RESEARCH
O&G Forum 2024; 34 – 3s: 2509-2514

ASTHMA IN PREGNANCY MANAGEMENT AND OUTCOMES

Dr. Y. Ooha Dharani[1], Dr. Rajalekshmi[2]

[1]Postgraduate Obstetrics and Gynaecology, Saveetha Medical College and Hospital, Chennai, Tamilnadu, India

[2]Professor, Obstetrics and Gynaecology, Saveetha Medical College and Hospital, Chennai, Tamilnadu, India.

Abstract:
One of the most prevalent illnesses that affect women who are fertile is asthma. Data on asthma-complicated pregnancies are mounting, and they show that asthma is not a benign illness in terms of obstetric outcomes and foetal health. Numerous extensive investigations on the effects of pregnancy in women with complex asthma. We carried up an observational cross-sectional study to see how pregnant asthmatic patients were treated and the outcomes. Our results showed that nearly one quarter of the pregnant women in our research had uncontrolled asthma. According to these findings, moms in the lowest level may be more likely to have an asthmatic pregnancy. Before their initial appointment, 8.8% of patients experienced moderate to severe asthma exacerbations. Vaginal birth is now more feasible even in cases of asthma and more than half of the patients using short acting beta 2 agonists in our study. Sufficient control of asthma during pregnancy presents a fulfilling chance to improve mother and child health.
Keywords: Asthma, Pregnancy, Management, Corticosteroids, Outcomes

Introduction:

Asthma management is known to be significantly complicated by pregnancy since it can change how severe an asthma attack gets and how it is treated, both of which can have an impact on the quality of the pregnancy. [1] Numerous unfavourable perinatal outcomes, such as an increased risk of low birth weight, preterm birth, and newborn hospitalisations, are linked to maternal asthma. [1,2] As a result, even though a large body of research indicates that asthma during pregnancy represents a frequent and growing threat to the health of expectant mothers and their offspring, more trustworthy studies are still needed in this area. Asthma typically produces systemic inflammatory chemicals, which are linked to adverse pregnancy outcomes, particularly preterm birth or preeclampsia. [9] Asthma impacts between 2% and 13% of pregnancies globally. [12,13] Between 5% and 8% of pregnant women in the US suffer with asthma, and the condition is becoming more common. [10,11] Based on published research, it is estimated that 3–14% of pregnancies are affected by asthma, and asthma medications are frequently taken throughout pregnancy. Pregnancy also brings about a number of physiological and mechanical changes that may alleviate or exacerbate asthma symptoms, including exacerbations. [6] About one-third of women reported an improvement in their asthma symptoms during pregnancy, one-third reported a worsening of their symptoms, and one-third reported no change in symptoms, according to a systematic review and meta-analysis of 14 studies published before 1990 that assessed the course of asthma during pregnancy. [7] Additionally, studies have demonstrated that within three months of giving birth, changes in the severity of asthma that occur during pregnancy frequently return to pre-pregnancy levels. [8] Current recommendations advise treating asthma during pregnancy in the same way that an adult without a pregnancy would, including how asthma medicine is taken. Guidelines and knowledge of the serious consequences of asthma during pregnancy have not improved the management of the condition or decreased the perinatal morbidity and death that it is associated with. [3] The way asthma is now managed seems to be more reactive than proactive. The fact that only 15% of the pregnant asthmatic women in our prior prospective study had an asthma action plan serves as evidence for this. [3] There is evidence that the way pregnant women with asthma are now treated may be greatly improved, and evidence-based methods for enhancing clinical practice are urgently needed. [4] Cochrane studies have shown that in non-pregnant individuals, giving asthma self-management instruction as opposed to asthma exacerbations are decreased by standard care [5], and nurse-led asthma care is at least as effective as

physician-led therapy economical [5] Exhaled fraction of nitric oxide (FeNO), a measure of inflammation, may be used to regulate asthma, according to recent experiments conducted in pregnant women with asthma. Active management can greatly improve maternal asthma, as evidenced by the substantial decrease in the prevalence of women experiencing an exacerbation that was linked to this intervention during pregnancy [2]. In order to observe the care of asthmatic patients during pregnancy and its results, we conducted an observational cross-sectional study.

