

Effects of Nicotine on Fetal Development: Enhancing Education in Nursing Practice

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Abstract

Background: With the rise of electronic nicotine delivery systems (ENDS), nursing education about the effects of nicotine on fetal development is vital. **Methods:** Research pertaining to the effects of tobacco cigarettes on a developing fetus is abundant; however, studies focusing on the effects of non-cigarette nicotine products are far less extensive. Therefore, the literature review focused on learning more about this topic and recognize any gaps in the evidence utilizing the John Hopkins Model. **Results:** Current literature revealed misconceptions regarding nicotine use during pregnancy, a lack of application of educational and screening tools within healthcare, and a need for change in nursing practice. **Conclusions:** In order to promote better health outcomes for both obstetric and neonatal patients, nurses are obligated to incorporate evidence-based practice in support of these findings.

Research Question and Introduction

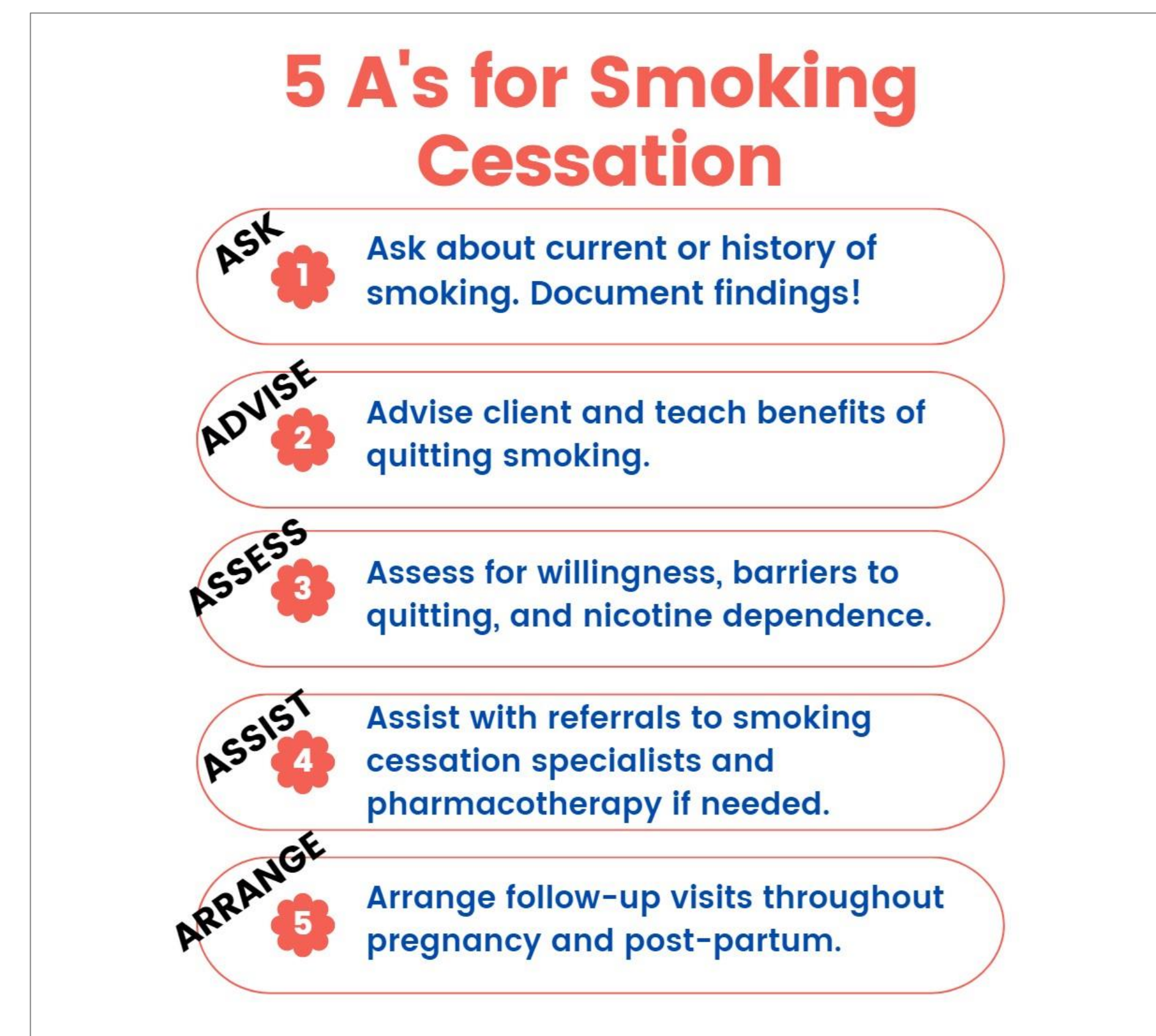
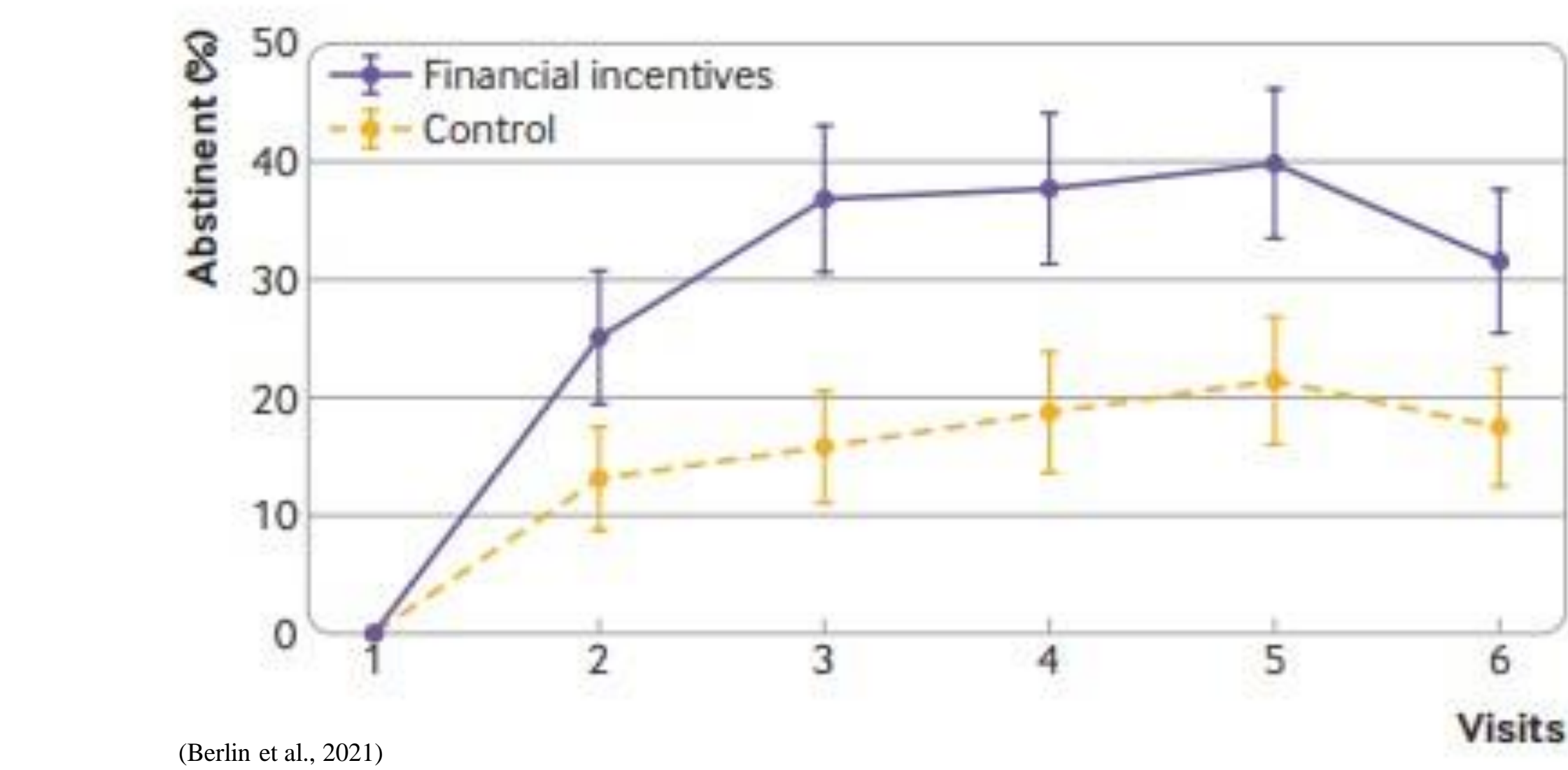
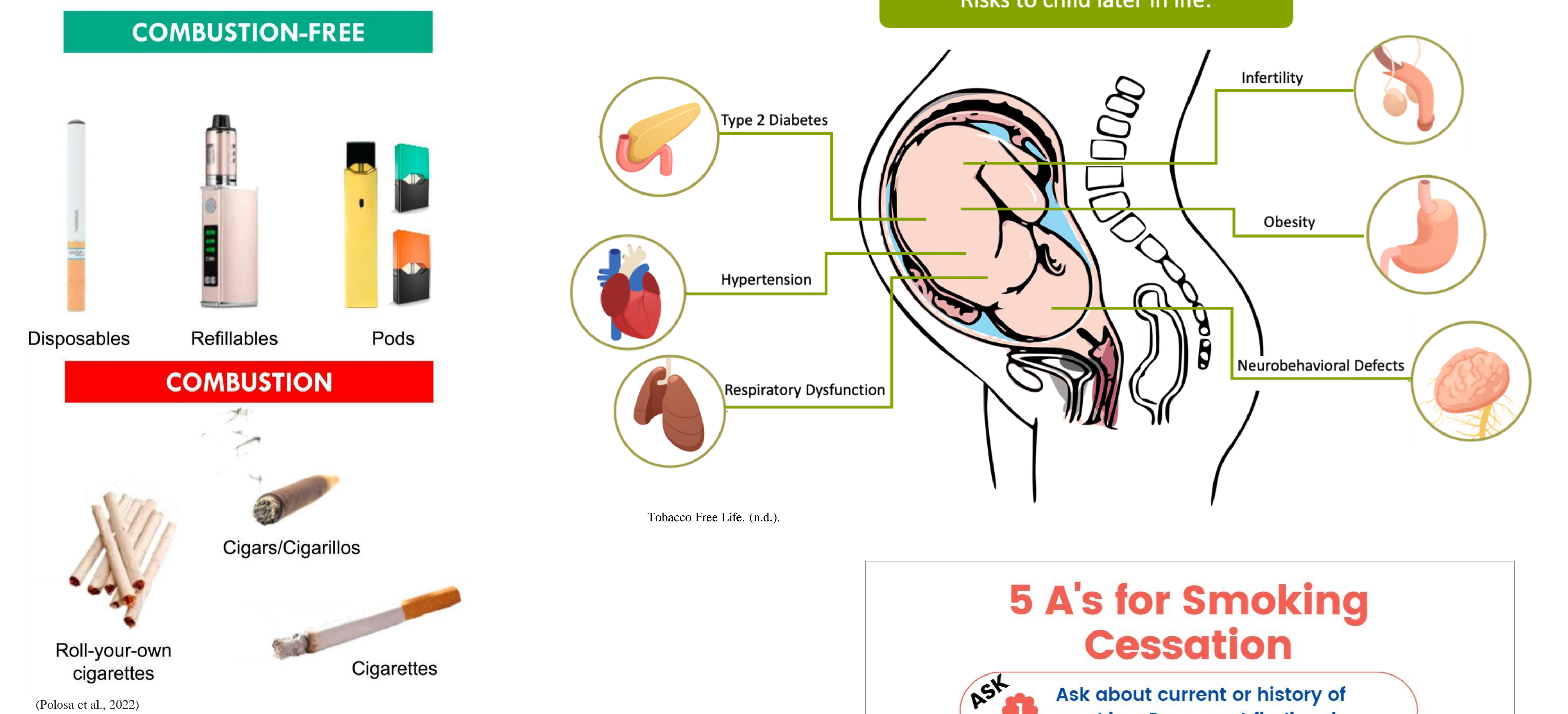
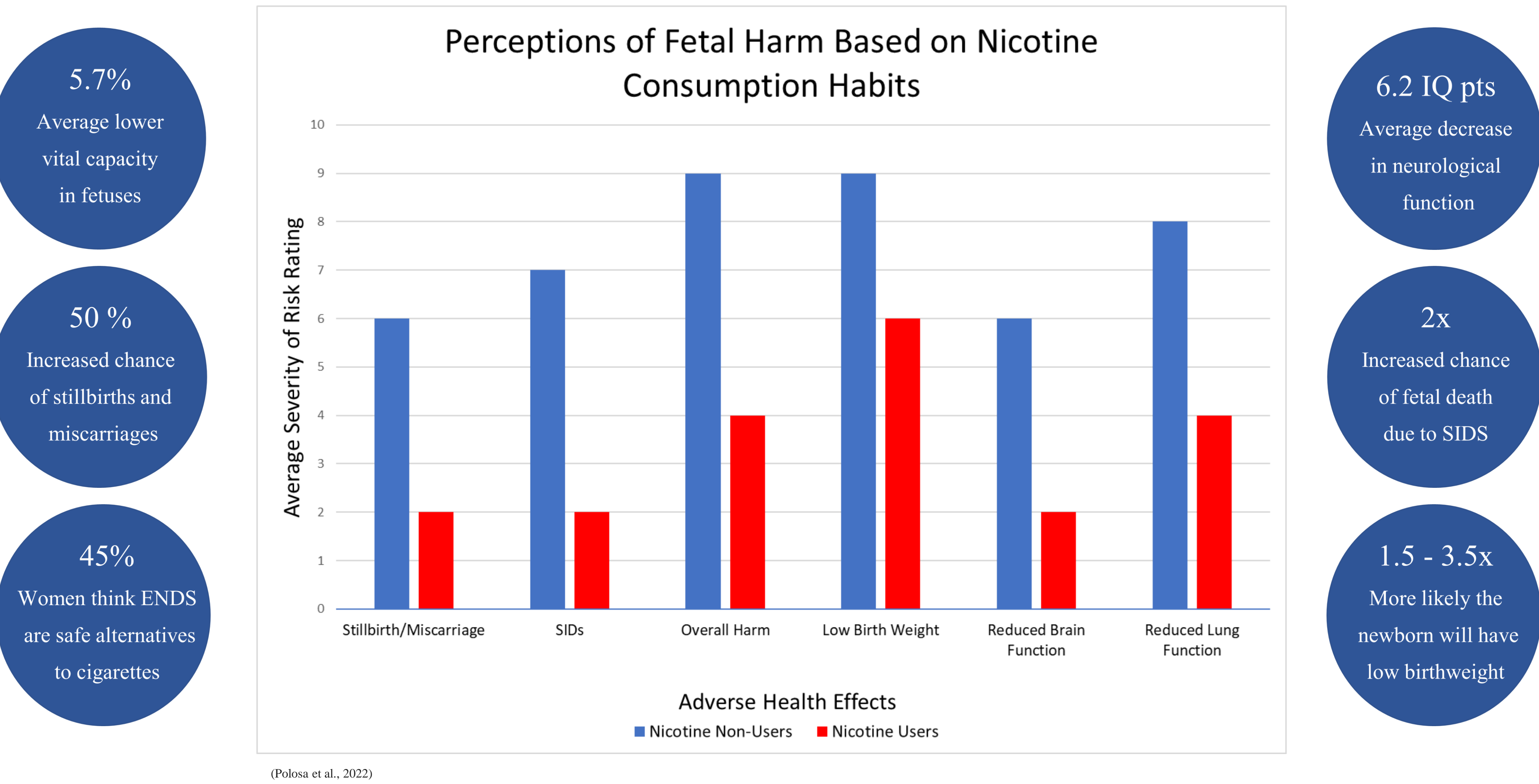
Research Question:
How can nurses better support prenatal patients engaging in non-combustible nicotine use given the effects of nicotine on the neonate?

