

# Smoking and Pregnancy Sickness

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## ABSTRACT

**Objective:** The objective of our study is to find out the relationship between smoking and pregnancy sickness.

**Methods:** This is Descriptive Comparative study which was done at King Hussein Medical Center during a period of one year from March 2012 to March 2013. Pregnant women who visited the clinic and were complaining of nausea and vomiting were asked about their smoking habits and if they were exposed to second hand smoke. The control group was from pregnant women who were coming for regular check up to the antenatal care clinic and were not complaining of nausea or vomiting.

**Results:** Two hundred and seventy nine cases were included with a mean age of 26.1 and 332 controls were recruited with a mean age of 28.2. The largest numbers of cases were primigravida and para 4 and more (113 patients and 82 patients respectively). Most cases and controls were in their first trimester (180 patients and 225 women, respectively). Ninety percent of cases were smokers or passive smokers, while only one third of controls were smokers or passive smokers. Odds ratios for smokers and passive smokers were 7.3 and 7.6, respectively.

**Conclusion:** Active smoking and passive smoking were shown to be directly proportional to the frequency of pregnancy sickness in this study. However, more representative studies are needed to confirm our results.

**Key words:** Active smoking, Passive smoking, Pregnancy sickness.

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## Introduction

Pregnancy sickness, also known as emesis gravidarum, is a very common condition during pregnancy which is characterized by nausea and vomiting that occurs usually during the morning in the first trimester of pregnancy and subsides by 20 weeks of gestation in most patients. It affects between 50% and 90% of pregnant ladies. The spectrum of pregnancy sickness presentation ranges from simple nausea and vomiting with no pregnancy adverse effects to severe form that

affects the patient's nutritional status and is called hyperemesis gravidarum with an incidence rate of around 2% and it is associated with fetal and maternal adverse outcomes.<sup>(1,2)</sup>

The etiology of pregnancy sickness is still a debatable issue with many theories postulated to clarify its nature. For example, there are psychological theories, social theories, evolutionary theories and physiological theories but none of them is totally accepted. The most widely accepted theory is the alteration in gastric

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and small bowel motility due to the increased level of progesterone that in turn causes relaxation of gastric and intestinal smooth muscles.<sup>(3)</sup>

The differential diagnosis of pregnancy sickness is wide because nausea and vomiting are general symptoms that can result from any body's system from CNS to locomotor system. The differential diagnosis includes but is not limited to neurological disorders, endocrine diseases, ophthalmological disorders, vestibulocochlear problems, infections, drugs, metabolic derangements, ischemic conditions and gastrointestinal disorders. Therefore, the history, physical examination and investigations should exclude these pathologies.<sup>(4)</sup>

Recent data suggests that pregnancy sickness can be prevented by dietary and life style modifications and by vitamin supplements, especially pyridoxine and thiamine. Hence, preemptive treatment of emesis gravidarum may improve maternal quality of life and decrease morbidity. Treatment of nausea and vomiting during pregnancy can range from life style modification to pharmacologic therapy, to enteral and parenteral nutrition, to alternative medicine such as hypnosis and acupuncture.<sup>(5,6)</sup>

Smoking, whether active or passive, is the most common preventable cause of death worldwide and it has several adverse effects in pregnancy on both the mothers and the fetus. Smoking has been proved to be a risk factor for abortion, low birth weight infants, still birth, abruptio placenta, placenta previa, preterm labor and sudden infant death syndrome. It also has contributed to depression among pregnant women.<sup>(7)</sup>

Risk factors for pregnancy sickness include: multiple pregnancy, nulliparity, low socioeconomic status, obesity, metabolic disturbances, trophoblastic disorders, psychological problems, etc. In addition, smoking has been postulated as either a risk factor or a protective factor for pregnancy sickness but neither the pathophysiologic mechanism for such an effect, nor direct cause effect relationship have been confirmed yet.<sup>(2,3,8-13)</sup>

However, there are few studies about the effect of smoking on the incidence rate of pregnancy sickness. The aim of our study was to find out the relationship between smoking and passive

smoking and the development of nausea and vomiting during pregnancy.