Materials and methods:

This observational cross-sectional study was carried out among pregnant asthmatic women in Saveetha medical college and hospital . Eighty asthmatic women with a physician's diagnosis were selected at random. We evaluated the impact of maternal asthma in perinatal outcome. We gathered demographic information about the mother, such as her height, weight, and her obstetric and medical histories, using a standard data collecting method. Each woman's socioeconomic position at the time of delivery was ascertained using her residential postcode. The Asthma Control Questionnaire (ACQ) was used to evaluate asthma control. The ACQ is a validated 7-item questionnaire that assesses lung function and asthma symptoms; scores greater than 1.5 indicate uncontrolled asthma. An Easy One spirometer was used to assess the forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1) both before and after salbutamol was administered. Using the Gore et al. formulae, the expected FEV1% was determined based on the patient's age and height. Data on perinatal outcomes, such as baby sex, gestational age, birthweight, length, head circumference, delivery technique, and Apgar scores, were gathered at delivery from the medical records. The last menstrual period date was used to calculate gestational age, which was then verified by ultrasound at 18 weeks. Small for gestational age (SGA) was defined as birthweight <10 percentile for gestational age, whereas preterm birth was classified as <37 weeks gestation.

Statistical analysis:

The statistical package for the social sciences (SPSS) programme version was used to analyse all of the data. With respect to the baseline attributes, the categorical data were displayed as percentage, while the continuous data were shown as mean + SD or median, depending on the situation.

Results:

Table 1: Maternal demographics and asthma history

	Antenatal asthma management (N=80)
Demographics	
Maternal age	25.8 ±4.8
BMI (kg/m2)	26.9±6.1
Socioeconomic status	
Lowest	58 (72.5%)
Middle	10 (12.5%)
Highest	12 (15%)
Asthma history	
Baseline ACQ6 Score	0.71± 0.64
Baseline Asthma Control (ACQ6> 1.5)	
ACQ<1.5	51 (82.2%)
ACQ> 1.5	11 (17.8)
Moderate/severe exacerbation prior to first visit	
No	73 (91.2%)
Yes	7 (8.8%)

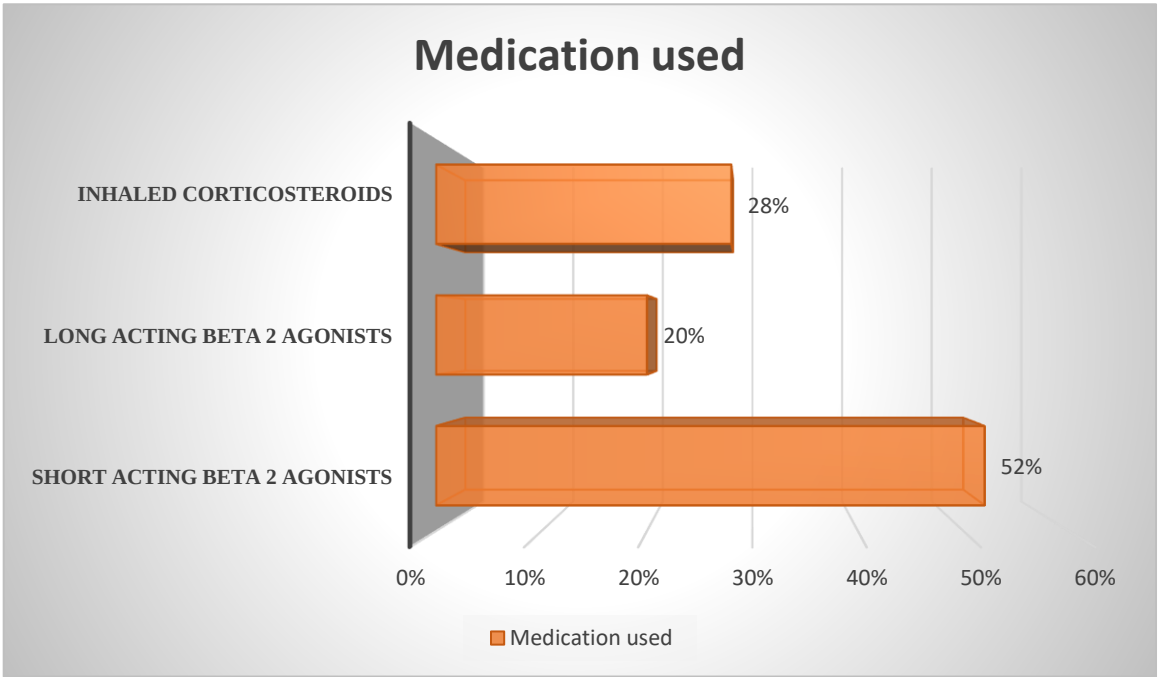
Spirometry	
FEV1 (L)	3.2±0.34
FEV1Perc/predicted	0.90±0.8
FVC (L)	3.4±0.44
FEV1/FVC Ratio	0.73±0.04