Introduction:
In the United States, up to 8.3% of obstetric patients use ENDS before pregnancy, and within that population, roughly 24.4% continue to use ENDS throughout pregnancy (Liu et al., 2021). As many as 38.8% of current pregnant smokers have been found to also use e-cigarettes either as a substitute for, or in addition to, combustible cigarettes (Dobbs et al., 2021). These statistics show that a large number of neonates are exposed to nicotine. This harmful exposure can lead to permanent damage such as stillbirth, miscarriage, increased heart rate and blood pressure, low birthweight, sudden infant death syndrome (SIDS), reduced lung function and brain function, ectopic pregnancy, altered metabolic, neurologic developmental changes, and overall harm to the developing fetus. Additionally, this list does not include the harms inflicted on the pregnant smoker. Furthermore, studies have shown that the use of combustible cigarettes during pregnancy is perceived as significantly more harmful than using ENDS (Dobbs et al., 2021). Pregnant smokers have admitted to replacing combustible cigarettes with ENDS, assuming it is significantly healthier for their child. This false perception leads to irreparable harm for infants exposed to nicotine from ENDS. Ultimately, this misconception is due to a lack of prenatal education and screening within nursing practice. One study found some of their participants had been instructed by their personal health care providers (HCP) to switch to ENDS during pregnancy (Wagner et al., 2017). Current healthcare practice does not include proper screening and support to obstetric patients. According to a recent survey, 79% of gynecologists admitting to screening for substance use in pregnancy. However, only 11% used an established screening tool (Smid & Terplan, 2023).

