Multidisciplinary Reviews

MINI REVIEW
Published Online: September 25, 2024
https://doi.org/10.31893/multirev.2025025

Asthma and pregnancy: Understanding the dynamic relationship - A comprehensive review

Riya Pawar[a] ✉ | **Alka Rawekar**[b]

[a]Jawaharlal Nehru medical college, Datta Meghe institute of medical sciences and research, sawangi, wardha, maharashtra, India.
[b]Department of physiology, Jawaharlal Nehru medical college, sawangi, Wardha, Maharashtra, India.

Abstract The health of pregnant women and their developing fetuses can be greatly impacted by asthma, a prevalent chronic respiratory disease. Pregnancy-related asthma is a serious health risk. A potentially fatal condition that makes many pregnancies more difficult is asthma. The prevalence of asthma has increased within the past few decades. This comprehensive review explored the complex connection between asthma and pregnancy. Analyzing physiological alterations during pregnancy revealed dynamic interactions between immunological responses and respiratory function. These Important discoveries highlight the susceptibility to exacerbations of asthma. This discussion focuses on the links between poorly managed asthma and unfavourable - perinatal outcomes, with particular attention given to maternal and fetal outcomes, tracking and tailored treatment to provide the best possible management of asthma. This review emphasizes how important it is to manage asthma throughout pregnancy because it can have a positive impact on both the mothers and fetuses long-term health. Consequences for clinical practice emphasize the value of preconception care, ongoing surveillance, and joint obstetrician-pulmonologist efforts. This review also sheds light on how common asthma is in expectant mothers, and this field's future directions require further investigation. Low birth weights and small for gestational age are associated with a greater risk, especially in women who have moderate-to-severe asthma and have episodes of the condition during pregnancy. Additionally, there was a slight but statistically significant increase in the chance of congenital deformities. By preventing exacerbations, active management may lessen these risks. Ensuring optimal management of asthma during pregnancy is crucial for the welfare of the expectant mother and the unborn child. While poorly managed and undertreated asthma is linked to a number of dangers for both mothers and fetuses, well-controlled asthma reduces the risk of complications for both mothers and fetuses.

Keywords: rhinitis, pharmacological treatment, diagnosis, exacerbations, managements, future perspective

1. Introduction

With 358 million cases estimated worldwide asthma is a common long-term respiratory condition. that affects a large section of the population (Tibrewal et al., 2023). One of the most common chronic disorders in children between the ages of one and three is asthma, and in the last 30 years, its prevalence has considerably increased. Pregnancy-related stress has been linked to childhood asthma in children. Studies on humans have not clarified the fundamental underlying mechanisms involved. According to research conducted on animals, stress during pregnancy modifies the immune system of children, increasing their susceptibility to allergies and asthma (Pape et al., 2021). A woman pregnancy is a highly unique and complicated time in her life. Alongside the biochemical and physiological changes, there were also noticeable alterations in her social and psychological functioning. Pregnancy is a complicated biopsycho-social phenomenon that involves changes in psychological traits, altered relationships with the social environment, and physical changes (Bjelica et al., 2018). Maternal asthma and a number of pregnancy-related issues are now clearly linked. These include the need for healthcare intervention during delivery, unfavourable perinatal outcomes, and difficulties for mothers, such as preeclampsia, gestational diabetes, and pregnancy induced hypertension (Vanders & Murphy, 2015a). Asthma has become far more common in recent decades, impacting millions of people globally. Respiratory conditions such as asthma result in hyperresponsiveness and swelling of the airways, which can cause repeated episodes of coughing, wheezing, and dyspnea. Pregnant women aged 20 and 50 years are more likely to have this illness. Women also have difficulties and hospitalizations more frequently and with greater severity. Some studies have linked this to decreased lung capacity, a narrower airway diameter, and the amount of female sex hormones. Variations in the disease severity have been linked to fluctuations in the blood concentration of estrogen during the menstrual cycle, and future pregnant women are more likely to experience exacerbations in the year before pregnancy (4.1%). Pregnancy-related elevations in cortisol can shield against inflammatory stimulants, whereas increases in progesterone may lessen the respiratory tract sensitivity to various provocative substances. Additionally, bronchial blockage may result from an increase in several the levels of several bronchoconstrictors, such as prostaglandin F2α, During pregnancy. Although asthma is one of the most