Table 2: Impact of antenatal asthma management and perinatal outcomes

	Antenatal Asthma Management (N=80)
Asthma related outcomes	
Moderate/severe exacerbation, n (%)	
No	68 (85%)
Yes	12 (15%)
Loss of control, n (%)	
No	54 (67.5%)
Yes	26 (32.5%)
Persistent uncontrolled asthma (ACQ6 >1.5 on ≥ 2 study visit), n (%)	
No	69 (86.3%)
Yes	11 (13.7%)
Perinatal outcomes	
Gestational age (days)	272±14
Birthweight centile	50.2 ±28
Infant sex, n (%)	
Male	41 (51.25%)
Female	39 (48.75%)

Birth weight (g)	3380±546
Delivery method, n (%)	
Vaginal	52 (65%)
Elective LSCS	12 (15%)
Emergency LSCS	16 (20%)
Birth length (cm), mean (SD)	48.8±2.4
Head circumference (cm), mean (SD)	33.9±1.5
Preterm birth	5 (6.25%)
Small for gestational age	8 (10%)

Figure 1: Medication used in asthmatic pregnant women



In our study, eighty asthmatic individuals enrolled up. Our study's mean mother age is 25.8 ±4.8 years old. The patients' mean BMI is 26.9±6.1. The majority of pregnant women are found to be healthy weight. Mothers' socioeconomic position shows that 72.5% of them are in the lowest status category. Of the moms, 15% belong to the highest-level category, while 12.5% fall into the intermediate class category. According to these findings, moms in the lowest level may be more likely to have an asthmatic pregnancy. Baseline asthma control ACQ> 1.5were 17.8%. This finding showed that nearly one quarter of the pregnant women in our research had uncontrolled asthma. Before their initial appointment, 8.8% of patients experienced moderate to severe asthma exacerbations. FEV1 (L), FEV1Perc/predicted, FVC (L), and FEV1/FVC Ratio

have mean values of 3.2±0.34, 0.90±0.8, 3.4±0.44, and 0.73±0.04, respectively. For asthma in pregnancy, 32.5% of the patients experienced a loss of control. 13.7% of the patients had uncontrollably unrelenting asthma. The majority of the patients in our research had typical vaginal births. This demonstrated that vaginal birth is now more feasible even in cases of asthma. 20% of moms had emergency LSCS, while 15% had elective LSCS. Twenty-five of our patients experienced a delivery-related problem, requiring emergency LSCS. Equal distribution in gender among foetus. The mean value of birth length (cm) is 48.8±2.4 and head circumference 33.9±1.5. 6.25% babies had pre-term birth. 10% of mothers have small gestational age. In our study, short-acting beta-2 agonists were used by over half of the patients, while long-acting beta 2 agonists and inhaled corticosteroids were used by the remaining patients.

