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Healthy behavior during pregnancy: Scoping review

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ABSTRACT

Maternal-fetal attachment (MFA) refers to the emotional bond or attachment that a mother has with her unborn child during pregnancy. Health behavior during pregnancy includes nutrition, personal hygiene, clothing, and stress management. Health in pregnant women to get a healthy mother and child is done while the mother is pregnant. This study was aimed to map the existing evidence on maternal-fetal attachment and healthy living behavior during pregnancy with a scoping review method utilizes the PRISMA-ScR checklist for mapping. Search strategy for exploring databases namely Pubmed, Science Direct, Wiley, EBSCO published between 2014-2023. There were 580 articles obtained from several databases, then filtered into 4 relevant articles. Obtained from several countries, namely, Finland 1 article, America 1 article, Iran 1 article, and Rhode Island with a total of q articles. Of the 4 articles, 2 articles were obtained that used a cross-sectional design, namely in articles A3 and A4, then for articles with a cohort-study design, namely A1, while articles that used qualitative research were A2. The main influences on maternal-fetal attachment for promoting healthy behavior during pregnancy including avoiding alcohol consumption, quitting smoking, exercising and conducting regular pregnancy check. Some health practices that can support pregnant women are avoiding alcohol consumption, quitting smoking, exercising, conducting regular pregnancy checks.

1. Introduction

The journey of pregnancy represents a significant phase in a woman's life, bringing about various changes that affect her physical, mental, psychological, and social well-being. These transformations during a normal pregnancy are considered physiological rather than pathological (Walyani, 2016). Maternal-fetal attachment (MFA) refers to the emotional bond or attachment that a mother has towards the fetus she is carrying during pregnancy. This concept includes feelings of affection, love and attachment that develop between mother and fetus in the process of pregnancy. MFA reflects the special emotional relationship between mother and fetus developing in the womb (Purwati et al., 2022). During pregnancy, the mother may experience positive feelings toward the fetus, feel emotionally connected, and experience profound psychological changes in response to the presence of the unborn child.

In 2022, the number of pregnant women reached a significant figure, highlighting the importance of maternal health. Pregnancy is a transformative phase in a woman's life, bringing physical, psychological, and emotional changes that shape her well-being (Jiménez et al., 2020). These changes are natural and reflect the dynamic process of maternal-fetal attachment (MFA), where a mother develops an emotional bond with her unborn child. Understanding pregnancy rates and their distribution can serve as a foundation for improving maternal health services through targeted policies

and programs. Strengthening maternal care and support systems is essential to ensuring the well-being of both mother and fetus throughout this critical period.

Healthy lifestyle behavior during pregnancy covers aspects such as nutritional needs, personal care, clothing selection, and stress management (Rezaee et al., 2022). When pregnant, it is important for mothers to consume foods that are rich in nutrients, this does not always mean expensive, but nutrition during pregnancy should include protein, iron and enough fluids to meet balanced needs. To maintain the health of the mother and child, care during pregnancy includes maintaining the health of the mother and child, care during pregnancy includes maintaining personal hygiene in order to reduce the risk of negative impacts, such as infection. One of the main issues that can affect pregnancy is attention to nutritional issues, which is often influenced by beliefs and dietary restrictions. This can have a negative impact on the health of the mother and fetus because the daily activities of pregnant women are not reduced, while there are restrictions on several foods that are actually needed during pregnancy (Ban Ki-moon & Organization, 2016; Walyani, 2016).

Smoking has a dangerous impact on pregnancy. A pregnant woman who smokes 20 cigarettes a day, the equivalent of one pack of cigarettes, means she will inhale tobacco smoke more than 11,000 times during an average pregnancy (Yuniati et al., 2023). Scientific research shows that smoking during pregnancy increases the risk of fetal death or damage to fetal development. Smoking also inhibits the absorption of vitamins B and C and folic acid, which can cause folic acid deficiency and risk causing neural tube defects (Elahi et al., 2024). In addition, smoking increases the risk of pregnancy complications in expectant mothers. Studies over several years show that babies born to mothers who smoke tend to have a lower body weight, reduced by around 200 grams. Children born to mothers who smoked during pregnancy also had lower IQ scores and higher levels of reading disorders compared to children whose mothers did not smoke (K Curtis, A Weinrib, 2012).

Cigarettes, medicines without indications from a doctor and alcohol are classified as types of alcoholic beverages and are dangerous if consumed by pregnant women and the fetus. All of these materials can accumulate in the mother's circulatory system and be transferred to the fetus via placental circulation which can have bad consequences for the mother and fetus such as abortion, bleeding, congenital abnormalities, etc (Dewi et al., 2021).

Research indicates a significant association between maternal-fetal attachment (MFA) and adherence to health behaviors during pregnancy. A study published in found that higher levels of MFA correlate with better adherence to health-promoting behaviors among pregnant women (Hernandez, 2014). This suggests that when a mother forms a strong emotional bond with her fetus, she is more likely to engage in activities that support both her health and that of her unborn child.