 Received: March 2, 2024 | Accepted: May 7, 2024

significant conditions that can cause problems during pregnancy, a study revealed that only 50% of pregnant women continued to take bronchodilators. In comparison, the other 50% stopped taking medication, which reduced the disease ability to be controlled. This is mostly caused by a lack of knowledge, anxiety that medical interventions may harm the developing foetus, and the misconception that asthma will progress when a woman becomes pregnant (Labor et al., 2018). It is a significant public health concern that impacts individuals of all ages, colours, and genders. However, the relationship between asthma and pregnancy is special and important. The medical condition known as asthma affects the airways, causing episodes of inflammation and bronchoconstriction. Exercise, irritants, viruses, and allergens are common causes of asthma symptoms. Such episodes can be moderate, severe, or potentially fatal in extreme circumstances. The physiological conditions of pregnancy are distinct, with major changes occurring in a woman body to support the development of the foetus. These changes may significantly impact the health and respiratory system of a woman. During this time, managing asthma and its implications for the health of the mother and foetus became critical factors. People living with asthma who are pregnant need extra support and care since uncontrolled asthma can have negative effects on the mother and the unborn child. For the sake of the developing foetus and the health of the expectant woman, it is essential to comprehend the consequences of asthma during pregnancy and develop workable management strategies (Vyawahare et al., 2023). Asthma incidence varies throughout populations and is impacted by a number of factors, including lifestyle choices, environmental triggers, and genetic predispositions. The impact of asthma on lung function and general health has been studied in great detail, but more focus has recently been placed on how asthma affects women reproductive health, particularly in terms of fertility and pregnancy outcomes. Women who have asthma may experience particular difficulties in becoming pregnant, bringing a baby to term, and using assisted reproductive technologies (ARTs). To provide the right care and assistance, healthcare practitioners must comprehend the complexity underlying fertility concerns in women with asthma (Shaikh et al., 2023). As one of the most common preexisting medical conditions among pregnant women, asthma warrants special attention due to its potential to impact the health of both the mother and the foetus. Since the physiological changes that coincide with pregnancy might affect how the condition develops, controlling asthma during pregnancy becomes a difficult balancing act. These modifications include adjustments to immunological responses, hormone levels, and respiratory function, all of which increase the difficulty of controlling asthma at this crucial time. The immune and respiratory systems are impacted by the considerable physiological changes that pregnancy itself brings about. These modifications may worsen asthma in women, increasing the risk to the developing foetus and the mother. During pregnancy, poorly managed asthma has been linked to negative outcomes such as preterm birth, low birth weight, and increased perinatal mortality. In addition to the obvious dangers, managing asthma throughout pregnancy is essential to the long-term health of mothers and children. Recent research highlights the necessity for preventative management techniques by pointing to possible connections between a mother asthma and the emergence of respiratory disorders in her children. The goal of this review is to broaden knowledge of the intricate interactions between pregnancy and asthma. An in-depth analysis of the physiological alterations, the impact of asthma medications, and the outcomes for both the expecting mother and the foetus will offer significant new insights into the most effective treatment of asthma in pregnant women (Yadav et al., 2023). The purpose of this review paper is to inform medical professionals about the value of an integrated approach to the treatment of pregnant asthmatic patients. This article aims to enhance clinical management to improve reproductive health for women with asthma by addressing knowledge gaps and proposing research topics (Shaikh et al., 2023).

2. Literature Review

2.1. Effects of pregnancy on asthma

Weak data exist about the precise processes through which pregnancy may influence asthma symptoms and management. Nevertheless, it is known that in approximately 30–40% of women, pregnancy might exacerbate asthma. It is believed that a variety of variables, such as mechanical or hormonal changes, contribute to the aggravation of asthma that some pregnant women experience, combined with worse symptom management and more frequent exacerbations. On the other hand, it might occasionally be difficult to distinguish between pregnancy-induced dyspnea and a true asthmatic exacerbation. Measuring lung function, namely the FEV1, which is not strongly affected during pregnancy, in addition to other related asthma symptoms, may help differentiate between these situations (Carvalho-Pinto et al., 2023).

2.2. Peripartum management of asthma

Asthma medication should be continued during labour and delivery, and to prevent problems, enough fluids and analgesics must be administered. With a few notable exceptions, most labour and delivery management drugs are safe. For example, prostaglandin F2-a analogs, such carboprost, have been shown to cause bronchoconstriction in animal tests therefore, they should not be used by pregnant women with asthma. Individuals who suffer from asthma during pregnancy are more likely to undergo C-sections and oxytocin-induced labor.98 Additionally, 10% of pregnant patients with asthma experience worsening symptoms during childbirth, and these symptoms are often managed with bronchodilators. Additionally, because morphine

and meperidine have the potential to trigger histamine production, they should not be used to treat pain (Bravo-Solarte et al., 2023).

