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THE NEGATIVE IMPACTS OF SMOKING IN PREGNANCY AND THE POSSIBILITIES OF CONTROLLING IT

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Abstract: Smoking during pregnancy is a significant public health problem with negative impacts on maternal and fetal health. The search for an investigation into the effectiveness of different interventions to help pregnant women quit smoking is pertinent in order to seek to present relevant methods. In order to better understand the topic, an integrative literature review was carried out using studies available on the National Library of Medicine (PubMed) and Virtual Health Library (VHL) platforms, after applying exclusion criteria, 20 articles were analyzed. Factors such as nicotine dependence, motivation to quit and the specific characteristics of different population groups influence the effectiveness of interventions. According to the authors consulted, there is a clear need to develop personalized strategies and consider aspects such as the perception of safety in relation to smoking, treating tobacco as a way of coping with stress and depression. In addition, it is important to adapt interventions to meet the needs and barriers of different population groups.

Keywords: Smoking; Pregnancy; Impacts; Health.

INTRODUCTION

According to Arger et al. (2019), during pregnancy, increased liver metabolism, driven by hormones such as estrogen and progesterone, can accelerate nicotine metabolism. This results in lower concentrations of nicotine in the blood, which can intensify withdrawal symptoms and the need to smoke to maintain the same levels of satisfaction, making it more difficult to quit (PATTEN et al. 2020).

The time course of the changes throughout pregnancy is still uncertain, so there is a need to better understand how fluctuations in nicotine levels affect smoking behavior at different stages of pregnancy (DE GENNA et al. 2023).

Karimiankakolaki; MazloomiMahmoodabad; Kazemi(2023), consider that contact with cigarette smoke, even passively, can have a negative impact on pregnancy. Liu et al. (2020), highlight the association between maternal lifestyles during pregnancy and congenital heart defects (CHD), so exposure to passive smoking during pregnancy may be associated with greater risk, and it is therefore necessary to develop specific intervention strategies to reduce these risk factors.

This study aims to investigate the efficacy and safety of different smoking cessation interventions for pregnant women, with a focus on identifying effective and safe approaches to promote maternal and fetal health, taking into account the specific needs and characteristics of different population groups.

METHODOLOGY

This qualitative, retrospective and cross-sectional study was based on an integrative literature review as a research method. The study was conducted by searching the PubMed and Virtual Health Library (VHL) platforms, using the terms “pregnancy” and “tobacco” combined by the Boolean operator “and”.

In order to ensure that the selected studies were relevant to the topic, inclusion criteria were defined, prioritizing studies consistent with the proposals to evaluate the effects of smoking in pregnancy and the origin of interventions. In addition, articles published between 2019 and 2024, in English, Portuguese or Spanish, and available for free access were considered.

The initial search resulted in a total of 11,195 papers, of which 7,539 were found in PubMed and 3,656 in the VHL. By adopting the inclusion and exclusion criteria, articles that did not fit the proposed theme or were repeated were eliminated.

RESULTS AND DISCUSSION

The in-depth analysis of the study focused on 20 journals, selected from 132 articles after reading and manual selection. Of these, 15 were found in PubMed and 5 in the VHL, presented in the final analysis as shown in Figure 1.

The practical approaches to intervention and analysis of tobacco consumption reduction were characterized according to the presentation of the 20 studies considered. The analyses are shown in Table 1 below.

Several studies have investigated different interventions to help pregnant women quit smoking, with varying results. While some studies demonstrate the effectiveness of approaches using resource application methods such as e-cigarettes, nicotine patches and gradual reduction interventions, others work on the basis of motivational and support programs for overcoming consumption.

Hajek et al. (2022), when comparing pregnant women who smoked rechargeable e-cigarettes with nicotine patches, smoking cessation rates by the end of pregnancy showed no significant difference between the two groups (6.8% for e-cigarettes and 4.4% for patches). However, an analysis excluding participants who used non-designated products showed that e-cigarettes were more effective (6.8% vs. 3.6%). Safety was similar between the groups, but low birth weight was less frequent with e-cigarettes (9.6% vs. 14.8%).

