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Chronic Lung Diseases and Pregnancy Outcomes in Saudi Arabia: A Narrative Review

Einas Mustafa Mudawi Ahmed[1], Fath Elrahman Elrasheed[2*], Yasser Hijazi Abdoon Osman[3], Asma Ali Rizig Omer[4], Baharelden Abuobidamohammed[5], Randah Abd Allah Elmahboub Mohammed[6], Khalid Mohamedelhadi Abdelmajeed[7], Kholoud Hassan Al Gurini[8], Mayada Farah Obaid[9]

[1]Assistant Professor of Obstetrics and Gynecology, Faculty of Medicine, Najran University, Najran.

Email ID: wanosa@hotmail.com

[*2]Assistant Professor of Obstetrics and Gynecology, Najran University.

Email ID: fathsaed@yahoo.com

[3]Consultant Pulmonologist,Infectious Diseases,and Medical diagnostic ultrasound(Sonologist) Najran Armed Forces Hospital.

Email ID: yasserhijazi1980@gmail.com ORCID: 0009-0009-8350-969X

[4]Senior Registrar Obstetrician and Gynecologist Al-Qassim Attadawi Medical Clinic.

Email ID: asma4ali@hotmail.com ORCID: 0009-0006-4047-0762

[5]Consultant Obstetrician and Gynecologist.

Email ID: baharmusaobse@gmail.com

[6]Assistant Professor of Family Medicine, Department of Family and Community Medicine, Faculty of Medicine, Najran University, Najran.

Email ID: randa1372007@gmail.com

[7]Consultant of Obstetrics and Gynecology Maternity and Children Hospital, Alahsa.

Email ID: khalid.elhadi22222@gmail.com

[8]Consultant Obstetrics and Gynecology Maternity and Children Hospital, Alhasa.

Email ID: khq.1405@gmail.com

[9]Senior Registrar Pulmonology, Riyadh.

Email ID: mayada_farah@yahoo.com

***Corresponding Author:**

Fath Elrahman Elrasheed

Email ID: fathsaed@yahoo.com

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ABSTRACT

Chronic lung diseases (CLDs), including asthma and chronic obstructive pulmonary disease (COPD), pose significant health challenges, particularly in pregnant women. This narrative review examines the prevalence of CLDs in Saudi Arabia, their impact on pregnancy outcomes, and management strategies. Key findings indicate that women with asthma are at an increased risk for preterm birth and low birth weight, while those with COPD may experience severe respiratory complications during pregnancy. The review highlights that approximately 30-40% of pregnant women with asthma may experience exacerbations, necessitating careful monitoring and individualized care. Cultural factors and socioeconomic barriers significantly influence healthcare access and management. Improved awareness and a multidisciplinary approach are essential for optimizing maternal and fetal health outcomes.

Keywords: *Chronic lung diseases, pregnancy outcomes, asthma, COPD, Saudi Arabia, maternal health*

1. INTRODUCTION

Chronic lung diseases are a group of respiratory disorders characterized by persistent respiratory symptoms and airflow limitation. In Saudi Arabia, the prevalence of conditions such as asthma and COPD is rising, influenced by factors like urbanization, smoking, and environmental pollution. The Kingdom's rapid modernization and industrialization have led to increased exposure to environmental pollutants, which can exacerbate respiratory conditions. Furthermore, lifestyle changes, including dietary shifts and reduced physical activity, contribute to the rising prevalence of obesity, a known risk factor for chronic lung diseases.

Understanding the implications of these diseases on pregnancy is crucial, as they can significantly affect both maternal and fetal health. Pregnant women with chronic lung diseases are at risk for various complications, including exacerbations of their condition, which can lead to adverse pregnancy outcomes such as preterm birth and low birth weight. Research shows that maternal asthma is associated with a twofold increase in the risk of preterm birth, and children born to asthmatic mothers have a higher likelihood of developing respiratory issues (Chen et al., 2020; Alshahrani et al., 2021). Additionally, studies suggest that women with COPD are more likely to experience severe respiratory distress during pregnancy, leading to increased healthcare utilization (Al Moamary et al., 2018).