2.3. Asthma incidence among expectant mothers

Among the most dangerous illnesses that affect individuals worldwide at all ages is asthma (Zairina et al., 2014). Individuals of all ages including fertile women are affected by the common chronic respiratory illness asthma. Bronchial asthma (BA) is the most prevalent chronic illness among expectant mothers; it causes complications in 4% to 8% of pregnancies. Recognizing the importance of asthma as a health risk during pregnancy requires an understanding of how common the condition is among expectant mothers. Pregnant women who already have asthma may see changes in their symptoms and coping mechanisms, or their asthma increase for the first time. The prevalence of asthma in expectant mother's ranges from 3% to 8% in different communities, as epidemiological studies have consistently shown. This puts asthma among the most common chronic illnesses that affect expecting mothers (Vyawahare et al., 2023).

2.4. Asthma and pregnancy

There is a modest increase in complications for mothers and fetuses who have asthma.37–47 Crucially, asthma that is not under control increases these risks. A Significantly increased risk of congenital abnormalities, premature delivery, a low birth weight, newborn pneumonia and asthma, high blood pressure during pregnancy, and preeclampsia has been associated with antepartum asthma attacks. based on a recent, well-organized Canadian study of singleton pregnancies in asthmatic women. The course of asthma is frequently impacted by pregnancy, but this impact is erratic and somewhat unpredictable. Pregnancy-related asthma attacks have been linked to a number of factors, including (Couillard et al., 2021). Allergic rhinitis (Bousquet et al., 2020), smoking (Goldenberg et al., 2014), and obesity (Piché et al., 2020). The mechanisms underlying the exacerbation of specific asthma episodes during pregnancy are still unknown, despite a plethora of theories. Type 2 inflammation of the airways, a primary cause of asthma, does not appear to increase on its own during pregnancy, at least not empirically. Micro-aspirations, viral infections, and pregnancy-related illnesses could all be confounding factors. Regretfully, it appears that the main cause of this issue is a decline in adherence to asthma controller therapy (Couillard et al., 2021).

2.5. Diagnosis of asthma during pregnancy

In general, a history of several respiratory symptoms, such as wheezing and coughing, shortness of breath, and chest tightness, is considered to indicate general asthma, which frequently occurs during the day or at night, is worsened by viral infections, and is usually caused by vigorous activity, laughter, irritating substances, cold weather, and variable limitations of expiratory airflow. Pregnancy-related asthma symptoms are similar to those of regular asthma. On the other hand, if a pregnant woman primary symptom is chest tightness or shortness of breath, we must use caution when diagnosing her based on her medical history. Over one-third of expectant mother's report feeling breathless or having their chest constricted at some point throughout pregnancy., which can be attributed to the physiologic alterations that occur throughout pregnancy (Wang et al., 2020).

2.6. Rhinitis

Pregnancy-related hormonal changes can result in NAR. Sixty-five percent of pregnant women with asthma experience rhinorrhoea, which is linked to poor asthma management and a lower quality of life. Tri-daily intranasal lavage with a hypertonic saline solution, avoidance of triggers, and intranasal corticosteroid sprays benefits women with allergic rhinitis. When treating nonallergic rhinitis during pregnancy, intranasal corticosteroid sprays are ineffective. during pregnancy, nasal corticosteroid sprays are not effective for treating NAR. However, they do work for other types of rhinitis. In addition to other intranasal corticosteroids, certain practioners prefer intranasal budesonide due to the currently available safety information. Intranasal fluticasone was not associated with any difference in pregnancy outcome in a trial of expectant mothers. Antibodies that block leukotriene receptors, such as montelukast, are considered safe. Oral second-generation antihistamines such as loratadine or cetirizine, as well as intranasal antihistamines, are also deemed safe. Locally, oxymetazoline can be administered for three days at the regular dosage (Bonham et al., 2018).

2.7. Pharmacological treatment of asthma during pregnancy

Inhaled medicine is the mainstay of pharmacological treatment for asthma during pregnancy. According to all relevant guidelines, treatment for pregnant and nonpregnant patients should be similar. Whenever feasible, the importance and efficacy of the medication chosen should be considered, as well as the safety of the medicines for the expectant mothers and the developing foetus. The first option should always be to choose pharmaceutical treatments with long-standing safety profiles, whether altering a patient course with therapy or adding new treatments (Gade et al., 2022a).

