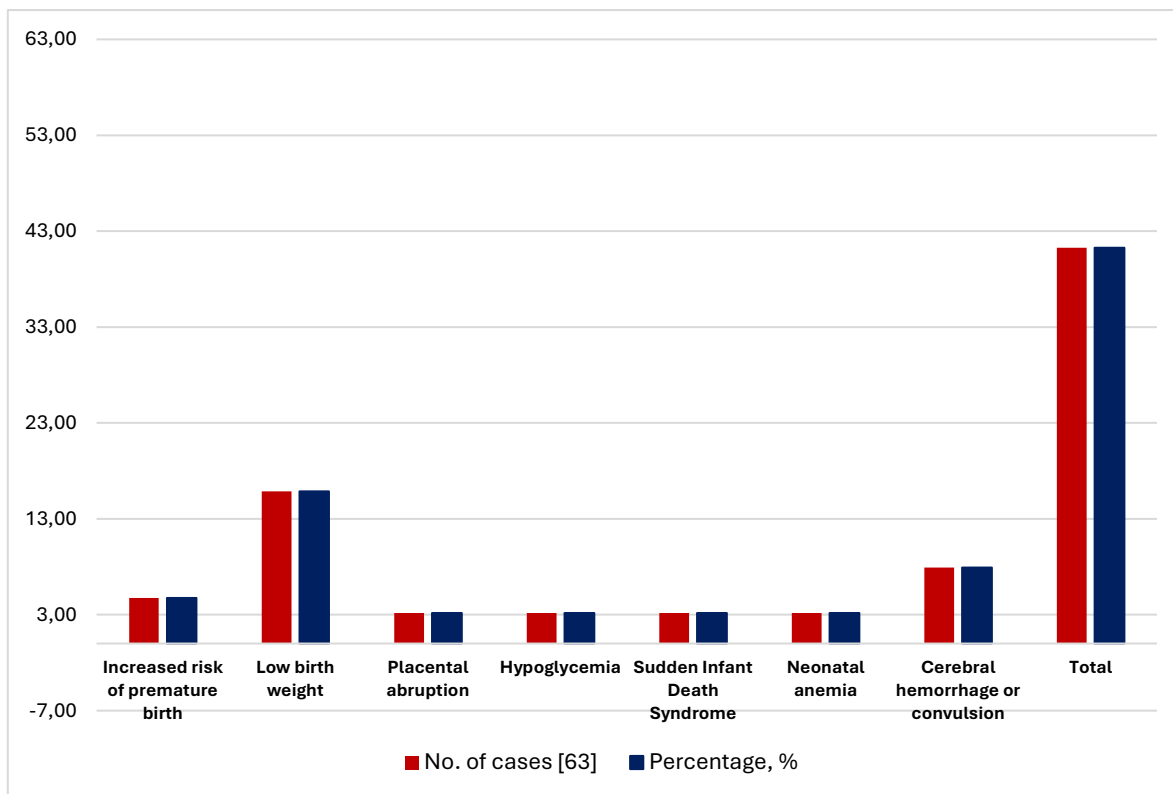


Figure 2. Perinatal complications of maternal smoking and fetuses

Table 3. Assessment of the quality – of life at women’s participants in terms of physical, psychological, social, emotional, and daily activities

QoL scores	
Items	Scores
Physical function	61.34 ± 15.20
Psychological function	56.35 ± 15.78
Social and emotional functions	65.62 ± 6.85
Daily activity	66.47 ± 9.53

Table 4. Determining risk factors affecting on maternal and fetuses

RISK FACTORS	Univariate analysis			
	Maternal		Fetuses	
	OR	CI 95%	OR	CI 95 %

Comorbidities	1.04	0.73 – 7.81	1.12	0.83 – 8.96
Cesarean section	0.72	0.20 – 1.87	2.54	2.11 – 5.60
Length of stay in hospital	3.64	2.57 – 8.40	3.77	2.48 – 9.38
Increased risk of premature birth	2.70	0.52 – 6.88	3.15	2.68 – 5.86
Low birth weight	2.73	1.82 – 3.69	1.55	0.87 – 2.14
Stillbirth	1.22	0.44 – 2.72	0.93	0.26 – 1.73
Birth weight (< 2500 g)	1.81	0.67 – 1.95	1.58	0.74 – 2.92
Type of pregnancy (Twin)	0.72	0.44 – 3.22	0.65	0.45 – 2.10
Placental abruption	1.05	0.76 – 2.84	0.93	0.33 – 2.90

4. Discussion

The study revealed that the maternal age group of 25–30 years old demonstrated the highest level of participation, comprising 24 cases. The daily cigarette consumption was classified into four categories: <10 cigarettes/day (29 cases), ≥ 10 cigarettes/day (20 cases), and ≥20 cigarettes/day (14 cases). Additionally, the gestational age of ≥37 weeks was identified in 53 cases. The majority of patients (97%) underwent caesarean section, with the remaining 28.57% undergoing vaginal delivery. Of the patients admitted to the NICU, 26 cases were admitted. The majority of patients (65.08%) initiated breastfeeding, while 49 cases had a length of stay of less than four days, and 14 cases had a length of stay of four days or more. Five cases had a head circumference of less than 32 cm, while 58 cases had a head circumference of 32 cm or more.