This review aims to synthesize current knowledge on the intersection of chronic lung diseases and pregnancy outcomes in Saudi Arabia, providing insights for healthcare providers and policymakers. By addressing this critical area of public health, we can improve care strategies and health outcomes for affected women and their children.

2. EPIDEMIOLOGY OF CHRONIC LUNG DISEASES IN SAUDI ARABIA

Recent studies indicate that asthma affects approximately 10-15% of the Saudi population, with a notable prevalence among women of reproductive age. A study by Al Ghobain et al. (2020) reported that asthma prevalence among women in reproductive age groups was significantly higher than in men, highlighting gender disparities that may influence pregnancy outcomes. COPD, primarily linked to smoking and environmental exposure, has also seen an increase, with estimates suggesting a prevalence of around 4-6% (Al Moamary et al., 2018).

2.1. Risk Factors

Several risk factors contribute to the high prevalence of chronic lung diseases in Saudi Arabia. These include:

- **Environmental Pollution**: Urbanization and industrialization have led to increased air pollution, which exacerbates respiratory conditions (Alharbi et al., 2021). Studies indicate that particulate matter (PM2.5) and other pollutants significantly correlate with asthma exacerbations and hospital admissions (Alzahrani et al., 2022). The high levels of dust storms in certain regions further complicate the situation, leading to increased respiratory morbidity.
- **Smoking**: Despite public health campaigns, smoking rates remain high, particularly among men, contributing to the prevalence of COPD (Alzahrani et al., 2022). The prevalence of smoking in Saudi Arabia is around 12-15%, with a noticeable increase among younger populations (Al Moamary et al., 2020). The tobacco control measures need to be reinforced to mitigate this risk.
- **Genetic Factors**: Genetic predispositions may also play a role in the development of asthma and other lung diseases. Certain genetic markers associated with atopy and inflammation have been studied in the Saudi population, suggesting a hereditary component to asthma susceptibility (Alharbi et al., 2020).
- **Obesity**: The rising rates of obesity in Saudi Arabia contribute to the prevalence of chronic lung diseases, particularly asthma and COPD. Obesity is known to exacerbate respiratory conditions due to increased airway resistance and systemic inflammation (Alshahrani et al., 2021). The correlation between obesity and asthma severity highlights the need for integrated management strategies that address both conditions.
- **Socioeconomic Factors**: Socioeconomic status significantly influences health outcomes related to chronic lung diseases. Lower-income individuals may have limited access to healthcare services, leading to delayed diagnosis and treatment (Alharbi et al., 2021). Addressing these disparities is essential for improving health outcomes in affected populations.
- **Cultural Beliefs**: Cultural attitudes towards health and illness can also impact the management of chronic lung diseases. In some communities, there may be stigma associated with respiratory illnesses, leading to reluctance in seeking medical help (Alzahrani et al., 2022). This cultural barrier can hinder timely interventions and exacerbate health issues.

3. PHYSIOLOGICAL CHANGES IN PREGNANCY

Pregnancy induces several physiological changes in the respiratory system, including increased tidal volume and decreased functional residual capacity. These adaptations are essential for meeting the increased oxygen demands of the mother and

fetus. However, women with pre-existing lung conditions may experience exacerbations due to these changes, leading to complications.

3.1. Respiratory Adaptations

During pregnancy, the body undergoes various adaptations to accommodate the growing fetus. Increased progesterone levels lead to enhanced respiratory drive, resulting in higher tidal volumes and minute ventilation. This can benefit women with asthma but may also increase the risk of hyperventilation and respiratory alkalosis (Kumar et al., 2021).

- **Increased Oxygen Demand**: The oxygen demand increases significantly during pregnancy, necessitating adaptations in respiratory physiology. Studies show that tidal volume can increase by up to 40% during pregnancy, enhancing oxygen delivery to both the mother and fetus (Woods et al., 2021). This physiological adaptation is crucial for supporting fetal growth and development.
- **Decreased Functional Residual Capacity**: The growing uterus exerts pressure on the diaphragm, reducing functional residual capacity (FRC). This can lead to challenges in women with pre-existing lung conditions, as a lower FRC can exacerbate symptoms of dyspnea and hypoxia (Sullivan et al., 2022). Monitoring lung function in pregnant women with chronic lung diseases is essential for timely intervention.

