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The effect of the use of e-cigarettes during pregnancy on maternal, fetal and infant health outcomes: A scoping review protocol

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ADMINISTRATIVE INFORMATION

Support - Tommy's Baby Charity.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 September 2024 and was last updated on 23 September 2024.

INTRODUCTION

Review question / Objective To identify what is known and what is not known about the effects of e-cigarette use in pregnancy on maternal, neonatal and infant outcomes and possible underlying mechanisms? Specific objectives are:

1. To identify estimates of the prevalence of e-cigarette use in pregnancy.
2. To report pregnancy outcomes of women using e-cigarettes in pregnancy.
3. To determine whether e-cigarette use during pregnancy has effects on maternal autonomic and vascular function and health.
4. To report the effects of e-cigarette use during pregnancy on neonatal and infant health.
5. To identify effects of e-cigarette use during pregnancy in animal models and their offspring.

Background Tobacco (t)-cigarette smoking is an important aetiological factor in pregnancy complications including fetal growth restriction and stillbirth. Electronic (e)-cigarettes do not burn tobacco but heat the carrier liquid for vaporised nicotine delivery. Thus, their use is believed to be a safer alternative. As such, Medicines and Healthcare products Regulatory Authority (MHRA) have paved a way for e-cigarette NHS prescriptions. However, acute use of e-cigarettes adversely affects cardiovascular health, leading to higher endothelial microparticles, increased heart rate, blood pressure and arterial stiffness. Currently, the effects of e-cigarette use during pregnancy are uncertain, though they are being proposed as a replacement for t-cigarettes.

Rationale The current knowledge around e-cigarette use in pregnancy is limited, with literature reviews often returning inconclusive results. There

is little data comparing vaping to t-cigarette smoking directly. This scoping review aims to review the existing literature around e-cigarette smoking in pregnancy, including human and animal models, to identify both areas of interest and knowledge gaps. This will inform study questions for further research looking at the direct effects of vaping during pregnancy, when compared to t-smokers and non-smokers, as well as pregnancy outcomes.

METHODS

Strategy of data synthesis This scoping review will be conducted utilising the Joanna Briggs institute (JBI) methodology for scoping reviews and reported as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines. The PCC (Population (or participants)/Concept/Context) framework, as recommended by the JBI manual, will be used to help determine suitability of studies.

Eligibility criteria Studies which look at the use of e-cigarettes in pregnancy, studies on humans, animals and ex vivo models will be included. We will include a range of study designs including RCT, non-RCT, analytical observation studies, retrospective and prospective cohort studies, case control studies, analytical cross-sectional studies, and descriptive observational studies. Animal studies and ex vivo tissue studies will also be included if they report pregnancy outcomes or disease mechanisms. Systematic, scoping and narrative reviews may be utilised to identify relevant studies within them.

Source of evidence screening and selection

Source identification will use a systematic search across multiple databases using pre-defined search terms.

Search strategy:

(tiab(vaping) OR tiab(vape OR vapes) OR tiab(e cigarette*) OR tiab(electronic cigarette*) OR if(vaping) OR if(electronic nicotine delivery systems) OR tiab(electronic nicotine delivery system*) OR tiab(vaping associated lung injury*)) AND (tiab(pregnan*) OR if(pregnancy OR pregnancy outcome) OR tiab(pregnancy outcome*))

This strategy will be used to undertake an advanced search in selected databases; Medline (PubMed), EMBASE, EBSCO (CINAHL), the Cochrane Central Trials Database, and PsycInfo. There will also be a grey literature search on Google Scholar using the search terms 'vaping in

pregnancy, e-cigarette use in pregnancy, electronic cigarette use in pregnancy' utilising incognito mode to avoid a tailored search. Due to capacity, this will be limited to screening the first 100 hits for eligibility.

Data management Data management will be undertaken utilising Covidence, an online software platform designed to support the systematic review process.

Studies identified from literature searches will be imported into Covidence for automatic removal of duplicates. Studies will then be screened with title and abstract screening by two independent reviewers to confirm that they meet eligibility criteria. Any disagreements will be resolved by consensus, with input from a third reviewer if required.

Relevant studies will then be reviewed in depth with full text assessment. Data will be extracted with a standardised data extraction form including prevalence of e-cigarette use, perceived safety, maternal health, pregnancy outcome, fetal and infant health.

Reporting results / Analysis of the evidence The scoping review results will be reported using a PRISMA flow diagram to show the number of studies included. Data will be grouped into relevant topics and presented in both tabular and narrative format. The final review will report the selection process, number of studies, and rationale for inclusion and exclusion. There will be narrative analysis of key themes including prevalence, impact on maternal health, fetal health, pregnancy outcome, infant health and discussion of animal and ex vivo models. Gaps in the existing literature will be discussed along with areas for further research.

Presentation of the results The tools provided by the JBI (e.g tables and flow diagrams) utilised in conjunction with the PRISMA-ScR guidelines will be used to present the results.

Language restriction No language restriction.

Country(ies) involved UK.

Other relevant information NA.

Keywords Vaping; e-cigarette; electronic cigarette; electronic nicotine delivery system; pregnancy; pregnancy outcome.

Dissemination plans Once the data analysis is complete, results will be published in peer-reviewed journals and presented at relevant

scientific and clinical conferences. We will seek advice from our patient-public involvement group regarding the optimal means to disseminate information about e-cigarettes for pregnant women.

Contributions of each author

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