



INTRODUCTION

- According to the CDC, in 2020, 11% of U.S. adult women currently smoked cigarettes.
- In 2016, 7.2% of women who gave birth smoked cigarettes during pregnancy.
- Maternal smoking increases the risk of disease and death for both a mother and her baby.
- Cigarette smoke contains many toxic substances including polycyclic aromatic hydrocarbons and aromatic amines³, which can cause infertility, sub-fecundity, and younger menopausal age and menstrual disorder as well as adverse birth outcomes^{2,4}.
- Quitting smoking before and during pregnancy decreases poor fertility and birth outcomes¹.
- The optimal time to quit smoking and the effect the timing of cessation has on outcomes throughout the pregnancy period needs to be investigated.
- This umbrella review examined the literature since the 2020 Surgeon General's Report to identify studies exploring the point at which tobacco cessation occurs during pregnancy and its ability to improve reproductive health.

METHODOLOGY

Databases

- PubMed
- CINAHL
- EMBASE

Search Terms

- Tobacco
- Reproductive Health
- Cessation

Inclusion Criteria

- English
- Published 2020 – 2022
- Based on Human Subjects Research
- Women ages 14 - 46
- Effects of tobacco use on reproductive health

METHODOLOGY CONTINUED

Figure 1: Article Screening Process

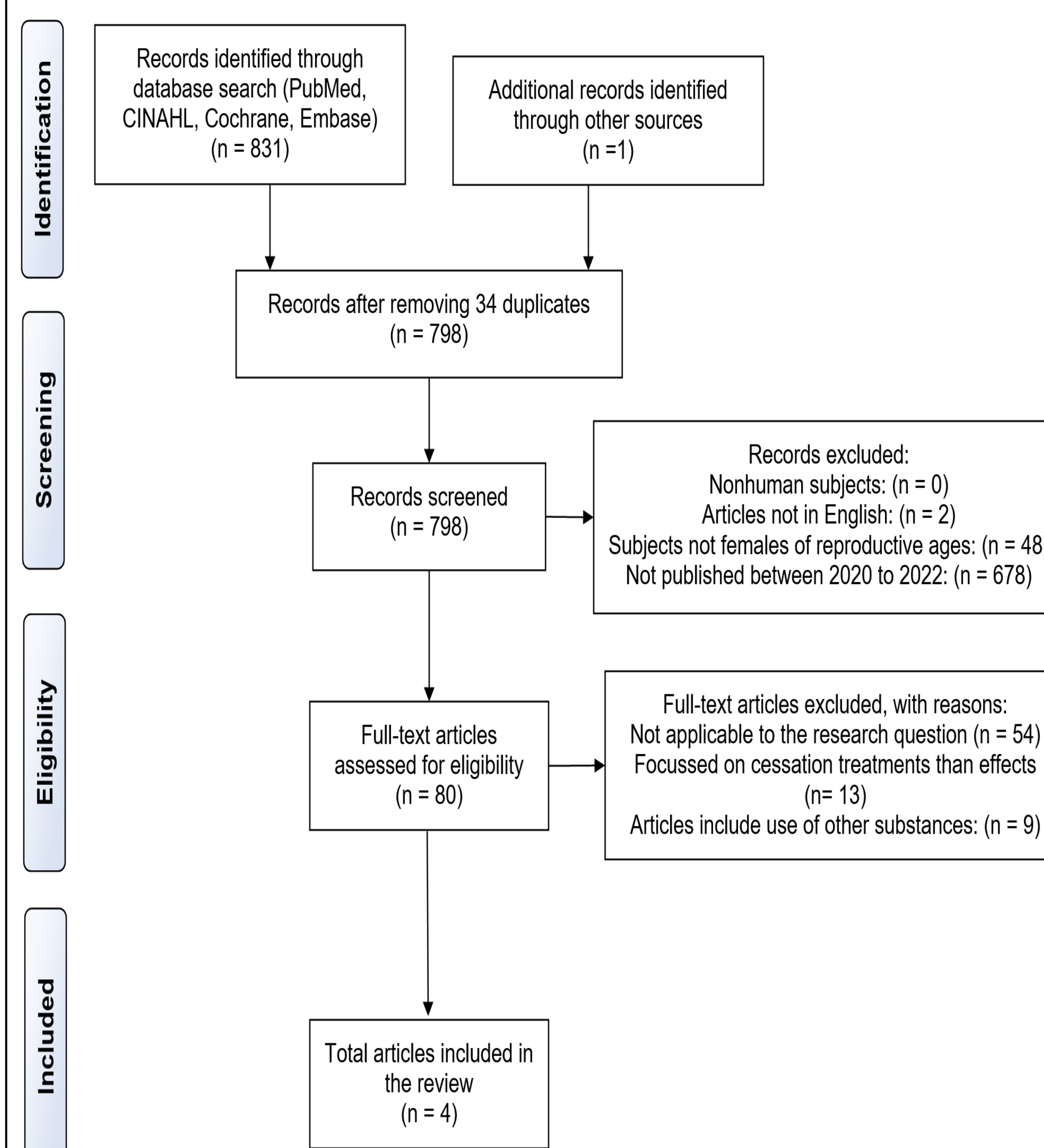


Table 1: Literature Review Articles

Title	Authors	Date Published	Study Design	Purpose	Significant Findings
Effects of Past Environmental Tobacco Smoke Exposure on the Menstrual Cycle and Menstrual Phase-Related Symptoms: A Cross-Sectional Study.	Sakai, Hiroko, Ohashi, Kazutomo	January 2021	Case Control Study	This study examined the effects of current and past environmental tobacco smoke exposure on the menstrual cycle and menstrual phase-related symptoms in nonsmoking Japanese women of child-bearing age.	Current smokers had significantly more severe premenstrual symptoms than the other four groups, including past smokers and nonsmokers with past ETS. Current smokers also had significantly more severe menstrual phase-related symptoms than 250 nonsmokers during both the premenstrual and menstrual phases.
Does Cigarette Smoking Really have a Clinical Effect on Folliculogenesis and Oocyte Maturation?	Burcu Ozbakir, Pinar Tulay	April 2020	Case Control Study	The aim of this study was to investigate the effects of cigarette smoking on oocyte quality as well the quantity in young fertile women.	Cigarette smoke has been shown to lead to the production of smaller size oocytes with lower numbers of granulosa cells. Cigarette smoke did not affect the number of oocytes obtained from young females. However, significantly higher numbers of cytoplasmic anomalies were observed.