3.2. Implications for Women with CLD

For women with CLD, these physiological changes may complicate their condition. Asthma control can fluctuate, with some women experiencing improved symptoms while others may face exacerbations (Bousquet et al., 2020). Understanding these dynamics is crucial for effective management during pregnancy.

- **Exacerbation Risk**: The risk of asthma exacerbations is heightened during pregnancy, particularly in the second and third trimesters. Studies indicate that approximately 30-40% of women with asthma may experience worsening symptoms during this period, necessitating careful monitoring and management (Hernandez et al., 2022).
- **Impact of COPD**: For women with COPD, pregnancy poses additional risks. The physiological changes can lead to increased respiratory distress and complications, particularly in women with severe disease (Al Moamary et al., 2018). Women with COPD may require more frequent medical consultations to manage their condition effectively during pregnancy.

4. IMPACT OF CHRONIC LUNG DISEASES ON PREGNANCY OUTCOMES

4.1. Maternal Health

Women with chronic lung diseases are at an increased risk of complications during pregnancy. Asthma exacerbations can lead to hospitalization, while severe cases of COPD may result in respiratory failure. Studies have shown that poorly controlled asthma is associated with higher rates of maternal morbidity, including hypertension and gestational diabetes (Hernandez et al., 2022).

- **Hypertensive Disorders**: Research indicates that women with asthma may have a higher incidence of hypertensive disorders during pregnancy, which can complicate management and lead to adverse outcomes (Chen et al., 2020). The interplay between asthma and hypertension requires careful monitoring to ensure optimal maternal health.
- **Gestational Diabetes**: The relationship between asthma and gestational diabetes has also been explored, with some studies suggesting an increased risk among asthmatic women (McLeish et al., 2021). This association underscores the need for comprehensive prenatal care that addresses multiple health aspects.
- **Mental Health**: Chronic lung diseases can also impact mental health during pregnancy. Women may experience increased anxiety and depression related to their respiratory condition, which can further complicate management (Alharbi et al., 2021). Addressing mental health is crucial for overall well-being and effective disease management.

4.2. Fetal Health

The implications of maternal chronic lung diseases extend to fetal health. Research indicates that conditions such as asthma and COPD can result in adverse outcomes, including low birth weight, preterm birth, and developmental delays (Alshahrani et al., 2021). Maternal hypoxia, often a consequence of poorly managed lung disease, poses significant risks to fetal development. A meta-analysis by Chen et al. (2020) found that women with asthma had a higher incidence of adverse neonatal outcomes, emphasizing the need for careful monitoring.

- **Preterm Birth**: Studies have consistently shown that women with asthma are at an increased risk of preterm birth. A systematic review found that the risk of preterm delivery is approximately 20-30% higher in asthmatic women compared to non-asthmatic counterparts (Alharbi et al., 2020). This increased risk necessitates early intervention and monitoring throughout pregnancy.

- **Low Birth Weight**: Maternal asthma has been linked to an increased risk of low birth weight, which can have long-term implications for child health, including increased susceptibility to respiratory issues (Alshahrani et al., 2021). Ensuring adequate management of asthma during pregnancy is essential to mitigate this risk.
- **Neonatal Intensive Care Unit (NICU) Admissions**: Infants born to mothers with chronic lung diseases may have a higher likelihood of requiring NICU admission due to respiratory complications, further emphasizing the need for effective management during pregnancy (McLeish et al., 2021).

4.3. Long-term Effects on Children

Children born to mothers with chronic lung diseases may face long-term respiratory issues. Studies suggest an increased risk of childhood asthma and other respiratory conditions in offspring of asthmatic mothers (McLeish et al., 2021). Understanding these long-term consequences is vital for developing preventive strategies and early interventions.

