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Impact of Asthma on Perinatal Outcomes: Risks and Management Strategies in Pregnant Women

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A B S T R A C T

Background: Pregnant women frequently have asthma, particularly asthma flare-ups are prevalent throughout pregnancy. One frequent pregnancy issue is parental asthma, which might have negative short-term repercussions on the baby's development.

Objective: To determine the perinatal outcomes among pregnant females having asthma.

Methodology: The current retrospective cohort study was conducted in the Department of Obstetrics and Gynaecology, Mardan Medical Complex from July 2020 to December 2020 after the ethical approval from the ethical review board of the hospital. A total of 62 asthmatics and 59 non-asthmatics pregnant mothers with single-ton births were selected through a random sampling technique, in addition, informed consent was also obtained from each participant before the collection of data, moreover, they were ensured that confidentiality and anonymity would also be maintained throughout the period. All the collected data was thoroughly analyzed by using SPPS version 23.

Results: The retrospective cohort study included a total of 62 asthmatics and 59 non-asthmatics pregnant mothers, in addition, their maternal and fetal outcomes were assessed. The mean age of asthmatic mothers was 27.21 ± 4.8 years while in non-asthmatic it was 26.71 ± 3.89 years. The premature rupture of the membrane was 7% and 2% with a p-value of 0.002 among asthmatic and non-asthmatic mothers. The value of APGAR was also lower at 6.93 and 7.84 at 1 and 5 minutes in mothers with asthma, which was higher among non-asthmatic mothers at 1 and 5 minutes (7.74 and 8.36). Moreover, the gestational age was lesser (36.89) among asthmatic as compared to non-asthmatic. Additionally, the number of hospitalizations was 2.0 and 1.52 amongst both mothers having asthma and those without asthma.

Conclusion: The present study concluded that pregnant mothers with asthma were more likely to suffer from adverse perinatal outcomes such as premature rupture of membrane, low birth weight, and lower gestation age than those without asthma. There was also less prevalence of UTIs and hospitalization among non-asthmatic pregnant females.

Keywords: Perinatal Outcomes; Asthma; APGAR; Abortion; UTI

Introduction

The most frequent respiratory illness to cause complications while pregnant is asthma, which, despite advancements in treatment, is still considered an exceptionally dangerous condition. Asthma affects 5 to 8 percent of women during their pregnancies in the USA, and the condition is becoming more common.[1,2] Asthma impacts between 2% and 13% of births globally.[3,4] Pregnancy-related asthma is a particularly prevalent respiratory disease, and its prevalence and expense are rising.[5] Research studies that have been conducted indicate that as many as fifty percent of women having asthma are likely to have a worsening of their asthma while being pregnant, based on the severity of their condition. Asthma flare-ups during gestation are prevalent.[6] The impact of parental asthma during gestation on various outcomes for both mom and baby has been studied in some prior research. These studies have unequivocally shown that inadequate control of asthma increases the risk of preterm delivery, preeclampsia, retardation of intrauterine growth, low birth weight, as well as perinatal death for both moms along with the baby.[7,8] Unidentified processes underlie the association between asthma that is unregulated along with low birth weights alongside additional fetal problems, however, they could involve the direct impact of hypoxia in the fetus on growth, modifications in fetal development due to decreased uteroplacental blood circulation, or additional variations in placental functioning.[9,10]Sixty-three percent of pregnant women having asthma in the US utilized asthma drugs over 6 years. Merely 25% of these females were utilizing corticosteroids that were inhaled.[11,12] Research examining the long-lasting impacts of mothers' asthma throughout pregnancy on their offspring has indicated that wheeze incidence increases at fifteen months of infancy and that juvenile respiratory illnesses generally rise, but additional investigations have not identified any effects on the offspring's maturation.[13]Asthma that is uncontrollable has been linked in certain studies to negative pregnancy results and fetal effects, such as low birth weight, being preterm, and a greater likelihood of congenital abnormalities.[14] According to a survey, most major obstetrics including newborn illnesses can be avoided by carefully managing asthma and associated flare-ups throughout pregnancy. This finding supports the theory that poor availability of oxygen is the root cause of adverse consequences throughout asthma in pregnancy.[15] Individuals having asthma have an increased prevalence and severity of breathing infections caused by viruses during pregnancy. Among 285 women who were pregnant surveyed, 71% during their pregnancy, 46% of women with no asthma, and women alongside asthma reported having at least one common cold.[16] Researchers discovered that 36% of those with asthma had worse daily illness control throughout gestation. Pregnant individuals are more likely to experience asthma flare-ups, especially if they have previous episodes of chronic asthma. In research involving 1,739 individuals, the increase in symptoms rate among individuals with severe asthma was 52%, while the rates for individuals with moderate to severe and milder forms of asthma were 26% and 13%, respectively, throughout gestation.[17] Given the present circumstances, which include a rise in the prevalence of asthma and contradictory findings from different research projects, it is essential to track any regional developments. Therefore, this was designed to assess the specific outcomes of asthma among those with asthma at tertiary care hospitals so that we can control and minimize as well as manage those outcomes that negatively affect the health of mothers and their infants.