Discussion:

This study has revealed that while asthma is not linked to poor pregnancy outcomes, individuals with active disease may have a modest increased risk of premature birth. Pregnancy results for women who have asthma are better than previously believed. In fact, if the active cases are removed from the analysis, the success rates are excellent. Asthma is a respiratory illness characterised by inflammation that can produce many inflammatory factors that may impact placental function and development. This could potentially raise the risk of adverse obstetric outcomes, such as preterm birth, foetal growth restriction, and pre-eclampsia. [14,15] Although it is unknown how asthma can lead to low birth weight or premature birth, it is likely linked to inflammatory markers, which are known to trigger labour in asthmatic individuals. [9] In a different study by Chaiprom et al., the mean gestational age was substantially lower and the rate of preterm delivery in cases of active asthma tended to increase but did not achieve statistical significance. [9] Gestational age is normal in our study. The majority of earlier research revealed that pregnancies involving asthma had a higher caesarean rate. However, given the greater risks of poor obstetric outcomes, it is reasonable to anticipate a higher caesarean rate. As is evident in routine clinical practice, difficult pregnancies have a comparatively high caesarean rate. [16] Our research did not, however, show that the rate of caesarean sections rose with asthma cases. According to Wang et al., people with severe asthma had a higher probability of requiring a caesarean section than those with mild asthma. [16] After 14 to 16 weeks of gestation, healthy pregnant women have no change in FEV1 and a very slight increase in FVC (about a tenth of a litre), with no discernible change in the FEV1/FVC ratio for the course of the pregnancy. Therefore, any decrease in these spirometric measures should raise concerns in pregnant asthmatic women. [17] Kircher et al. discovered that 36% of asthma patients had worse day-to-day disease control during pregnancy. Pregnant people are more likely to experience asthma exacerbations, especially if they have a history of severe asthma. [18] Congenital abnormality was not linked to bronchodilator or inhaled corticosteroid (ICS) use, exacerbations, or any of them.[19] Another meta-analysis of research from 1975 to 2012 discovered a link between moderate-to-severe asthma and a higher proportion of small-for-gestational-age newborns, as well as a link between maternal oral corticosteroid use and low birth weight and preterm delivery. [20] In one survey, moms with asthma were predicted to take 5% of short-acting beta-agonists (SABAs), 12% of ICS, and 42% of oral corticosteroids. [21] Increasing asthma management can lower the chance of pregnant women experiencing asthma flare-ups.

Conclusion:

Improving asthma control during pregnancy requires the use of portable and transferable asthma management techniques across healthcare settings. Sufficient control of asthma during pregnancy presents a fulfilling chance to improve mother and child health. Therefore, for all women with asthma who are of reproductive age, complete education, modifying environmental triggers, and titrating asthma medication should ideally commence before to conception. Increasing asthma symptoms should be aggressively minimised throughout pregnancy through medication up-titration, as opposed to running the risk of inadequate asthma management and asthma exacerbations.

References:

1) Murphy VE, Namazy JA, Powell H, et al. A meta-analysis of adverse perinatal outcomes in women with asthma. BJOG: Int J Obstet Gynaecol 2011;118(11): 1314–23
2) Powell H, Murphy VE, Taylor DR, et al. Management of asthma in pregnancy guided by measurement of fraction of exhaled nitric oxide: a double-blind, randomised controlled trial. Lancet 2011;378(9795):983–90.
3) Murphy VE, Gibson PG, Talbot PI, Kessell CG, Clifton VL. Asthma self-management skills and the use of asthma education during pregnancy. Eur Respir J 2005;26(3):435–41
4) Bain E, Pierides KL, Clifton VL, et al. Interventions for managing asthma in pregnancy. Cochr Database Syst Rev 2014;10:CD010660.
5) Kuethe MC, Vaessen-Verberne AA, Elbers RG, Van Aalderen WM. Nurse