Additionally, low birth weight was identified as a risk factor, with 10 cases. The incidence of perinatal complications was 41.27% among the total patient population. Furthermore, 11.11% of patients had an Apgar score of less than seven at 5 minutes. The birth weight was less than 2500 g in 22 cases, and there were four cases of stillbirth. In evaluating the quality of life, we observed that the mean physical function score was 61.34 ± 15.20 , the mean psychological function score was 56.35 ± 15.78 , the mean social and emotional function score was 65.62 ± 6.85 , and the mean daily activity score was 66.47 ± 9.53 .

The impact cigarettes have on pregnancy is strong, leading to many negative outcomes during perinatal periods. In our research, we found that smoking was significantly correlated with premature labor, reduced birth weight, undernutrition before birth, transfer to the neonatal intensive care unit, and time spent there by newborns more than seven days. These correlations are all dose-dependent effects with significant trend results [21, 22].

The findings are consistent with the existing literature. The use of heavy cigarettes (≥20/day) was closely linked to intrauterine death, whereas other studies have related low tobacco intake with it. Neurological as well as gastrointestinal disorders can result from smoking in pregnancy for newborns. In addition, use of cigarettes during this period (≥20/day) can increase the risk of early birth infections [23].

Smoking has a multi-faceted impact on perinatal outcomes that leads to negative consequences. There are basic processes affected, including trophoblast proliferation, programmed cell death, and invasiveness, which can be altered during the development of placentae. It could also be due to changes in vascularization and metabolism in the placentas [24].

There have only been a few studies made thus far looking at how neonatal gastrointestinal pathology relates with smoking during pregnancy or how it relates with neonatal infections. Conversely, adult smokers have been shown to be more prone than non-smokers to bacterial or viral infections, possibly because their body's defence mechanisms can be structurally, functionally, or immunologically changed [25].

The outcome of pregnancy may be protected if you still smoke while pregnant. Pregnant women who smoked had lower rates of pre-eclampsia. Some of the reasons smoking might be helpful are related to carbon monoxide, which is produced when tobacco is burned. For instance, loss of placental production for antiangiogenic proteins like sFlt1 or sEng prevents the formation of preeclampsia. Nevertheless, no one knows everything about how exactly the different processes involved in developing pre-eclampsia interact with each other [26 – 28].

A study conducted by Americans may throw light on this baffling occurrence of this shielding effect more on events during birth than on consequences over the entire term of pregnancy when it comes to studying patients' accounting from observations. Nevertheless, let us put across our uncertainties against their findings from other studies [29 – 31]. Past examinations carried out using 308 individuals revealed that there was no important variation on pH levels among individuals who smoked cigarettes compared to those that did not smoke tobacco at all. Our outcomes do not indicate a major relationship for certain results, including APGAR scores below seven at five minutes, hypoglycemia, cerebral hemorrhage or seizure, jaundice, and neonatal anemia [32].

Pregnant women that smoke represent 8.1% of the population in Europe and 7.2% of the population in the USA, according to 2018 estimates, indicating that efforts directed towards prevention are inadequate. It is imperative that pregnant women are availed with information showing that even smoking in small doses have effects on their pregnancy, not to mention on their own well-being. Regular counselling sessions every few weeks and nicotine replacement therapies for those who do not respond solely to counselling are effective tools for quitting smoking while pregnant. Another study has revealed positive outcomes after incorporating motivational incentives into programs aimed at reducing tobacco use among expectant mothers [33 – 36].

Moreover, it is imperative to point out that some confidence intervals of odds ratio are broad, particularly for subgroups of “ ≥ 20 cig/day”. This might be rationalized by the fact that this subgroup consists solely of 499 patients from the pool of 19,554 patients. We, therefore, recognize that few comparisons are underpowered so that for some of them, the lack of statistically significant relationships is not an index of absence thereof. Since our study may have underestimated associations as patients would underreport their consumption, hence this “ > 20 cig/day” group could well depict the actual effect smoking has on pregnancy [37 – 40].

5. Conclusion

Several negative maternal-perinatal outcomes are linked to smoking cigarettes whilst pregnant. This correlation is frequently dose-dependent, just like early delivery, low birth weight (<2500 g), intrauterine growth restriction, neonatal transfers to intensive care units (ICU) as well as NICU admissions that last longer than a week. Further emphasis should be laid on preventing such cases among mothers since some effective strategies could have helped eliminate these problems during the childbearing period.

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