## Methods

This is a Descriptive Comparative study which was done at King Hussein Medical Center in Amman, Jordan during a period of one year between March 2012 and March 2013. The case group included all pregnant women who attended the clinic or emergency room during that period and their chief complaint was nausea and vomiting. The control group consisted of pregnant women who attended the antenatal care clinic as part of their routine follow up and did not have any complaints during the same period. Women in both groups were interviewed by the physician and formal history, physical examination and any required investigations were done.

The women were specifically asked about smoking habits and the amount of cigarette consumption, second hand smoking whether at home or work, caffeine consumption, previous history of pregnancy sickness, parity, single or multiple pregnancy, gestational age etc. Pregnant ladies known to have any chronic medical illnesses were excluded from the study as well as those with abnormal investigations which suggested other pathology.

Smokers were defined as being regularly smoking of at least one cigarette daily for the last six months. Ex-smokers were those who quit smoking for at least one month after being regular smokers. Never smokers were those who never smoked. Never smokers and ex-smokers made the group of non smokers. Passive smokers were defined as those who were non smokers and were exposed to second hand smoke at the home, work, public transport and other places.<sup>(8-10)</sup>

Odds ratios which are an estimate of risk assessment were calculated using two by two tables to measure the association between smokings whether active or passive with pregnancy sickness. Ninety five percent confidence intervals which are a measure of odds ratios precision and whether the odds ratios were statistically significant or not were calculated based on natural log scale and then they were reconverted into the original scale. The odds ratios are considered statistically significant if the

**Table I:** Characteristics of cases and controls

	Cases	Controls	Total
Total number	279	332	611
Age(mean)	26.1	28.2	27.7
Parity			
PG	113 (41%)	94 (28%)	207 (34%)
P1	20 (7%)	49 (15%)	69 (11%)
P2	27 (10%)	50 (15%)	77 (13%)
P3	37 (13%)	35 (11%)	72 (12%)
P4 +	82 (29%)	104(31%)	186 (30%)
Gestational age			
1 <sup>st</sup> trimester	180 (65%)	225 (68%)	405 (67%)
2 <sup>nd</sup> trimester	65 (23%)	61 (18%)	126 (20%)
3 <sup>rd</sup> trimester	34 (12%)	46 (14%)	80 (13%)
Single tone	266 (95%)	315 (95%)	581 (95%)
Multiple pregnancy	13 (5%)	17 (5%)	30 (5%)
PMHx of pregnancy sickness*	117 (42%)	132 (40%)	249 (41%)
Active smoking	23 (8%)	4 (1%)	27 (4%)
Passive smoking	224 (80%)	116 (35%)	340 (56%)

\*Past medical history of pregnancy sickness

**Table II:** 2x2 table to calculate odds ratio for smokers

	Cases	Controls	Total	OR (CI) <sup>1</sup>
Smokers	23 (8%)	4 (1%)	27(4.4%)	7.3
Non smokers	256 (92%)	328 (99%)	584(95.6%)	(2.5-21)
Total	279	332	611	

1-Odds ratio & confidence interval

**Table III:** 2x2 table to calculate odds ratio for passive smokers

	Cases	Controls	Total	OR (CI) <sup>1</sup>
Passive smokers	224 (80%)	116 (35%)	340 (56%)	7.6
Non passive	55 (20%)	216 (65%)	271 (54%)	(5.2-10.9)
Total	279	332	611	

1-Odds ratio & confidence interval

confidence intervals do not include one in their range. As the confidence intervals get narrower the odds ratios become more precise.