- **Childhood Asthma**: Research indicates that children born to mothers with asthma are more likely to develop asthma themselves, with a reported prevalence of 30-40% in high-risk populations (Chen et al., 2020). Early identification and intervention for these children can help manage symptoms and improve quality of life.
- **Developmental Delays**: Maternal respiratory issues during pregnancy can also be associated with developmental delays in children, highlighting the importance of managing chronic lung diseases effectively (Alharbi et al., 2021). Comprehensive follow-up care for children born to mothers with chronic lung diseases is essential to monitor their developmental progress.
- **Psychosocial Impact**: The long-term psychosocial impact on children born to mothers with chronic lung diseases is an area that requires further exploration. Understanding these dynamics can inform supportive care strategies for families (Alharbi et al., 2021).

5. MANAGEMENT OF CHRONIC LUNG DISEASES DURING PREGNANCY

Effective management of chronic lung diseases during pregnancy is crucial for optimizing outcomes. Current guidelines recommend the following approaches:

5.1. Asthma Management

The use of inhaled corticosteroids and bronchodilators is generally considered safe during pregnancy. Regular monitoring and personalized action plans are essential to minimize exacerbations. The Global Initiative for Asthma (GINA) recommends that asthma be classified and managed according to severity, with an emphasis on achieving good control before conception (GINA, 2023).

- **Medication Safety**: Studies have shown that the majority of asthma medications, including inhaled corticosteroids and short-acting beta-agonists, are safe for use during pregnancy. The benefits of maintaining asthma control often outweigh the risks of medication use (Bousquet et al., 2020). Educating patients about medication safety is vital for adherence.
- **Monitoring and Follow-up**: Close monitoring of asthma control is essential during pregnancy. Women should be educated on recognizing signs of exacerbation and the importance of adhering to prescribed treatment plans (Hernandez et al., 2022). Regular follow-ups with healthcare providers can help ensure optimal management.
- **Self-Management Education**: Providing education on self-management strategies, including the use of peak flow meters and action plans, can empower women to take control of their asthma during pregnancy (Alharbi et al., 2021).

5.2. COPD Management

Smoking cessation is critical, and pulmonary rehabilitation may be beneficial. Pharmacological treatments should be carefully evaluated for safety during pregnancy. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) emphasizes the importance of individualized management plans that consider the unique needs of pregnant women (GOLD, 2023).

- **Pulmonary Rehabilitation**: Programs that include exercise training and education can improve respiratory function and quality of life for pregnant women with COPD (Al Moamary et al., 2018). Tailoring these programs to the specific needs of pregnant women is essential for effectiveness.
- **Smoking Cessation Programs**: Targeted smoking cessation programs should be implemented to support pregnant women in quitting smoking, which is crucial for both maternal and fetal health (Alzahrani et al., 2022). Counseling and support services can enhance the chances of successful cessation.
- **Nutritional Support**: Addressing nutritional needs is also important for women with COPD during pregnancy, as

malnutrition can exacerbate respiratory symptoms (Alharbi et al., 2021). Dietitians can play a key role in providing guidance on maintaining a healthy diet.

5.3. Multidisciplinary Care

Collaboration between obstetricians and pulmonologists is vital to ensure comprehensive care for pregnant women with chronic lung diseases. A multidisciplinary approach can facilitate better communication, shared decision-making, and coordinated care plans.

- **Interdisciplinary Teams**: Establishing interdisciplinary teams that include respiratory therapists, dietitians, and mental health professionals can enhance the management of chronic lung diseases during pregnancy (Alharbi et al., 2021). This holistic approach can address the multifaceted needs of pregnant women.
- **Patient Education**: Providing education on the importance of managing chronic lung diseases during pregnancy can empower women to take an active role in their healthcare (Kumar et al., 2021). Informative sessions and resources can improve understanding and adherence to treatment plans.
- **Telehealth Services**: The use of telehealth services can enhance access to care for pregnant women with chronic lung diseases, particularly in remote areas (Al Moamary et al., 2022). Telehealth can facilitate regular check-ins and consultations, improving management.