Methods

Inquiry was sparked by the recent influx in non-combustible cigarette use and how that might affect a developing fetus. This led us to formulate a practice question concerning the role of the nurse and a brief survey of existing evidence. While there is an abundance of research about the effects of combustible cigarette use on a pregnant patient and the fetus, there was a gap in evidence pertaining to ENDS nicotine use during pregnancy. As a result of this gap, another area of study was identified with lacking evidence concerning proper screening and education about ENDS during pregnancy. A literature review was conducted on both the effects of ENDS on a neonate and the current healthcare approach when working with pregnant nicotine users. By leveling the evidence using Johns Hopkins Model, the research proved to be well-rounded.

- 18 peer-reviewed sources collected
- 9 sources included in presentation
- Research published within the last five years
- Leveled evidence using Johns Hopkins Model



Results and Conclusion

Results:
Use of ENDS has considerably increased in acceptance and practice from its introduction in 2004 (Wagner et al., 2017). Specifically, within the pregnant population, there has been a rise in the use of ENDS because of the perception that they are safer than combustible cigarettes. Nicotine has been proven to cause negative effects in neonates when used by the mother regardless of delivery device (Havard et al., 2022).

- These effects include stillbirth, miscarriage, low birth weight, reduced lung function, and an increased risk for SIDS.

Research has also shown that pregnant nicotine users have misconceptions regarding the harms of nicotine exposure to the neonate (Dobbs et al., 2021). These patients' lack of understanding regarding the dangers of nicotine and increased risks during pregnancy demonstrates that there is a dire need for education, screening, and training tools such as:

- Extensive and clear methods of screening (such as the 5 A's)
- Regular practice and implication of screening methods
- Education for obstetric patient on cessation programs (incentive-based programs)

Conclusions:
In response to the results above, there is an obligation for health care providers, specifically registered nurses, to be knowledgeable about smoking cessation resources and how to implement a holistic approach.

- Smoking cessation programs, including incentive-based programs, have been shown to decrease nicotine use in pregnancy (Berlin et al., 2021).
- Smoking cessation programs provide education, counseling, follow up care, trainings that are teaching behavioral modification skills, and tools for relapse prevention.

By effectively screening and educating, nurses and HCPs can help improve the health of both their obstetric and neonatal patients. Along with these intervention programs, registered nurses have a profound impact through their presence and demeanor (Small et al., 2022). Nurses can implement this into practice by:

- Cultivating interactions with a supportive attitude, providing useful and accessible interventions, and fostering a professional environment.
- Enacting a holistic and non-authoritarian approach when screening and educating patients.

Future Work

1. Research the long-term consequences of ENDS use on an individual.
2. Investigate the specific effects of ENDS on fetal development as opposed to combustible cigarettes.
3. Partner with other healthcare professionals (e.g. psychologists, counselors, public health workers) to discover the most therapeutic nursing approach when dealing with stigmatized issues.
4. Determine the most effective screening tool for nicotine use.
5. Find the most effective follow up interventions to promote nicotine cessation.

References and Permissions

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