RWD114

Pharmacological and electronic cigarette interventions for smoking cessation in pregnancy: a systematic review and network meta-analysis

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INTRODUCTION

Tobacco smoking during pregnancy has detrimental effects on both mothers and fetuses. In addition to behavioral therapy, nicotine replacement therapy (NRT) is recommended in pregnant women, whereas the use of other medications and electronic cigarette (E-cigarette) remains controversial.

OBJECTIVES

We aimed to assess the clinical effects of pharmacological treatment and E-cigarette in supporting smoking cessation during pregnancy.

METHODS

- **Databases searched:** PubMed, EMBASE, CENTRAL, EBSCO Open Dissertations (inception–Dec 2024)
- **Inclusion criteria:** RCTs on pharmacotherapy or E-cigarette use for smoking cessation during pregnancy
- **Screening process:** Title/abstract screened in duplicate
  - ChatGPT = first reviewer
  - Two human researchers = second reviewers
- **Risk of bias assessment:** Cochrane RoB2 tool
- **Data synthesis:** Random-effects model
- **Effect measures:**
  - Risk ratios (RRs, 95% CIs) → point prevalence abstinence, continuous abstinence, preterm birth
  - Mean differences (MDs, SDs) → birthweight
- **Ranking of interventions:** Surface under the cumulative ranking curve (SUCRA)

RESULTS

- **Studies included**
  - Eleven RCTs (n=4,065) were included.
- **Quality assessment**
  - Six studies had a high risk of bias.
- **Smoking abstinence**
  - Combined nicotine patch + gum vs usual care: **RR 3.22 (95% CI: 1.40–7.39).**
  - E-cigarettes vs usual care: **RR 1.81 (95% CI: 1.11–2.93).**
- **Birthweight** (compared to usual care)
  - Nicotine gum: **+337.00 g (95% CI: 103.18–570.82).**
  - Nicotine patch: **+281.30 g (95% CI: 22.26–540.33).**
  - Combined patch + gum: **+369.00 g (95% CI: 67.49–670.51).**
- **Preterm birth**
  - Nicotine gum reduced risk vs usual care: **RR 0.39 (95% CI: 0.17–0.91).**

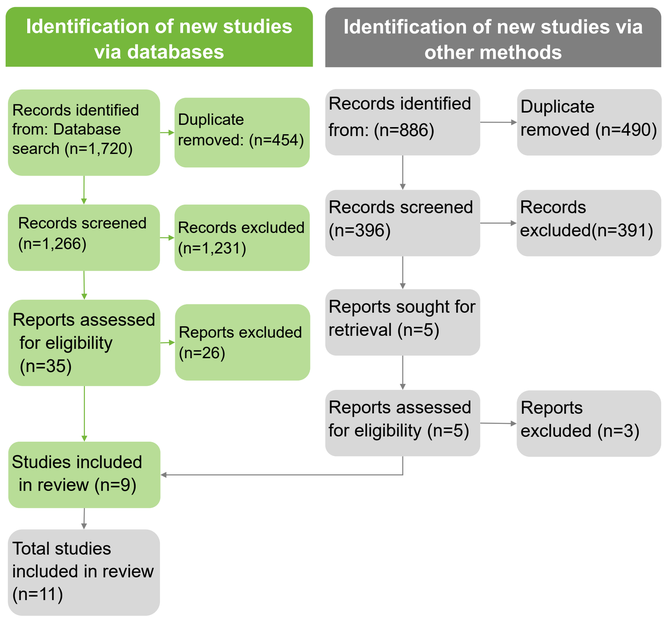
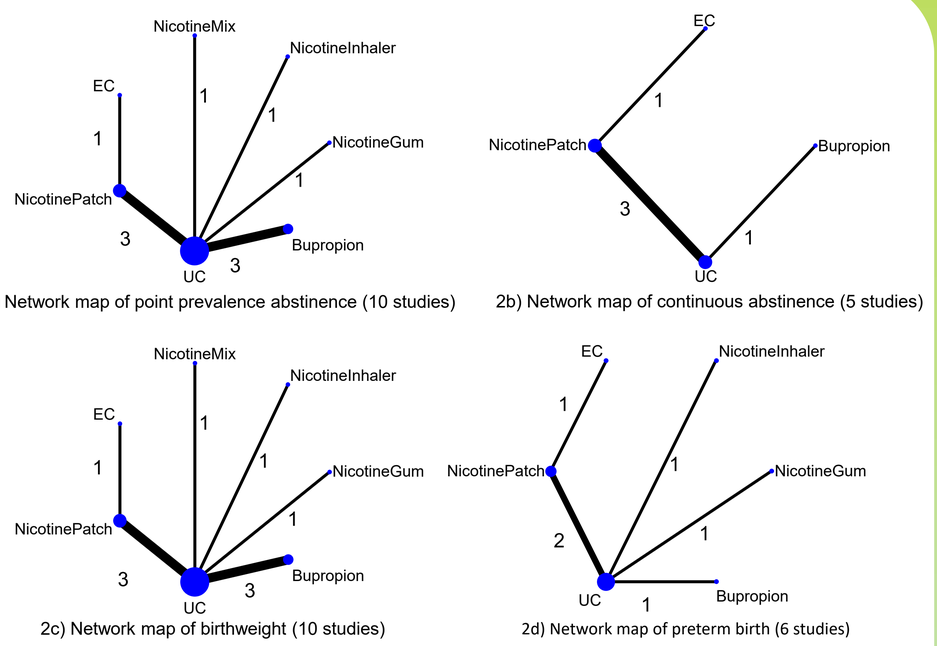