2.8. Asthma treatment and fertility

According to documented findings, short-acting β2-agonist (SABA) monotherapy is linked to decreased fertility. However, the use of an additional long-acting β2-agonist (LABA) in the treatment of ICS-induced asthma may improve asthma management while potentially reducing systemic inflammation, which may also be the cause of fertility problems. This is corroborated by a smaller observational trial that revealed improved fertility in women receiving add-on biologic therapy for severe asthma, likely targeting both local and systemic inflammation. There is no complete agreement, however, as a recent study by Crowe et al. (2020) reported a weak correlation between fecundability and a history of asthma or asthma medication usage. However, their results showed that women with adult-onset asthma were less productive. The best asthma management method appears to have the potential to at least partially mitigate the detrimental effects of asthma on fertility despite contradictory results. Nonetheless, more investigations are required to fully understand the relationship between fertility and asthma management (Gade et al., 2022b).

2.9. Physiology of pregnancy and – asthma

The expectant mother experiences notable physiological and anatomical transformations to support and care for the growing foetus. These alterations impact the body organ systems and start after conception. Most women who have an uncomplicated pregnancy experience these changes ending after pregnancy with little to no lasting repercussions. Knowing the typical physiological changes throughout pregnancy will help you distinguish between normal adaptations and unhealthy ones (Soma-Pillay et al., 2016). The respiratory system experiences notable modifications to fulfil the heightened metabolic requirements associated with pregnancy. The Lung volume and capacity fluctuate as the gravid uterus grows because it raises the diaphragm and modifies thoracic compliance. The Functional residual capacity and expiratory reserve volume fall as tidal volume increases. These changes may affect how pregnant women perceive dyspnea and aggravate respiratory symptoms when combined with underlying asthma. As tidal volume increases, functional residual capacity and expiratory reserve volume decrease. When paired with underlying asthma, these alterations may exacerbate respiratory symptoms and influence how pregnant women perceive dyspnea. Although the respiratory stimulatory actions of progesterone can improve bronchodilation, estrogen may be responsible for increased bronchial reactivity and airway inflammation. The complex interactions between these hormones and how they affect asthma emphasize the need for a comprehensive knowledge of the illness experienced by expectant mothers. Studies indicate that some women may experience a brief worsening of their asthma symptoms due to hormonal changes that occur after childbirth. To provide the expectant mother and her baby with the best possible respiratory health during the entire peripartum period, it is essential to recognize these hormonal implications for asthma management (Yadav et al.,2023).

2.10. Pathophysiology of asthma

The main feature of asthma is airway obstruction, which results from narrow airway. Chronic inflammation of the airway wall causes the airways to narrow. This inflammation is characterized by the infiltration and activation of immune cells, including mast cells, eosinophils, neutrophils, lymphocytes, and innate lymphoid cells (ICLs). The complex interplay between neighbouring structural cells such as epithelial cells and other immune cells induces B.H.R. and other asthma symptoms. Bronchodilators can usually be used to reverse this interaction. However, airway obstruction does not usually reappear after treatment for more severe forms of asthma. Chronic airway blockage may be caused by the formation of mucus plugs in the smaller airways of affected patients. Airway remodelling, which includes goblet cell metaplasia, increased subepithelial collagen deposition, and airway smooth muscle hyperplasia, may also play a significant role in the pathophysiology of asthma in individuals with severe asthma (Hammad & Lambrecht, 2021).

2.11. Exacerbations

A systematic analysis revealed that 20% of pregnant women with asthma need intervention if their asthma flares during pregnancy. When comparing rates among women without asthma, exacerbations were linked to a greater chance of low birth weight. Exacerbations are less likely to occur during labour and delivery and are more common in the latter half of the second trimester. The incidence of exacerbations increases with the severity of asthma, from 8% in mild asthma to 47% in moderate asthma to 65% in severe asthma. Poor quality prenatal care, obesity, and inadequate inhaled corticosteroid treatment are risk factors for exacerbations. Viral respiratory tract infections and noncompliance with inhaled corticosteroid therapy are the primary triggers (Kher & Mota, 2017). Pregnancy flare-ups are serious problems that that can negatively affect an unborn child development. Five to twenty percent of pregnant asthmatic women who require medical attention experience asthma flare-ups during pregnancy. According to specific theories, women with well controlled asthma who have never experienced an exacerbation before and who are not on controlled medication may have a decreased risk of experiencing one during pregnancy. Nevertheless, exacerbations may occur in up to 37% of deliveries complicated by well-controlled asthma, with 40% of these episodes potentially severe. Exacerbations occurred in the second trimester of pregnancy in the majority of the trials. Nonetheless, a recent study revealed that exacerbations were most common during the first trimester of pregnancy. These results might indicate the necessity for intensified preconceptional asthma control and intensification of treatment. Pregnant