When conducting a randomized clinical trial aimed at reducing tobacco use at delivery and in the following months, however, there was no significant difference in tobacco use rates between the groups. However, 70% of participants in the intervention group tried to quit smoking two months after giving birth, compared to 51% of the control group (PATTEN et al. 2020).

When the effectiveness of e-cigarettes and nicotine patches in helping pregnant women quit smoking was compared, although there was no significant difference in the cessation success rate between the two groups in the primary analysis, e-cigarettes proved to be almost twice as effective as nicotine patches when considering the use of e-cigarettes in the nicotine patch group. Overall, e-cigarettes did not increase the risk of adverse events or adverse birth outcomes and were associated with a lower rate of low birth weight babies (PRZULJ et al. 2023).

According to Satyanarayana et al. (2024), the feasibility and acceptability of a multicomponent behavioral intervention to reduce secondhand smoke (SHS) exposure in pregnant women in India and Bangladesh. The intervention was well accepted by the interventionists, pregnant women and their husbands and with this, the recruitment and retention rate was good, especially in Bangladesh.

When investigating the efficacy and safety of sustained-release bupropion to help pregnant women quit smoking, it was found that bupropion was not effective in promoting smoking cessation in pregnant women, both at the end of treatment (week 10) and at week 24 after the start of treatment, there were no significant differences in terms of safety between the group receiving bupropion and the placebo group (KRANZLER, 2021).

The efficacy of MiQuit, a personalized text messaging program for smoking cessation during pregnancy, was verified in the increase in 7-day self-reported abstinence at the start of treatment (4 weeks after initiation) and showed a marginally significant effect in late pregnancy, but had no impact on prolonged abstinence or biochemically validated abstinence (EMERY, et al., 2024).

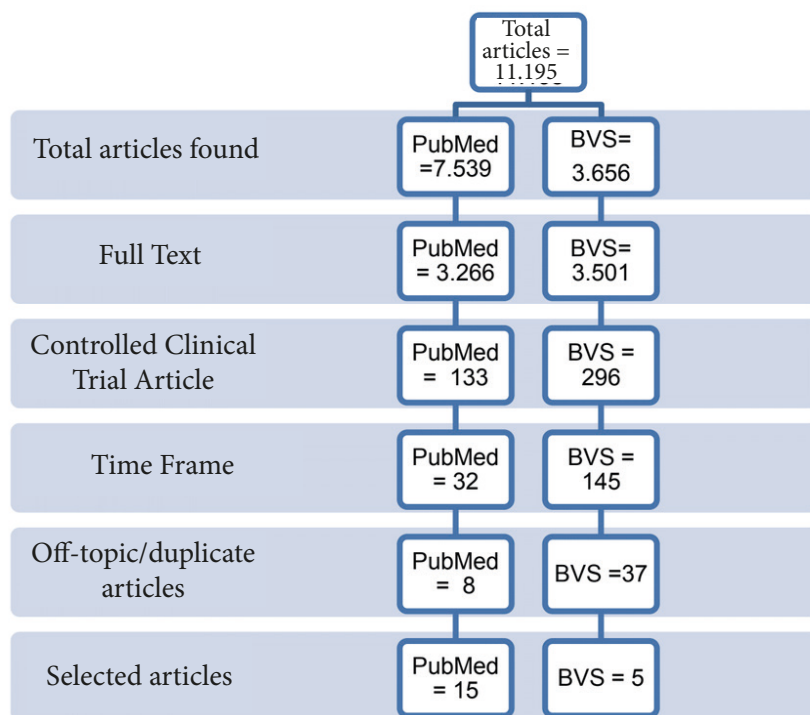


Figure 1. Flowchart for identifying and selecting the selected articles

Source: Authors (2024)