## Results

Table I demonstrates the characteristics for case and control groups. Two hundred and seventy nine cases and 332 controls were included in the study with case control ratio of about 0.8: 1. The mean age for the cases was 26.1 years while that for the control group was 28.2 years. Most of the cases were primigravida (n=113, 40%) or para 4 or more (n=82, 30%). The control group had similar distribution according to the parity, but the great majority of patients were para 4 or more (n=104, 31%) which was followed closely by primigravida (n=94, 28%).

Most cases and controls were in the first

trimester (n=180, 65%) and (n=225, 67%), respectively. Multiple pregnancies formed a tiny minority in both groups with less than 5% for each group. Past medical history of pregnancy sickness was similar in both groups at around 40% for each.

Ninety percent of cases were either passive smokers or actively smoking, whereas only one third of the control groups were passive or active smokers. Odds ratio, calculated by using 2x2 table, for smokers was 7.3 with confidence interval from 2.5 to 21.5 (Table II). Odds ratio for passive smoking was 7.6 with confidence interval from 5.2 to 10.9 (Table III).

One hundred and seventeen women (42%) in the case group gave a past history of nausea and vomiting in previous pregnancies and 132 women (40%) in the control group gave such history with

odds ratio of 1.1 and confidence interval of 0.8 to 1.5 which is statistically insignificant.

## Discussion

Up to 90% of pregnant women suffer from nausea and vomiting during pregnancy with a great impact on the quality of their lives. When severe enough, pregnancy sickness can cause fetal and maternal adverse outcomes. Several risk factors of this condition have been studied but a handful of studies have addressed smoking as a risk factor for pregnancy sickness.

The current study has demonstrated the direct relationship between smoking and pregnancy sickness through statistically significant odds ratio and confidence interval. The overall risk of active smoking on pregnancy sickness was estimated to be 7.3-fold. In addition, it has revealed a positive correlation between passive smoking and pregnancy sickness. Passive smokers have been shown to carry 7.6-fold increase in their risk of developing pregnancy sickness. So, it is not surprisingly to find that the great majority of cases were either active or passive smokers.

Another unexpected finding that was observed in our study was the past medical history of nausea and vomiting during pregnancy has no significant effect on pregnancy sickness, in contrast with other studies that showed a positive relationship between them. The odds ratio for past medical history of pregnancy sickness was 1.1 with confidence interval between 0.8 and 1.5 which is insignificant.

A study conducted by Chou *et al.* in 2009 showed that smoking increased the risk of pregnancy sickness by around 2-fold and it also demonstrated the amount of cigarette smoking is directly proportional to the severity of pregnancy sickness.<sup>(11)</sup> Lacasse *et al.* had also concluded that smoking before pregnancy was associated with higher frequency of pregnancy sickness and the usage of antiemetic drugs during pregnancy.<sup>(12)</sup>

On the other hand, a study was done by Kramer *et al.* revealed that smoking has protective effect on nausea and vomiting during pregnancy.<sup>(13)</sup> Similarly Gadsby *et al.* showed that no smoking is associated with higher rates of pregnancy sickness.<sup>(14)</sup>

From what has been discussed it seems that there is inconsistency among studies on the effect

of smoking on pregnancy sickness. Some studies showed that smoking is a risk factor for nausea and vomiting during pregnancy, while other studies showed that smoking has protective effect and decreases the incidence of pregnancy sickness. Therefore, further prospective and more representative studies are needed to draw a more robust conclusion.

## Limitations of the study

Our study has some limitations: firstly it is a retrospective study, secondly the possibility of confounding variables could not be eliminated and thirdly the sample size is relatively small to generalize our results. Another drawback of this study is that it did not differentiate between light smokers and heavy smokers.

## Conclusion

The findings of our study demonstrated that passive and active smoking is positively associated with nausea and vomiting of pregnancy. Hence, smoking cessation therapy should address pregnant women and their spouses to decrease pregnancy morbidity and adverse outcomes. Further studies are needed to confirm our results.

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