Objective

To determine the perinatal outcomes among pregnant females having asthma.

Methodology

The current retrospective cohort study was conducted in the Department of *Obstetrics* and Gynaecology, Mardan Medical Complex from July 2020 to December 2020 after the ethical approval from the ethical review board of the hospital. A total of 62 asthmatics and 59 non-asthmatics pregnant mothers with single-ton births were selected through a random sampling technique, in addition, informed consent was also obtained from each participant before the collection of data, moreover, they were ensured that confidentiality and anonymity would also be maintained throughout the period. Those who had cardiac diseases, renal failure, DM, hypertension, and other respiratory conditions such as chronic bronchitis and pneumonia could imitate asthma or have an impact on the pregnancy outcomes under investigation. In addition, induction of labor with medicine or surgery and pregnant mothers who take medications (apart from asthma medications) were excluded from the study. The study focused on three neonatal results: birth weight at delivery, premature delivery, as well as Apgar assessments at one and five minutes. The number of hospitalizations, the frequency of reported UTIs throughout the study gestation, and the existence of prior abortions and premature births were among the mother's results that were looked into. All the collected data was thoroughly analyzed by using SPPS version 23.

Results

The retrospective cohort study included a total of 62 asthmatics and 59 non-asthmatics pregnant mothers, in addition, their maternal and fetal outcomes were assessed. The mean age of asthmatic mothers was 27.21

Table 1. sociodemographic characteristics among both asthmatic and non-asthmatic women's

Parameters	Asthmatics n = 62	Non-Asthmatics n = 59	p-value
Age (years)	27.21 ± 4.8	26.71 ± 3.89	0.002
Education			
Illiterate	04.51%	02.31%	0.038
Matric	23.81%	18.21%	
F.A/FSC	38.42%	33.61%	
Graduation	33.26%	45.87%	
History of Stillbirth	2.81%	1.83%	0.220
H/o Abortion	24%	18%	0.052
Family h/o Asthma	21.27%	2.13%	0.001
Allergic	14.32%	87.65%	0.001
Gravida's			
1	12.89%	33.25%	0.004
2	30.72%	31.31%	
3	27.41%	22.42%	
> 3	28.98%	13.02%	