Author	Year	Type of study	Effectiveness	Application
Hajek et al.	2012	Randomized study (n=1140)	Yes	E-cigarettes can help with smoking cessation with comparable safety to nicotine patches.
Patten et al.	2020	Study randomized (n=352)	No	The community intervention raised awareness about healthy pregnancies, but was not effective in reducing tobacco use.
Przulj et al.	2023	Study randomized (n=140)	Yes	E-cigarettes were more effective than nicotine patches.
Satyanarayana et al.	2024	Case series (n=102)	Yes	The pilot study provided data on the rate of recruitment and retention, and on the concentration of salivary cotinine.
Kranzler et al.	2021	Case series (n=129)	Yes	The study identified some factors that influenced quit rates, such as race and the severity of nicotine dependence.
Emery et al.	2024	Case series (n=1409)	No	The use of a text messaging program did not prove effective in achieving prolonged or validated abstinence.
Kennedy et al.	2022	Case Series (n=2201)	Yes	Sending messages to promote smoking reduction during pregnancy can have a positive impact on birth weight.
Pierce et al.	2022	Study randomized (n=357)	No	Cigarette packs with graphic warning labels may have a social impact, but they have not generated lasting effects in 1 year of follow-up.
Luk et al.	2021	Randomized study (n=1053)	Yes	The combined approach of counseling and therapy can be an effective strategy.
Wahabiet al.	2020	Randomized study (n=100)	No	The application of counseling has improved knowledge and perception, but it may not be enough to change behavior.
Xia et al.	2020	Randomized study (n=1023)	Yes	The video-based intervention was feasible and offers the potential to reduce the negative impacts of passive smoking on the health of mothers and babies.
Wechsberg et al.	2024	Case series (n = 406)	Yes	By addressing the specific needs of young women based on race and structural challenges, interventions can have a greater impact on reducing tobacco use...

Aziz Ali et al.	2021	Randomized study (n=480)	No	The potential dose-response relationship between smokeless tobacco use and adverse outcomes during pregnancy has not been conclusive.
Jaber et al.	2021	Case series (n = 217)	Yes	Effective interventions provide pregnant women with accurate information about the risks of smoking during pregnancy.
Murphy et al.	2021	Case series (n=382)	No	Telephone intervention may not be enough to combat the challenges of the postpartum period.
Berlin et al.	2022	Case series (n=460)	Yes	Financial incentives can be an effective and safe intervention to encourage pregnant smokers to quit.
Von Ash et al.	2023	Case series (n=399)	Yes	Assessing excessive sleepiness in late pregnancy can help identify women with negative attitudes towards breastfeeding.
Tappin et al.	2022	Case series (n=4,032)	Yes	Financial incentives encourage the reduction and even elimination of smoking.
Venkatesh; Manuck	2018	Case series (n=356)	Yes	Tobacco use has less influence than overweight on the likelihood of having a shortened cervix.
Wang et al.	2020	Case series (17)	Yes	The need for stress and depression management strategies for pregnant women with anorexia nervosa was considered.

Table 1. Characterization of articles according to authors, year of publication, type of study, effectiveness and application

Source: Authors (2024)

According to Kennedy et al. (2022), an SMS-programmed gradual reduction intervention did not result in significant differences in birth outcomes, such as birth weight and gestational age, compared to the control group. The majority of participants reduced their smoking during pregnancy, women who managed to reduce more than 50% of their daily cigarettes had a significant increase in birth weight compared to those who did not.

Pierce et al. (2022), in a randomized study, found that smokers who received cigarette packs with graphic warning labels (GWLs) were more likely to hide their packs in public than those who received standard or blank packs, probably due to negative reactions from observers. Although the behavior of hiding packs increased during the period of exposure to GWLs, there were no significant changes in the prevalence or consumption of cigarettes over 12 months.