Conversely, weaker MFA may lead to neglect of essential prenatal care practices, potentially increasing risks for both mother and fetus. Therefore, fostering MFA is crucial, as it not only enhances the emotional connection between mother and child but also promotes behaviors that contribute to healthier pregnancy outcomes (El-Sayed, 2023; Sayed et al., 2020).

Stress management during pregnancy is essential for both maternal and fetal well-being (Mousavi et al., 2007; Traylor et al., 2020). High stress levels can negatively impact pregnancy by increasing the risk of complications such as preterm birth, low birth weight, and hypertension. Effective stress management strategies include practicing relaxation techniques like deep breathing, meditation, and prenatal yoga, which help regulate emotional responses and promote overall well-being.

Pregnancy exercise is a relaxing activity that can reduce the mother's stress level during pregnancy and before delivery. Through this exercise, mothers can learn proper breathing and pushing techniques, which can help reduce feelings of tension. In the last trimester of pregnancy, it is recommended for mothers to take exercise classes guided by an instructor at least once a week, which can be continued until closer to the time of delivery (Souza et al., 2021).

Physical activity is an important factor for pregnant women in achieving a healthy and fit body condition. However, the type of exercise you do must be adjusted to the physical changes that occur during pregnancy. Usually, pregnancy exercise starts in the third trimester, around 28-30 weeks of gestation. Apart from maintaining fitness, sports activities during pregnancy also have a significant role (in increasing the mother's physical and mental readiness for the birthing process (Yuliana & Rahman, 2019).

Iron deficiency can result in microcytic anemia, which is the most common type of anemia throughout the world, with around 60-70% of anemia cases caused by iron deficiency. This anemia occurs more often during pregnancy because nutritional needs increase and changes occur in the blood and bone marrow. Several factors influence the level of anemia in pregnant women, including the consumption of iron tablets, the nutritional status of pregnant women, and the presence of bleeding infections (Cai et al., 2020).

During pregnancy, it is important to maintain good hygiene. It is recommended to shower at least twice a day because pregnant women tend to sweat a lot. Maintaining personal hygiene, especially skin areas such as the armpits, under the breasts and genital area, needs to be done by cleaning it with water and then drying it. Special attention is also needed in maintaining oral hygiene because pregnant women are often susceptible to cavities, especially if they lack calcium. The common feeling of nausea during pregnancy can worsen oral hygiene and increase the risk of tooth decay (Duncan et al., 2018).

What is no less important is, selecting appropriate maternity clothing is essential for ensuring comfort, mobility, and overall well-being. As the body undergoes significant physical changes, loose-fitting, breathable fabrics such as cotton and linen are recommended to prevent skin irritation and excessive sweating. Maternity wear should provide adequate support, particularly around the abdomen and breasts, to accommodate growth and reduce discomfort (Saberi et al., 2014; Sohn & Bye, 2015). Wearing well-fitted bras with adjustable straps can help prevent back pain and maintain proper posture. Additionally, pregnant women should choose comfortable footwear with proper arch support to reduce swelling and minimize strain on the lower body. Prioritizing suitable maternity clothing not only enhances physical comfort but also contributes to a positive self-image and emotional well-being during pregnancy.

Pregnancy brings significant physical, psychological, and emotional changes, reinforcing the need for proper maternal health care. Engaging in healthy behaviours, such as consuming nutrient-rich foods, maintaining hygiene, managing stress, and wearing appropriate maternity clothing, contributes to maternal well-being and fetal development. Harmful behaviours, including smoking, alcohol consumption, and inadequate nutrition, pose serious risks, such as fetal abnormalities and low birth weight. Research indicates that stronger MFA leads to better health practices, while weaker attachment may result in neglect of prenatal care. Therefore, fostering MFA is essential for promoting both emotional bonding and positive health outcomes during pregnancy.

2. Methods

To carry out a scoping review on " Healthy Behavior During Pregnancy: Scoping Review " it is recommended to carry out several stages, namely first determining inclusion and exclusion criteria to limit the scope of the research, such as year of publication, type of literature, and language. Then identify information sources using databases such as PubMed, Science direct, Wiley, EBSCO. Identify the keywords most relevant to the research topic by using Boolean operators (AND, OR, NOT) to organize effective searches. The key search terms include *"maternal-fetal attachment," "healthy behavior during pregnancy," "nutrition during pregnancy," "personal hygiene in pregnancy," "maternity clothing,"* and *"stress management in pregnancy."*. After finding articles that match the inclusion criteria, then analyze the journal by identifying the main findings of each article, comparing and synthesizing the findings from various sources. The methodology for grouping reviews as suggested by Arksey and O'Malley (Levac et al., 2012) carried out in this scoping review review consists of: identifying scoping review questions, identifying relevant articles, charting data, compiling, summarizing and reporting results.