women are particularly vulnerable to infections because of immune system adaptations, which are the primary cause of exacerbations. The most common of these infections of the respiratory system. According to some authors, being obese or gaining an excessive amount of weight during pregnancy increases the chance of asthma flare-ups. Additionally, a higher incidence of gestational diabetes has been observed in individuals who also have obesity and asthma comorbidities. Severe flare-ups increase the chance of preterm birth, gestational age (Dodd, 1996) and preeclampsia (Dimitriadis et al., 2023). Additionally, a few small factors may burden pregnancy or exacerbate asthma control during pregnancy. Numerous studies have investigated the impact of psychological stress on the frequency of exacerbations during asthmatic pregnancies. A few studies have suggested that anxiety and patient belief that their asthma is out of control could affect flare-ups and increase the chance of a caesarean delivery (Rey et al., 2019). Many well-known pregnancy problems are brought on by smoking. Furthermore, in pregnant women with asthma, the risk of severe flare-ups, infection of the urinary tract, and premature birth increases (Rey et al., 2019).

2.12. Guidelines for the management of asthma during pregnancy

Breathing becomes difficult due to the inflammation and tightness of the lung airways caused by asthma, a common lung ailment (Al-Hussainy & Mohammed, 2021). One of the world most prevalent respiratory conditions, asthma, affects more than 300 million people globally (Sio & Chew, 2021). There are globally recognized guidelines that describe the objectives of effective asthma care and offer suggestions for managing asthma during pregnancy. Using treatments with few or no adverse side effects, the objectives are to prevent exacerbations, maintain good pulmonary function and regular activities, and prevent persistent daytime and nighttime symptoms. Controlling maternal hypoxia is another goal pregnancy to sustain fetal oxygenation. This can only be accomplished by appropriately using pharmacotherapies, educating patients on self-management, and routinely monitoring clinical symptoms. It is recommended that all medical professionals involved in a woman care practice multidisciplinary management. As with other adults with asthma, treating asthma during pregnancy should be done gradually. According to guidelines, women who have persistent asthma should use short-acting β-agonists (SABAs) and inhaled corticosteroids (I.C.S.) as relief drugs. The safety of pharmaceutical I.C.S. use during pregnancy is largely encouraging, especially in regard to budesonide, which has the highest safety rating during pregnancy (Murphy, 2015).

2.13. Future perspective

Appropriate management techniques must be used because the prevalence of asthma is increasing and because it is now well-established that asthma during pregnancy, particularly asthma exacerbations, increases maternal and fetal problems. Newer and more effective management options to ensure appropriate management of asthma during pregnancy will be developed as research opens the way to recognizing and raising awareness of the significant problems connected with asthma. There is a teratogenic risk associated with the use of asthma medicines during pregnancy. Since β2 agonists and I.C.S. medications are safe during pregnancy, encouraging adherence is crucial. The more catastrophic implications that arise from exacerbations during pregnancy greatly exceed the risk of using oral steroids during pregnancy F.E.N.O. It is a valuable tool for measuring airway inflammation and successfully lowering the frequency of exacerbations during pregnancy. Using asthma medications while expecting carries a teratogenic risk (Vanders & Murphy, 2015b). This systematic analysis suggested that. Pregnant women who have might need extra help and care for their condition. According to the reviewed publications, receiving assistance from a qualified healthcare provider can help with this. However, more research is needed to fully explore this area, including more extensive trials that determine whether beyond any potential benefits from changing medication regimens and employing fraction of exhaled nitric oxide for asthma control monitoring, personalized assistance for pregnant women with asthma offers any added value particularly when the latter option is not always diagnostic. Compared to in-person consultations, asynchronous telemedicine appears to result in reduced waiting times, fewer needless referrals, increased patient satisfaction, and equivalent diagnostic accuracy, according to a systematic review. In the case of paediatric asthma, where emergency admissions were prevented, resource satisfaction was high, and significant cost savings in remote areas were observed, this asynchronicity has been proven to be very substantial. These asynchronous resources might serve as a clearinghouse for information on crucial elements of asthma care, such as medication and symptom management. They might also give pregnant women more confidence in their ability to seek medical advice from professionals and make the most of their consultations. This approach might be particularly useful because pregnant women are uniquely receptive to educational input and already access the internet for information (Williamson et al., 2017). Targeting type 2 inflammation and airway restriction has already demonstrated the effectiveness of a curable approach for the management of asthma during pregnancy, reducing exacerbations by 50% while maintaining perinatal outcomes (Joshi et al., 2023).