Figure 1: PRISMA flow diagram of selected articles



2a) Network map of point prevalence abstinence (10 studies)

2b) Network map of continuous abstinence (5 studies)

2c) Network map of birthweight (10 studies)

2d) Network map of preterm birth (6 studies)

Figure 2: Network map

Abbreviations: EC= E-cigarette; NicotineMix= Combined nicotine patch and gum; UC = Usual care

The numbers along the connection lines in each network geometry indicate the number of studies for each direct comparison.

Table 1: Comparative effects of different interventions on smoking abstinent and infant outcomes

				Birthweight MD (95% CI)		
Buproion	25.54 (-240.13,291.22)	306.84 (12.29,601.39)	74.18 (-228.62,376.98)	-62.16 (-323.56,199.24)	25.54 (-182.69,233.78)	-30.16 (-209.30,148.98)
0.42 (0.17,1.04)	**E-cigarette**	281.30 (-25.82,588.41)	48.64 (-266.40,363.68)	-87.70 (-363.18,187.78)	0.00 (-164.99,164.99)	-55.70 (-254.83,143.42)
0.62 (0.23,1.70)	1.50 (0.67,3.33)	**Nicotine gum**	-232.66 (-570.70,105.38)	-369.00 (-670.51,-67.49)	-281.30 (-540.33,-22.26)	-337.00 (-570.82,-103.18)
1.35 (0.42,4.31)	3.24 (1.20,8.76)	2.16 (0.74,6.37)	**Nicotine inhaler**	-136.34 (-445.92,173.24)	-48.64 (-317.02,219.74)	-104.34 (-348.47,139.79)
0.23 (0.08,0.73)	0.56 (0.21,1.47)	0.38 (0.13,1.07)	0.17 (0.05,0.58)	**Combined nicotine patch and gum**	87.70 (-132.91,308.31)	32.00 (-158.37,222.37)
0.60 (0.26,1.37)	1.44 (0.98,2.13)	0.97 (0.48,1.95)	0.45 (0.18,1.12)	2.57 (1.06,6.21)	**Nicotine patch**	-55.70 (-167.19,55.78)
0.75 (0.35,1.63)	1.81 (1.11,2.93)	1.21 (0.64,2.29)	0.56 (0.23,1.33)	3.22 (1.40,7.39)	1.25 (0.93,1.68)	**Usual care**

Point prevalence abstinence RR (95% CI)

Abbreviations: CI = Confidence interval; MD = Mean Difference; RR = Risk Ratio

Table 2: The surface under the cumulative ranking curve (SUCRA)

Treatment	SUCRA	
	Point prevalence abstinence	Birthweight
Combined nicotine patch and gum	97.0	22.6
E-cigarette	81.3	49.0
Nicotine patch	56.1	51.5
Nicotine gum	51.6	97.0
Usual care	33.8	27.7
Bupropion	21.1	41.5
Nicotine inhaler	9.1	60.8

Abbreviations: NA = Not applicable

CONCLUSION

The combination of a nicotine patch and gum is effective in helping pregnant women quit smoking, as well as E-cigarette. Nicotine gum may offer additional benefits by improving birthweight and reducing the risk of preterm birth. However, more high-quality RCTs with a longer treatment duration and biochemical confirmation of smoking cessation are still required to confirm sustained smoking cessation.

CONTACT INFORMATION

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