3. Results

In Step 1, the author limits articles to a range of 10 years or starting from 2014-2024 to ensure that the sources used in the scoping review are current, relevant, and reflective of recent advancements in health behaviors during pregnancy. By selecting articles within this time frame, the review incorporates the latest findings, ensuring that recommendations align with contemporary clinical practices and public health policies. Additionally, using a decade-long range allows for a comprehensive analysis of trends and developments while avoiding outdated or potentially obsolete

information. To identify articles to be researched, the author uses the PCC format to make it easier for the author to develop a search strategy.

Table 1. PCC format

No	Framework	Information
1	*Population*	Pregnant mother
2	*Concept*	Healthy lifestyle behavior during pregnancy
3	*Context*	Studies conducted in healthcare, community, or home settings worldwide

Authors conducting a scoping review by methodicallly recognizing, selecting, and analyzing pertinent writing. It's start with characterizing the inquire about scope, defining the investigate address utilizing the PCC (Populace, Concept, Setting) organize, and deciding consideration and avoidance criteria, such as distribution a long time (2014–2024), article sort, and language. Once look comes about are gotten, the authors download and oversee references using Mendeley whereas using Covidence for orderly screening. The screening prepare includes looking into titles and abstracts to eliminate irrelevant articles, taken after by a full-text review to guarantee arrangement with the ponder criteria. Moreover compile and report comes about in a story blend, distinguishing research gaps and area for future ponder.

Until the writer produces it PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). To make it easier for writers to determine which articles to use, they will be sorted using inclusion and exclusion criteria, which are as follows:

Table 2. Eligibility Criteria

No	Inclusion Criteria	Exclusion Criteria
1.	Article about Maternal – fetal attachment and healthy living behavior of pregnant women	Literature Review
2.	Articles written in English, Indonesian	The composition of the article is incomplete
3.	Articles published from 2014-2024	Thesis, thesis, book
4.	Original Article open access Full text of the article	

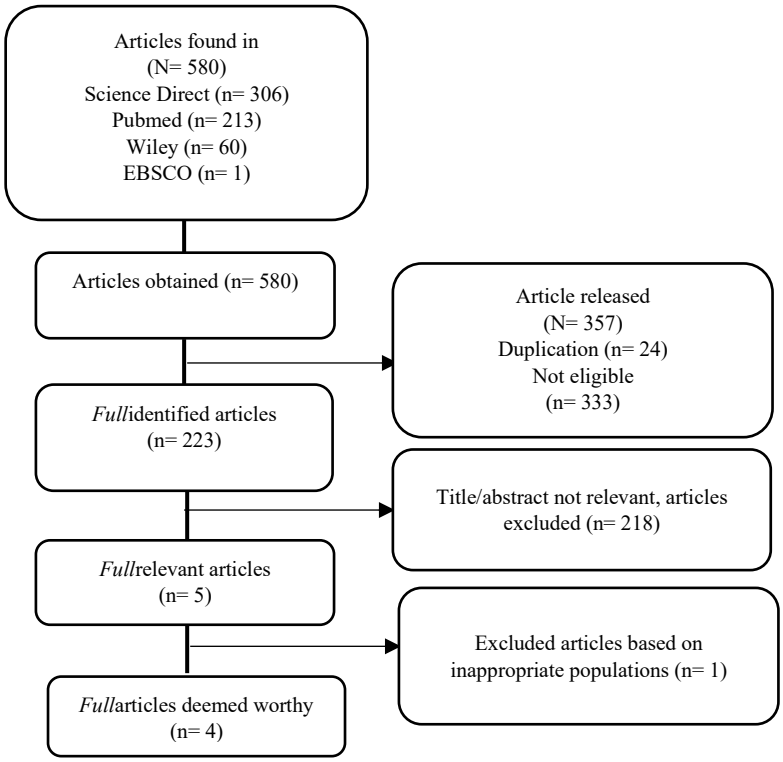

Fig. 1. PRISMA-ScR flow diagram

3.1. Selection of Sources of Evidence (steps 2&3)

In Step 2, there were 580 articles that had been filtered using the Science Direct, Pubmed, Wiley, and EBSCO databases. After getting the desired journal, filtering is carried out based on the title and abstract of the article and then marking the article as suitable, not suitable or possible using the Covidence application. Then determine the inclusion and exclusion criteria. Of the 580 articles obtained, 24 articles were excluded due to duplication and 333 did not meet the requirements. There were 223 full text articles, then 218 were excluded based on irrelevant titles/abstracts. A total of 5 articles were found to be relevant and appropriate. And 1 article was removed whose population did not match the criteria, resulting in 4 relevant articles.