Luk et al. (2021), found that combining brief counseling with a 1-week sample of nicotine replacement therapy (NRT) and referral to smoking cessation programs

almost doubled the chances of prospective smoking parents achieving validated tobacco abstinence compared to brief counseling alone. This intervention also had a positive effect on perceived family harmony.

Wahabi, et al. (2020), considered in randomized analysis comparing the effectiveness of face-to-face counseling based on the health belief model (HCM) with only written educational pamphlets to improve perception, avoidance behavior and exposure to secondhand smoke (SHS) in pregnant women. Face-to-face counseling resulted in higher perceived susceptibility to and severity of SHS and lower perceived barriers to avoiding SHS exposure.

Xia et al. (2020), analyzed how a video-based smoking cessation intervention focused on the risks of smoking to maternal and child health was effective in promoting cessation in prospective parents, with videos being more effective than text messages. Compared to a control group that only received an information leaflet, the groups that received videos or text messages showed significantly higher rates of validated smoking abstinence after six months.

Wechsberg et al. (2024), consider that interventions to reduce the risk of tobacco use during pregnancy should be adapted to take into account the differences between population groups and intersecting barriers, including as a factor in favor of avoiding the spread of the HIV virus.

Aziz Ali et al. (2021), analyzed the link between the use of smokeless tobacco (SLT) before pregnancy and maternal and fetal outcomes. Despite a high prevalence of SLT (gutka) use among women of reproductive age, the analysis did not find a statistically significant association between gutka use and maternal anemia, miscarriage, premature birth, stillbirth or low birth weight.

More than a third of pregnant women believe that smoking “a few” cigarettes during pregnancy is safe for them and their babies. This perception of safety is significantly related to the information received from health professionals about the acceptability of smoking small amounts during pregnancy, the perception of harm reduction from smoking light cigarettes and moderate to severe depression and anxiety scores (JABER et al., 2021).

Motivational interviewing (MI) via telephone to help pregnant women maintain abstinence from smoking after giving birth. Women who had recently quit smoking were randomized to receive five MS counseling calls or standard prenatal and postnatal care. Although a significant number of women quit smoking during pregnancy, postpartum relapse rates remained high (MURPHY et al., 2021).

For Berlin et al. (2021), financial incentives were associated with a significant 7% reduction in the risk of negative neonatal outcomes. This reduction was observed in relation to birth weight, with more babies in the financial incentives group reaching ≥ 2500 g.

According to Von Ash et al. (2023), excessive sleepiness in late pregnancy was associated with less favorable attitudes towards breastfeeding. Although excessive sleepiness was

not associated with the intention, initiation or continuation of breastfeeding, it was related to a lower tendency to use food to calm a fussy baby in the postpartum period.

According to Tappin et al. (2022), a study group that received financial incentives had a significantly higher smoking cessation rate than the control group. Despite the high relapse rate after birth, the authors recommend including financial incentives in smoking cessation services for pregnant women as a safe and effective approach, in line with the new UK guidelines.

After taking into account the number of previous premature births and tobacco use, overweight or obese women were less likely to have a shortened cervix compared to women of normal weight (VENKATESH; MANUCK, 2018).

Tobacco users reported lower levels of stress and clinical depression than non-users. These findings suggest that tobacco use may be a way of coping with stress and depression for these women (WANG et al. 2020).

FINAL CONSIDERATIONS

Research into smoking cessation in pregnant women has shown promising results, but also challenges. While e-cigarettes have been shown to be more effective than nicotine patches in some studies, bupropion has not been shown to be effective and telephone motivational interviewing has had no significant impact on relapse prevention. Multicomponent interventions and face-to-face counseling show promise, as do financial incentives and gradual smoking reduction. The perception of safety in relation to smoking during pregnancy and the use of tobacco as a way of coping with stress and depression are also important aspects to consider. However, it is crucial to adapt interventions to take into account the differences between population groups and intersecting barriers, with a focus on maternal and child health.

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