versus physician-led care for the management of asthma. Cochr Database Syst Rev 2013;2:CD009296.
6) Charlton RA, Hutchison A, Davis KJ, De Vries CS. Asthma management in pregnancy. PloS one. 2013 Apr 4;8(4):e60247.
7) Juniper EF, Newhouse MT (1993) Effect of pregnancy on asthma: systematic review and meta-analysis. In: Schatz M, Zeiger RS, Claman HN, editors. Asthma and immunological diseases in pregnancy and early infancy. New York: Marcel Dekker. 223–250.
8) Schatz M, Harden K, Forsythe A, Chilingar L, Hoffman C, et al. (1988) The course of asthma during pregnancy, postpartum, and with successive pregnancies: A prospective analysis. J Allergy Clin Immunol 81: 509–17.
9) Chaiprom P, Sekararithi R, Tongsong T, Traisrisilp K. Pregnancy outcomes among women with intermittent asthma: a retrospective cohort study. International Journal of Environmental Research and Public Health. 2021 Jun 12;18(12):6376.
10) Kwon H.L., Triche E.W., Belanger K., Bracken M.B. The epidemiology of asthma during pregnancy: prevalence, diagnosis, and symptoms. Immunol Allergy Clin North Am. 2006;26(1):29–62.
11) Mendola P., Laughon S.K., Mannisto T.I. Obstetric complications among US women with asthma. Am J Obstet Gynecol. 2013;208(2):127.e1–127.e8
12) Jolving L.R., Nielsen J., Kesmodel U.S., Nielsen R.G., Beck-Nielsen S.S., Norgard B.M. Prevalence of maternal chronic diseases during pregnancy—a nationwide population based study from 1989 to 2013. Acta Obstet Gynecol Scand. 2016;95(11):1295–1304.
13) Sawicki E., Stewart K., Wong S., Leung L., Paul E., George J. Medication use for chronic health conditions by pregnant women attending an Australian maternity hospital. Aust N Z J Obstet Gynaecol. 2011;51(4):333–338
14) Murphy V.E., Zakar T., Smith R., Giles W.B., Gibson P.G., Clifton V.L. Reduced 11beta-hydroxysteroid dehydrogenase type 2 activity is associated with decreased birth weight centile in pregnancies complicated by asthma. J. Clin. Endocrinol. Metab. 2002;**87**:1660–1668.
15) Clifton V., Murphy V. Maternal Asthma as a Model for Examining Fetal Sex-specific Effects on Maternal Physiology and Placental Mechanisms that Regulate Human Fetal
Growth. Placenta. 2004;**25**:S45–S52.
16) Wang G., Murphy V.E., Namazy J., Powell H., Schatz M., Chambers C., Attia J., Gibson P.G. The risk of maternal and placental complications in pregnant women with asthma: A systematic review and meta-analysis. J. Matern. Neonatal. Med. 2014;**27**:934–942.
17) Grindheim G., Toska K., Estensen M.E., Rosseland L.A. Changes in pulmonary function during pregnancy: a longitudinal cohort study. *BJOG.* 2012;119(1):94–101
18) Kircher S, Schatz M, Long L. Variables affecting asthma course during pregnancy. Annals of Allergy, Asthma & Immunology. 2002 Nov 1;89(5):463-6.
19) Bonham CA, Patterson KC, Strek ME. Asthma outcomes and management during pregnancy. Chest. 2018 Feb 1;153(2):515-27.
20) Namazy J.A., Murphy V.E., Powell H., Gibson P.G., Chambers C., Schatz M. Effects of asthma severity, exacerbations and oral corticosteroids on perinatal outcomes. Eur Respir J. 2013;41(5):1082–1090.
21) Powell H., McCaffery K., Murphy V.E. Psychosocial outcomes are related to asthma control and quality of life in pregnant women with asthma. J Asthma. 2011;48(10):1032 –1040