Table 3. Charting Data

Title And Author	Objective	Country	Data analysis method	Research result
The relationship between maternal-fetal attachment and smoking behaviors, including cessation during pregnancy, as examined in the FinnBrain Birth Cohort Study. (Jussila et al., 2020)	This research seeks to explore the connection between maternal smoking during pregnancy and the use of multifactorial assessments (MFA), as well as the factors influencing smoking cessation in the early stages of pregnancy.	Finland	The analysis conducted involved logistic regression to explore the association between maternal smoking behavior prior to childbirth and the use of multifactorial analysis (MFA). To compare groups characterized by nominal variables, the Pearson chi-square test was employed, while the two-tailed independent sample t-test was utilized for continuous variables that followed a normal distribution.	The research revealed that 16.5% (612 out of 3698) of pregnancies were associated with smoking. Among the mothers who smoked during their pregnancies, 58.1% (354 out of 609) successfully quit smoking, whereas 41.9% (255 out of 609) continued to smoke beyond 12-14 weeks of gestation. The findings indicate a correlation between the strength of the altruistic aspect of maternal-fetal attachment and the likelihood of smoking cessation. Consequently, the study advocates for an increased focus on prenatal interventions aimed at reducing smoking.
The connection between maternal-fetal bonding and cigarette consumption during pregnancy. (Magee et al., 2014)	The objective of this research was to explore the connection between the mother-fetus bond and the smoking behaviors of expectant mothers who engage in smoking.	Rhode Island	This study employed a bear measures analysis of covariance (ANCOVA) to assess maternal smoking patterns during pregnancy, focusing on the maternal-fetal relationship. The analysis aimed to account for pre-pregnancy smoking behaviors while examining weekly smoking habits throughout the gestational period..	The findings of this research distinctly demonstrate the connection between maternal-fetal relatedness and smoking behavior. The study indicates that a reduced sense of maternal-fetal relatedness correlates with increased cigarette consumption among pregnant female smokers. This is particularly significant, as higher smoking rates during pregnancy are linked to adverse effects on newborn health.
Maternal-fetal attachment influences the patterns of smoking during pregnancy and the level of exposure to harmful substances. (Massey et al., 2015)	The objective of this study is to present empirical data supporting the cessation of smoking prior to childbirth as a maternal measure aimed at benefiting the fetus.	America	Data analysis used one-way analysis of variance (ANOVA) and used the chi square test for continuous and binary variables. Total and subscale scores on the maternal-fetal relatedness scale were also compared between non-smokers, quitters, and continuous smokers.	Reduced maternal-fetal connectivity was linked to the daily cigarette consumption during pregnancy. This underscores the importance of smoking cessation during pregnancy as a measure aimed at promoting fetal well-being rather than solely for the mother's health.
The relationship between maternal-fetal attachment and health behaviors during pregnancy in relation to neonatal outcomes. (Maddahi et al., 2016)	This research seeks to investigate the relationship between maternal-fetal interactions and health behaviors during pregnancy, as well as their impact on neonatal outcomes.	Iran	Descriptive and inferential statistics are employed to examine data and identify relationships among variables. The Pearson product-moment correlation coefficient is utilized to assess the correlation between variables, while regression analysis is applied to evaluate the relationship between independent and dependent variables.	Most participants were at 39 weeks of gestation and were undergoing their first pregnancy. The health scores during pregnancy varied from 53 to 156, with an average of 123.57. The researchers determined that behaviors related to maternal-fetal health contributed to the early start and sustained engagement in prenatal care, appropriate nutrition, sufficient sleep and physical activity, as well as the avoidance of alcohol and illicit substances.

3.2. Critical Appraisal (Step 4)

In this research, researchers expanded their exploration by using tools from the Joanna Briggs Institute (JBI) for quantitative and qualitative research studies. The selection of the JBI assessment tool was motivated by the type of research that can be carried out with the tool. Researchers categorize the value of articles based on the total value obtained from the results of the critical assessment in accordance with JBI guidelines. For critical appraisal quality, you can see the following table.

Table 4. Quality Assessment of JBI Cross Sectional Study

Grades	Scale
A = Very Good (19-24)	0 = No
B = Good (9-18)	1 = Not Applicable
C = Poor (0-8)	2 = Unclear
	3 = Yes

Table 5. Quality Assessment of JBI Cohort Studies

Grades	Scale
A = Very Good (23-33)	0 = No
B = Good (12-22)	1 = Not Applicable
C = Poor (0-11)	2 = Unclear
	3 = Yes

Table 6. JBI Qualitative Research Quality Assessment

Grades	Scale
A = Very Good (21-30)	0 = No
B = Good (11-20)	1 = Not Applicable
C = Poor (0-10)	2 = Unclear
	3 = Yes

Table 7. Critical Appraisal Cross Sectional

No.	Questions	Item No	
		A3	*A4*
1.	Criteria inclusion?	3	3
2.	Study subjects and setting described in detail?	3	3
3.	Exposure measured?	3	3
4.	Objective, standard criteria?	3	3
5.	Confounding factors?	3	3
6.	Confounding factors?	0	0
7.	Outcomes valid and reliable way?	3	3
8.	Statistical analysis?	3	3
	Score	21/A	21/A

