

Pre-pregnancy Paternal Smoking Cessation Reduces the Risk of Spontaneous Abortion: a Population-based Retrospective Cohort Study

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1. Parental smoking cessation before conception could reduce the risk of spontaneous abortion by 14%.
2. Husbands with smoking should be advised to quit smoking in preconception counseling.
3. Husbands are encouraged to participate in preconception counseling and preparing for pregnancy along with their wives.

BACKGROUND

Tobacco use is a public health problem that more prevalent in men globally, husband smoking has substantially contributed to the most common source for family tobacco smoking exposure. Passive smoking behavior during pregnancy and periconceptional paternal smoking could have adverse effects on pregnancy outcome, including spontaneous abortion (SAB). But the evidence on whether pre-pregnancy paternal smoking cessation can reduce the risk of SAB is still remain unexplored.

METHODS

- **Participants:** The current study was based on non-smoking reproductive-aged Chinese women who had participated twice and with husband active smoking at the first participation in a nationwide free pre-pregnancy examination during 2010-2018.
- **Exposure:** Pre-pregnancy husband smoking cessation, defined as no husband smoking in the second participation. Secondary exposure was pre-pregnancy husband cigarettes smoked reduction.
- **Outcome:** Spontaneous abortion (SAB) in the second participation, defined as fetal death occurring before 28 weeks of gestation.
- **Statistical Analysis:** ORs and 95% CIs estimated by logistic regression were applied to determine the association of paternal smoking cessation and reduced amount with SAB. Inverse probability weighting via propensity models were used to adjust for the imbalance by covariates. And magnitude of the association was also reported according to husband smoking amount in the first participation in cigarettes/day and pack-years.

RESULTS

Table 1. Association between paternal smoking cessation and the risk spontaneous abortion.

Paternal Smoking	N (%)	Age-adjusted OR ^a (95% CI)	Multivariable-adjusted OR ^b (95% CI)	IPW-adjusted OR ^c (95% CI)
Smoking Cessation				
No	85 758 (3.59)	1 (reference)	1 (reference)	1 (reference)
Yes	73 228 (2.87)	0.80 (0.76-0.85)	0.85 (0.80-0.90)	0.86 (0.81-0.91)
Reduced Amount in Cigarettes/day				
Unchanged or Increased	60 949 (3.58)	1 (reference)	1 (reference)	1 (reference)
1-4	21 299 (2.89)	0.82 (0.75-0.90)	0.86 (0.79-0.95)	0.99 (0.90-1.08)
5-9	28 261 (2.98)	0.84 (0.77-0.91)	0.88 (0.81-0.96)	0.91 (0.84-0.98)
10-14	31 021 (3.07)	0.85 (0.79-0.92)	0.90 (0.83-0.97)	0.88 (0.80-0.96)
15-19	5 342 (3.59)	0.99 (0.85-1.15)	1.04 (0.89-1.21)	0.92 (0.75-1.12)
≥20	12 114 (3.31)	0.88 (0.79-0.98)	0.93 (0.83-1.04)	0.79 (0.62-0.99)
P for trend	<0.01	<0.01	<0.01	<0.01

RESULTS CONTINUED

Table 2. Association between Paternal Smoking Cessation and the Risk of Spontaneous Abortion stratified by the amount of paternal smoking in the first participation.

Paternal smoking	Paternal smoking cessation	N (%)	Age-adjusted OR ^a (95% CI)	Multivariable-adjusted OR ^b (95% CI)
Husband smoking amount in the first participation, cigarettes/day				
1-9				
	No	30 747(3.18)	1 (reference)	1 (reference)
	Yes	32 366(2.64)	0.83 (0.75-0.91)	0.87 (0.79-0.96)
10-19				
	No	36 557(3.75)	1 (reference)	1 (reference)
	Yes	29 145(2.97)	0.79 (0.72-0.86)	0.80 (0.73-0.88)
≥20				
	No	18 454(3.96)	1 (reference)	1 (reference)
	Yes	11 717(3.24)	0.83 (0.73-0.94)	0.84 (0.74-0.96)
Husband smoking in the first participation, pack-years				
0.1-0.5				
	No	26 162(3.12)	1 (reference)	1 (reference)
	Yes	23 963(2.58)	0.83(0.74-0.92)	0.84 (0.75-0.94)
0.6-1.0				
	No	3 312(3.08)	1 (reference)	1 (reference)
	Yes	2 913(2.61)	0.84 (0.62-1.14)	0.97 (0.70-1.34)
≥1.1				
	No	4 510(4.28)	1 (reference)	1 (reference)
	Yes	3 719(2.88)	0.66 (0.52-0.84)	0.72 (0.55-0.93)

- In this cohort study of 158,986 non-smoking women, 5,180 (3.25%) participants recorded SAB in the second participation.
- Table 1 shows that the inverse-probability-weighted OR of SAB for pre-pregnancy paternal smoking cessation was 0.86 (95% CI: 0.81-0.91) compared with women exposed continuing pre-pregnancy paternal smoking. Compared with women with pre-pregnancy paternal smoking amount unchanged or increased, the inverse-probability-weighted ORs for the risk of SAB of paternal smoking reduced amount in 1-4, 5-9, 10-14, 15-29, >=20 cigarettes/day were 0.99 (0.90-1.08), 0.91 (0.84-0.98), 0.88 (0.80-0.92), 0.92 (0.75-1.12) and 0.79 (0.62-0.99), respectively (P trend < 0.01).
- Table 2 shows that the results were not substantially changed in different groups stratified by paternal smoking amount in the first participation.
- In subgroups analyses and sensitivity analyses, the results remained consistent.

CONCLUSIONS

Pre-pregnancy paternal smoking cessation was associated with decreased risk of spontaneous abortion (SAB) among non-smoking pregnant women in China. Given the prevalence of men smoking globally, particularly in China, the importance of tobacco control for husbands should be emphasized during preconception consultations to mitigate the risks posed by paternal smoking.