Impact of Cigarette Smoking on the Expression of Oxidative Stress-Related Genes in Cumulus Cells Retrieved from Healthy Women Undergoing IVF	Fani Konstantinidou, Maria Cristina Budani, Annalina Sarra, Liborio Stuppia, Gian Mario Tiboni, Valentina Gatta	December 2021	Case Control Study via DNA Methylation	The aim of this study was to analyze the impact of tobacco smoking on expression of oxidative stress-related genes in cumulus cells (CCs) from smoking and non-smoking women undergoing IVF techniques.	The overall downregulation suggests a lower antioxidant capacity in CCs of smoking versus non-smoking women. This data contributes to increase the interest around the concept that an oxidant-antioxidant imbalance could have a role in the pathogenesis of female infertility related to cigarette smoking.
Toxic Effects of Smokeless Tobacco on Female Reproductive Health: A Review	Laldinsangi, C	March 2022	Systematic Review	This paper provides an updated review on available literature regarding the negative effects of smokeless tobacco use on female reproductive health, during pregnancy and its adverse consequences on the offspring.	There is substantial lack of studies delving into the effects of the constituents of ST products, individually and/or as a whole, on the process of steroidogenesis, reproductive hormones, and their receptors, particularly at the molecular level. Available investigations in both animal models and humans have shown that ST products can negatively affect ovarian morphology, oocyte quantity and quality and derange ovarian steroidogenesis.

RESULTS

- None of the articles identified the optimal point of smoking cessation during pregnancy to reduce impaired reproductive health.
- Three of the articles compared the health effects of smoking between smokers and non-smokers.
- One article compared the effects of smoking between smokers, non-smokers, and past smokers.
- Three reported original research related to the effects of cigarette smoking cessation on the menstrual cycle, folliculogenesis and oocyte development by comparing follicle count and quality, menstrual cycle lengths, and menstrual abnormalities of smokers to nonsmokers^{1,3,4}.
- The other article was a review of the impact of smokeless tobacco on ovarian morphology and function which found that there is a lack of studies investigating the effects of the components of smokeless tobacco on the process of steroidogenesis, reproductive hormones, and their receptors at the molecular level².

DISCUSSION

- Quitting smoking benefits female fertility because past smokers have better reproductive health than current smokers, but worse reproductive health than never smokers⁴.
- Cessation may improve fertility; however, it cannot reverse all negative effects to female reproductive health caused by tobacco use.
- Future research studies are needed to determine if and how reproductive functions on a molecular level improve at varying time points of cessation of tobacco use and how long it takes to observe improvements.

REFERENCES

1. Konstantinidou, F., Budani, M. C., Sarra, A., Stuppia, L., Tiboni, G. M., & Gatta, V. (2021). Impact of cigarette smoking on the expression of oxidative stress-related genes in cumulus cells retrieved from healthy women undergoing IVF. *International Journal of Molecular Sciences*, 22(23), 13147. doi: 10.3390/ijms222313147. doi:10.3390/ijms222313147 [doi]
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