Table 8. Critical Appraisal Cohort Studies

No	Questions	Item No
		A1
1.	Two groups similar and recruited same population?	0
2.	Exposures measured exposed and unexposed groups?	3
3.	Exposure valid reliable?	3
4.	Confounding factors?	3
5.	Strategies confounding factors?	3
6.	Groups/participants free of the outcome ?	3
7.	Measured valid reliable way?	3
8.	Follow up time reported and sufficient outcomes to occur?	3
9.	Follow up complete, were the reasons described and explored?	3
10.	Strategies incomplete utilized?	3
11.	Appropriate statistical analysis?	0
	Score	27/A

Table 9. Critical Appraisal Qualitative Research

No	Questions	Item No
		A2
1.	Congruity philosophical perspective methodology?	3
2.	Congruity methodology and the research question?	3
3.	Congruity methodology and the methods collect data?	3
4.	Congruity methodology and the representation and analysis of data?	3
5.	Congruity methodology and interpretation of results?	3
6.	Statement locating culturally or theoretically?	3
7.	Influence on the research, and vice-versa, addressed?	3
8.	Participants, and their voices, represented?	3
9.	Ethical according to current criteria or, for recent studies, appropriate body?	3
10.	Conclusions drawn flow analysis, interpretation, the data?	3
	Score	30/A

3.3. Records Included (Step 5)

In step 5, after assessing several articles, it can be concluded that there are 4 articles that will be used.

3.4. Synthesis

Before presenting the results, an initial synthesis of the results was carried out for further discussion. There is a variety of articles that have been found both in terms of setting, participants, methods and in this stage there is a discussion process before the researcher summarizes the final results as presented.

3.5. Country

The articles included in this review begin from different nations, highlighting a different run of viewpoints on the relationship between maternal-fetal connection (MFA) and smoking behaviors amid pregnancy. Particularly, the chosen thinks about come from Finland (1 article), the Joined together States (1 article), Iran (1 article), and Rhode Island (1 article). These thinks about have been distributed in diaries ordered from Q1 to Q3, guaranteeing a level of validity and unwavering quality

3.6. Methodology

From the 4 articles, there were 2 articles that used a cross-sectional design, namely articles A3 and A4, then for articles with a cohort-study design, namely A1, while articles that used qualitative research were A2. Each of the 2 foreign cross-sectional articles received grade A, while the cohort-study article also received grade A, and the article with qualitative research received grade A.

3.7. Theme Analysis

By referring to the information taken in accordance with the questions and objectives of the review, the themes identified were the behavior of pregnant women and risks to the fetus.

Table 10. Determination of themes and subthemes

Theme	Subtheme	Article
Impact of smoking on maternal and fetal health	Prevalence of maternal smoking during pregnancy	A1, A4
	Risk factors for the fetus	A1, A3
	Behavior during pregnancy	A1, A2, A3, A4
Socio-demographic characteristics	Education	A1, A3
	Income	A3, A4
Maternal-Fetal Attachment		A1, A2, A3, A4

3.7.1 Impact of smoking on maternal and fetal health

3.7.1.1 Prevalence of maternal smoking during pregnancy

Prevalence of maternal smoking during pregnancy may be a noteworthy open wellbeing issue, related with different negative outcomes for both moms and newborn children. It may be a key maternal wellbeing determinant, affecting not as it were fetal advancement but moreover long-term wellbeing suggestions for children (Jussila et al., 2020). The predominance of maternal smoking amid pregnancy has been considered all inclusive, with different components, such as socio-economic

status, instruction level, and get to to smoking cessation programs, playing parts in its event (Massey et al., 2015).

Illustration I:
Smoking amid pregnancy increments the chance of low birth weight, preterm birth, and formative delays in children (Magee et al., 2014).

Illustration II:
Understanding the significance of smoking cessation programs and community bolster can altogether decrease smoking rates among pregnant ladies, moving forward wellbeing results for both mother and child (Jussila et al., 2020).

Potential instruments:
The Maternal Smoking Survey (MSQ) (Magee et al., 2014).

3.7.1.2 Risk factors for the fetus

Maternal smoking amid pregnancy could be a significant open wellbeing issue, related with different negative outcomes for both moms and newborn children. It could be a key maternal wellbeing determinant, affecting not as it were fetal advancement but moreover long-term wellbeing suggestions for children (Jussila et al., 2020). The predominance of maternal smoking amid pregnancy has been examined all inclusive, with different components, such as socio-economic status, instruction level, and get to smoking cessation programs, playing parts in its event.

Illustration I:
Smoking amid pregnancy increments the chance of moo birth weight, preterm birth, and formative delays in children (Massey *et al*., 2015).

Illustration II:
Understanding the significance of smoking cessation programs and community back can altogether diminish smoking rates among pregnant ladies, making strides wellbeing results for both mother and child (Jussila *et al*., 2020).

Potential Instrument:
The Maternal Smoking Study (MSQ) (Massey *et al*., 2015).

3.7.1.3 Behavior during pregnancy

Behavior amid pregnancy could be a noteworthy perspective of maternal wellbeing, related with different results for both moms and newborn children. It impacts not as it were fetal improvement but moreover long-term wellbeing suggestions for children (Jussila *et al*., 2020). Behaviors amid pregnancy have been examined universally, with different variables, such as socio-economic status, instruction level, and social bolster, playing parts in their event (Magee *et al*., 2014).