2.14. Vitamin supplementation

Pregnancy-related vitamin A supplementation appears to improve alveolar development and septation. It is linked to better lung function in children, according to some clinical and preclinical findings. This benefit is not exclusive to undernourished groups. However, an increased chance of child asthma has been associated with vitamin A. On the other hand,

in the Causal Pathways for Asthma (C.A.S.P.A.R.) in an investigation vitamin A and D intake during pregnancy and the development of asthma, vitamin D was associated with a decreased risk. Maternal asthma was a significant confounder of the benefit of vitamin A supplementation, indicating the need for additional research in this population. Decreasing vitamin C decreases the Effects of Smoking during Pregnancy on Infant Lung Function (V.C.S.I.P.) experiment, maternal asthma had no effect on the ability of vitamin C supplementation to enhance lung function in the offspring of pregnant smokers. Further research is necessary to determine when supplements containing vitamins A, C, and D are taken singly or in combination, are beneficial for enhancing the lung health of offspring whose mothers have asthma flare-ups (Robinson et al., 2023).

2.15. Handling and tactics for pregnant women with asthma

Prior conception counselling is essential for pregnant asthmatic women who are to maximize reproductive outcomes. During preconception counselling, healthcare professionals should evaluate medication use, asthma management, and severity. Women who have asthma should be made aware of the possible effects of their condition on conception and pregnancy and the significance of managing their asthma. To reduce the risk to the mother and the unborn child, they should be urged to attain the best asthma control possible before becoming pregnant. It is essential to maintain asthma under control throughout pregnancy for both the health of the developing foetus and the health of the mother. Low birth weight at delivery, preterm birth, preeclampsia, and deterioration of asthmatic symptoms are among the pregnancy issues that are most likely to occur in women with poorly controlled asthma. During pregnancy, asthmatic women should be continuously evaluated, and therapy modifications should be made to achieve the best possible control of their asthma. Women with asthma who intend to become pregnant may need to modify their asthma treatment regimens and prescriptions. Certain drugs, such as inhaled corticosteroids, are thought to be safe to take while pregnant and should be continued to control asthma under control. However, depending on the patient unique conditions and the severity of their asthma, different drug regimens might need to be tailored. Oral corticosteroids should be used with caution due to possible hazards, particularly during pregnancy. To develop a treatment plan that strikes a compromise between managing asthma and lowering risks to the developing foetus, close collaboration between the obstetrician and asthma specialist is required. For pregnant asthmatic patients, collaborative treatment between fertility specialists and asthma specialists is essential to ensure thorough and individualized management. A multidisciplinary approach makes it possible to optimize medication regimens, conduct a full assessment of asthma management, and consider any potential interactions between asthma and reproductive treatments. Pen-to-pen correspondence among medical professionals caring for women with asthma can assist in resolving issues, offering pertinent advice, and guaranteeing well-coordinated treatment from conception to pregnancy (Shaikh et al., 2023).

3. Final Considerations

Asthma during pregnancy is a noteworthy public health issue. According to studies pregnancy increases the chance of difficulties for both mothers and the children. This comprehensive review addresses the dynamic relationship between asthma and pregnancy. Notable observation also highlights significant physiological changes during pregnancy. The greater susceptibility to exacerbations in the early phase and the long-term effect on the mother and unborn child. Here we emphasize care taken before conception, pathophysiology, vitamin supplementation, the physiology of asthma and pregnancy, the effects of pregnancy on asthma, the prevalence of asthma in expectant mothers, diagnosis, pharmacological treatment, exacerbations, guidelines for management and its future prospective, regular monitoring and collaborative efforts of the doctors. A method that has been shown to be effective in decreasing pregnancy-related exacerbations is modifying treatment with the use of FeNO. Appropriate patient education and proactive therapy are core elements of effective asthma control. Good asthma management may shield mothers and children from unfavourable prenatal outcomes. Accurate and frequent monitoring is essential for preventing, identifying, and treating exacerbations.

Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

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