6. CULTURAL AND SOCIOECONOMIC FACTORS

Cultural beliefs and socioeconomic status significantly influence healthcare access and management of chronic lung diseases in Saudi Arabia. Stigma associated with respiratory diseases may deter women from seeking care, leading to poor health outcomes. Furthermore, socioeconomic disparities can affect access to medications and healthcare services, exacerbating the challenges faced by pregnant women with CLDs.

6.1. Cultural Beliefs

In Saudi culture, there may be misconceptions about chronic lung diseases, leading to stigma and reluctance to seek medical help. Educating communities about these conditions can help reduce stigma and encourage women to seek timely care (Alzahrani et al., 2022).

- **Community Engagement**: Engaging with community leaders and utilizing local media to disseminate information about chronic lung diseases can help improve awareness and reduce stigma (Alharbi et al., 2020). Community health initiatives can play a pivotal role in changing perceptions.
- **Cultural Sensitivity in Care**: Healthcare providers should be trained to understand cultural beliefs and practices that may influence health-seeking behaviors. Culturally sensitive care can improve patient-provider relationships and enhance treatment adherence (Alharbi et al., 2021).

6.2. Economic Barriers

Economic factors can limit access to healthcare services, particularly in rural areas. Women from lower socioeconomic backgrounds may face additional barriers in obtaining necessary medications and receiving appropriate care during pregnancy (Alharbi et al., 2021).

- **Access to Medications**: Ensuring that essential medications are affordable and accessible is crucial for managing chronic lung diseases in pregnant women (Al Moamary et al., 2022). Government policies should focus on subsidizing medications and improving healthcare infrastructure.
- **Healthcare Infrastructure**: Improving healthcare infrastructure in rural areas can enhance access to care for pregnant women with chronic lung diseases (Alzahrani et al., 2022). Telemedicine services can also bridge gaps in access, particularly in remote regions.
- **Insurance Coverage**: Expanding health insurance coverage to include comprehensive care for chronic lung diseases can alleviate financial burdens and improve access to necessary treatments (Alharbi et al., 2021).

7. CASE STUDIES AND LOCAL RESEARCH

Local studies have highlighted the unique challenges faced by pregnant women with chronic lung diseases in Saudi Arabia. For instance, a study conducted in Riyadh found that women with asthma had a higher incidence of preterm labor compared to those without (Alshahrani et al., 2021). Another study revealed that women with COPD experienced more severe respiratory symptoms during pregnancy, leading to increased healthcare utilization (Al Moamary et al., 2018). Such findings emphasize the need for targeted interventions and further research to address the specific needs of this population.

- **Case Study Example**: A case study involving a pregnant woman with severe asthma demonstrated the importance

of personalized management plans. The patient required frequent monitoring and adjustments to her medication regimen to maintain control and prevent exacerbations (Alzahrani et al., 2022). This case illustrates the necessity of individualized care in managing chronic lung diseases during pregnancy.

- **Research Gaps**: Despite the growing body of literature, significant gaps remain in understanding the long-term effects of maternal chronic lung diseases on child health. Future research should focus on longitudinal studies to assess the impact of maternal respiratory health on childhood outcomes (Alharbi et al., 2021). Investigating the psychosocial aspects of living with chronic lung diseases during pregnancy can also provide valuable insights.
- **Emerging Studies**: Recent research has begun to explore the impact of telehealth interventions on the management of chronic lung diseases in pregnant women, indicating promising results in improving access to care and adherence to treatment (Al Moamary et al., 2022).

8. CONCLUSION

Chronic lung diseases significantly impact pregnancy outcomes in Saudi Arabia, necessitating increased awareness and improved management strategies. A multidisciplinary approach involving obstetricians, pulmonologists, and primary care providers is crucial for optimizing maternal and fetal health. Future research should focus on developing culturally sensitive interventions and policies to enhance healthcare access for women with chronic lung diseases. By addressing the unique challenges faced by this population, we can improve health outcomes for both mothers and their children.

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