Illustration I:
A solid maternal-fetal connection empowers more advantageous behaviors, such as stopping smoking, which can progress fetal wellbeing and diminish the hazard of moo birth weight and preterm birth (Jussila *et al*., 2020b).

Illustration II:
Understanding the significance of social back and self-care can essentially move forward mental well-being and advance solid behaviors amid pregnancy, profiting both mother and child (Maddahi *et al*., 2016).

Potential Instrument:
The Maternal Smoking Study (MSQ) (Magee *et al*., 2014).

3.7.2 Socio-demographic characteristics

3.7.2.1 Education

Higher education levels for pregnant moms are related with more advantageous behaviors amid pregnancy, such as diminished smoking rates and expanded engagement in self-care hones (Jussila *et al*., 2020). Education makes a difference moms get it the dangers related with hurtful behaviors like

smoking and empowers them to look for smoking cessation programs, which lead to superior wellbeing results for both the mother and child. Moreover, taught moms are more likely to receive sound hones, which advantage their possess wellbeing and the wellbeing of their babies.

Illustration I:
Higher instruction levels are related with more advantageous behaviors amid pregnancy, such as diminished smoking rates. Instruction makes a difference moms get it the dangers of smoking and energizes them to look for smoking cessation programs, which can make strides fetal wellbeing and diminish the hazard of moo birth weight and preterm birth (Jussila *et al*., 2020).

Illustration II:
Instruction plays a significant part in advancing self-care behaviors amid pregnancy. Taught moms are more likely to lock in in sound hones, profiting both their possess wellbeing and the wellbeing of their babies (Massey *et al*., 2015).

3.7.2.2 Income

Higher income levels for pregnant mothers are related with more beneficial behaviors amid pregnancy, such as decreased nourishment uncertainty and superior mental wellbeing (Massey *et al*., 2015). Income makes a difference moms get to way better nourishment and healthcare, driving to moved forward wellbeing results for both the mother and infant. Also, higher wage levels are connected to decreased push and way better mental well-being, which advantage both mother and child.

Illustration I:
Lower wage levels are related with higher nourishment frailty, which can lead to unfavorable wellbeing results such as gestational diabetes, tall push levels, and destitute mental wellbeing (Massey *et al*., 2015).

Illustration II:
Financial solidness plays a significant part in advancing self-care behaviors amid pregnancy. Higher wage levels empower moms to lock in in solid hones, profiting both their claim wellbeing and the wellbeing of their babies (Maddahi *et al*., 2016).

3.7.3 Maternal-Fetal Attachment

Maternal-Fetal Connection (MFA) could be a important aspect of maternal wellbeing, related with different results for both moms and newborn children. It impacts not as it were fetal advancement but moreover long-term wellbeing suggestions for children. MFA has been examined global, with different components, such as socio-economic status, instruction level, and social back, playing parts in its event (Jussila *et al*., 2020).

Illustration I:
Higher MFA scores, especially within the charitable measurement, are associated with a better probability of smoking cessation amid pregnancy. This will progress fetal wellbeing and diminish the chance of moo birth weight and preterm birth (Jussila *et al*., 2020).

Illustration II:
Seen maternal and fatherly care has critical coordinate impacts on MFA amid pregnancy. Positive parental bonds and social bolster can essentially progress mental well-being and advance sound behaviors amid pregnancy (Magee *et al*., 2014).

Illustration III:
Positive recollections of parental care are emphatically related with MFA, proposing that steady and caring parental connections amid childhood can impact MFA amid pregnancy (Massey *et al*., 2015).

Illustration IV:
Favorable MFA quality is related with lower tactile affectability and higher tangible looking for. This highlights the significance of connection in child advancement and maternal wellbeing (Maddahi *et al*., 2016).

4 Discussion

An overview of the results of study articles that have been assessed, there are several themes that have been discovered by researchers, including the impact of smoking on maternal and fetal health, socio-demographic characteristics, and maternal-fetal attachment.

4.1 The Impact of Smoking on the Health of Pregnant Women and the Fetus

In research, (Manurung, 2020) explained that the dangerous substances contained in cigarettes inhaled by pregnant women can quickly enter the mother's bloodstream, causing a decrease in oxygen reception by the baby and placenta. The impact that occurs will result in a decrease in oxygen reception which will have implications for reducing the nutritional intake received by the baby, resulting in cell death due to lack of oxygen. This situation is known as fetal hypoxia, and also results in growth disorders in the fetus, causing low birth weight (LBW) babies. Therefore, smoking during pregnancy can have a serious impact on the developing health of the fetus, underscoring the urgency to avoid exposure to harmful substances from cigarettes during pregnancy.

In another study, it was found that passive smoking pregnant women showed a higher incidence of LBW in pregnant women whose husbands smoked 10 cigarettes or more of day (56,2%), compared to those with less than 10 cigarettes of day (Pratama & Wratsangka, 2018).

4.1.1 Prevalence of Maternal Smoking During Pregnancy

The findings from one of the studies indicate that the prevalence of maternal smoking during pregnancy varies globally. Smoking during this critical period is a modifiable risk factor, and cessation can lead to significant health improvements for both the mother and the fetus.

According to Jussila *et al*., 2020, survey data revealed a lower prevalence of smoking among pregnant women in specific hospital districts compared to the overall population in those areas. Specifically, the smoking prevalence among survey participants was 12.7%, while the general population rate stood at 16.6%. The data suggests that the prevalence of smoking during pregnancy recorded in official registers aligns closely with survey findings in the same regions. Furthermore, smoking rates among pregnant women in these hospital districts did not significantly differ from those in the general population at both local and national levels in Finland.

(Weiland *et al*., 2022) found that some pregnant women express a desire to quit smoking but encounter challenges due to significant life stressors occurring before or during pregnancy. This aligns with other studies that highlight stress as a primary obstacle to quitting smoking. Given the critical need to stop smoking during pregnancy, it is essential to address the sources of stress openly and provide adequate support to help women manage these challenges, ideally starting in the early stages or even prior to conception. Additionally, Iryadi, (2020) emphasizes that exposure to cigarette smoke adversely affects pregnancy development, with nicotine and carbon monoxide identified as particularly harmful substances for the fetus.

4.1.2 Risk Factors for the Fetus

There are several articles that have risk factors that suggest that the level of maternal-fetal attachment may increase the likelihood of smoking cessation. Knowing risk factors for the fetus is very important because it can help detect and manage potential health problems early during pregnancy. Preventive measures can be taken to reduce risks and improve maternal and fetal health.

Suena (Massey *et al*., 2015) (A3) stated that if the relationship or attachment between mother and fetus (maternal-fetal attachment) can be improved or strengthened, then it is likely that the mother will be more likely to choose to stop smoking. This is expected to provide significant benefits for maternal and child health, both in the short and long term. Children born to mothers who consistently smoke are not only exposed to cigarette smoke during pregnancy, but may also face a lack of emotional attachment from their mothers. This lack of attachment may be an important mechanism explaining why smoking during the prenatal period may increase the risk to exposed children, beyond just nicotine exposure but also to the social and emotional interactions between mother and child that may be affected by the smoking habit.

(Jussila *et al*., 2020) (A1) stated that there is a relationship between parenting styles, especially harsh parenting styles and child abuse with smoking during pregnancy. Mothers who smoke during pregnancy are more likely to adopt an abusive parenting style and may also increase the risk of child abuse, which will have a negative impact on their development and well-being. It is known that

exposure to tobacco during the prenatal period can have teratological impacts, meaning it can cause developmental abnormalities in the fetus. By designing interventions that strengthen maternal-fetal attachment, it is hoped that we can create a more positive and supportive environment for fetal development and can reduce the negative impacts of tobacco exposure during pregnancy.

4.1.3 Behavior During Pregnancy

Healthy lifestyle behavior during pregnancy is very important to support maternal health and fetal development. There are several healthy living behaviors recommended for pregnant women, including balanced nutrition, avoiding harmful substances, stopping smoking, exercising appropriately, getting enough rest, and regular health monitoring. This healthy lifestyle behavior can contribute to a better pregnancy, reduce the risk of complications, and support good maternal health and fetal development.

(Maddahi *et al*., 2016) (A4) stated that increasing attachment between mother and fetus has a positive impact on maternal health behavior during pregnancy. This attachment can encourage mothers to carry out health practices to support a healthy pregnancy. Some health practices that can support pregnant women are avoiding alcohol consumption, stopping smoking, exercising, and carrying out regular pregnancy checks. Several variables can be correlated with health practices during pregnancy, these variables are socio-economic, maternal education level, high level of social support. This shows that these factors play an important role in influencing maternal health behavior during pregnancy.

(Massey *et al*., 2015) (A3) stated that there was a significant change in health behavior, namely mothers who stopped smoking to show that this decision had a positive impact on health behavior in general. Mothers who stop smoking argue that they have a sense of empathy, this means that the mother may stop smoking as a form of empathy for the welfare of their unborn fetus. The emotional connection between mother and fetus may play a role in motivating the mother to quit smoking and also influence the child's behavior after birth.

(Jussila *et al*., 2020) (A1) stated that the MFA (maternal-fetal attachment) aspect also includes the mother's willingness and commitment to change habits that may be unhealthy during pregnancy. Mothers are willing to change behavior, follow healthy eating patterns, stop habits that can have a negative impact on the health of the unborn child. Choosing foods that support maternal health and fetal development. Apart from that, the mother is also willing to stop unhealthy behavior, perhaps such as smoking or consuming alcohol, which can have a negative impact on the health of the fetus.

(Magee *et al*., 2014) (A2) stated that women with lower maternal-fetal attachment are less able to regulate their smoking behavior. This is caused by a lack of intrinsic motivation (motivation that comes from within oneself) to refuse smoking for the sake of their baby's health. Although women with higher maternal-fetal attachment may be able to smoke just one cigarette to satisfy their craving, women with lower attachment may have difficulty stopping after just one cigarette.

The analogy of quitting smoking before or during pregnancy for female smokers at least results in the possibility of reducing the number of cigarettes consumed daily. (Fuada *et al*., 2020)

4.2 Socio Demographic Characteristics

4.2.1 Education

The findings of the research highlight the significance of maternal attachment to the fetus in influencing how maternal education levels and prenatal psychological stress affect smoking behaviors and cessation during pregnancy. Article (A1) notes that lower educational attainment is linked to an increased likelihood of smoking while pregnant. Additionally, lower maternal education and the presence of prenatal depressive symptoms correlate with smoking habits during pregnancy. This suggests that socioeconomic factors and maternal mental health are influential in the choice to smoke during this critical period. Women with lower education levels may lack awareness regarding high-risk pregnancies, which diminishes their ability to implement preventive measures and seek treatment to mitigate risk factors (Rumah Sakit Robert Wolter Mongisidi Manado *et al*., 2018)

In a separate study, it was observed that many pregnant women in the examined region had low educational levels, which may hinder their access to information about nutrition and reproductive health. Typically, these women are housewives with adequate time to participate in educational sessions on nutrition and reproductive health lasting two hours. This observation is corroborated by data from health profile reports and sociodemographic analyses (Permatasari *et al*., 2021)

4.2.2 Income

Pregnant women who successfully quit smoking tend to have higher incomes compared to those who continue to smoke. Article (A3) discusses how increasing the income of active smoking mothers who cease smoking can lead to various positive outcomes. This indicates that the choice to quit smoking during pregnancy may be influenced by economic conditions or financial stability. Women with higher incomes are better equipped with resources to aid their smoking cessation efforts, including access to cessation programs and medical assistance. Another study highlighted that support for pregnant women is a community service initiative aimed at enhancing community involvement in improving maternal and child health outcomes file report and sociodemographic (Permatasari *et al*., 2023).

4.3 Maternal-Fetal Attachment

Results research shows high levels of maternal-fetal attachment and implementing good health practices during pregnancy. Positive and significant correlations were found between all components of maternal-fetal attachment and neonatal outcomes, indicating that the higher the maternal-fetal attachment, the better the neonatal outcomes. It is important to identify factors that contribute to low birth weight and take preventive measures, considering the risk of these complications.

Pregnant women who smoke and are considering quitting show a stronger attachment to their fetus compared to pregnant women who have never smoked. The article (A1) explains that there is cognitive dissonance, which arises due to awareness of the harmful effects of smoking on the fetus and the emergence of maternal-fetal attachment. This cognitive dissonance promotes a tendency to resolve situations that conflict with preparations for smoking cessation, and this may strengthen the attachment between mother and fetus. In line with article (A3) indicating that these changes were made with the aim of helping the unborn child, providing empirical support for the conceptualization that stopping smoking before birth is considered an empathetic action taken for the welfare of the fetus (Humphrey et al., 2019).

The results of this study are in line with findings from other articles that low maternal-fetal attachment is more likely to smoke during pregnancy. This study provides a clear picture of the relationship between levels of attachment and smoking behavior, by showing that lower feelings of maternal-fetal attachment are associated with greater cigarette use among mothers who smoke during pregnancy.

According to the resulths of the study, the average attachment score between mother and fetus in high-risk pregnant women showed a significant increase after prenatal attachment education (Astri et al., 2020).

5 Conclusions

There are several influences of maternal-fetal attachment on healthy living behavior during pregnancy. Some health practices that can support pregnant women are avoiding alcohol consumption, stopping smoking, exercising, and carrying out regular pregnancy checks. The effect of exposure to cigarette smoke affects the risk of fetal growth, where children born to mothers who continuously smoke are not only exposed to cigarette smoke during pregnancy, beyond just exposure to nicotine but also social and emotional interactions between mother and child which may be affected by the habit. the smoking.

Based on these findings, a number of suggestions can be proposed to support maternal and fetal health during pregnancy. It is important for pregnant women to avoid consuming alcohol and stop smoking, because exposure to cigarette smoke can have a negative impact on fetal growth. Therefore, supporting pregnant women to live a healthy lifestyle and providing positive social support can contribute to maternal well-being and fetal development during pregnancy.

This review highlights imperative recommendations for supporting maternal and fetal wellbeing during pregnancy, emphasizing the require for pregnant women to avoid liquor utilization and stopped smoking, as presentation to cigarette smoke can contrarily affect fetal development. This review has practical suggestions for adopting a healthy lifestyle and the accentuation on positive social back, which can altogether contribute to maternal well-being and fetal improvement. Be that as it may, the review may not comprehensively address all socio-economic components that impact maternal and

fetal wellbeing and lacks detailed strategies for actualizing the recommended way of life changes and social support mechanisms.

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