± 4.8 years while in non-asthmatic it was 26.71 ± 3.89 years. 04.51% and 2.31% of them illiterate among asthmatic and non-asthmatic individuals. The graduation level of education among both groups was 33.26% and 45.87%. 21.27% of asthmatic and 2.13% of non-asthmatic participants have a family history of asthma. In addition, 24% (asthmatic) and 18% (non-asthmatic) women have a history of abortions. 28.98% and 13.02% among patients with asthma and those without asthma had > 3 gravidae (Table 1). Table 2 represents the premature rupture of the membrane at 7% and 2% with a p-value of 0.002 among asthmatic and non-asthmatic mothers. The value of APGAR was also lower at 6.93 and 7.84 at 1 and 5 minutes in mothers with asthma, which was higher among non-asthmatic mothers at 1 and 5 minutes (7.74 and 8.36). Moreover, the gestational age was lesser (36.89) among asthmatic as compared to non-asthmatic. Additionally, the number of hospitalizations was 2.0 and 1.52 amongst both mothers having asthma and those without asthma.

Table 3 highlights, the issues that are being faced by both with asthma and without asthmatic individuals. High blood pressure and pre-eclampsia were found in 3.13% of asthmatic and 2.89 % in non-asthmatic. Gestational diabetes was common (6.13%) among asthmatic patients, in addition to the bleeding before 3 weeks of delivery which was 19.76%.

Discussion

In 8–13% of pregnant women around the world, asthma is a particularly frequent chronic illness that pregnant women face.[18] Because of worries about the potential dangers of asthma drugs, more than 40 percent of pregnant women reduce or stop taking them.[19] Asthma exacerbations while pregnant can be caused by several things, including already present severe asthma, infections with viruses, being overweight, parity,

Table 2. Results of Pregnancy Among Mothers with and without Asthma

Outcomes	Asthmatics n = 62	Non-Asthmatics n = 59	p-value
Age of gestation	36.89	37.36	0.001
Birthweight	2.97	3.21	0.025
APGAR (1 minute)	6.93	7.74	0.002
APGAR (5 minute)	7.84	8.36	0.001
Premature rupture of membrane	7%	2%	0.002
Hospitalization	2.0	1.52	0.001

cigarettes, prolonged exposure to pollutants such as cigarette smoke, as well as air pollution from the outdoors.[20] A worsening of asthma while pregnant has been linked to unfavorable perinatal pregnancy results, including smaller for the gestational period, premature delivery, congenital deformity, pre-eclampsia, as well as low birth weight.[21] In the present study the mean age of asthmatic mothers was 27.21 ± 4.8 years while in non-asthmatic it was 26.71 ± 3.89 years. The premature rupture of the membrane was 7% and 2% with a p-value of 0.002 among asthmatic and non-asthmatic mothers. The value of APGAR was also lower at 6.93 and 7.84 at 1 and 5 minutes in mothers with asthma, which was higher among non-asthmatic mothers at 1 and 5 minutes (7.74 and 8.36). Another study, conducted by Kim S et al reported that maternal asthmatics saw a substantial reduction in visits to the doctor as well as prescriptions for the majority of asthma drugs, but they also experienced a higher rate of hospitalizations associated with asthma (1.3% vs. 0.8%). Throughout pregnancy, the percentage of patients who were ever admitted rose steadily (1st trimester, 0.2%; 2nd trimester, 0.5%; and 3rd trimester, 0.7%.[22] but in our study, it was the number of hospitalizations was 2.0 and 1.52 amongst both mothers having asthma and those without asthma. Similarly, Jooma R et al found that the average age of people with asthma was 28.0 ± 4.9 years, while that of people without asthma was 27.7 ± 3.6 years. Asthmatic women's mean parity was 2.97, compared to 2.57 ($p<0.137$) for controls. Babies with asthmatic moms had reduced Apgar ratings, a lesser mean gestation period, and a higher chance of preterm birth. Babies with low birth weights and miscarriages were more common in women with asthma. Additionally, their rates of hospital hospitalizations and UTIs were greater.[23] In contrast Fazel N et al reported that there were no discernible differences between moms who had asthma and those who did not in terms of the length of gestation, birthweight, low Apgar scores, or respiratory difficulties in the newborn. There was no difference between overall IgE antibodies or eosinophil counts based on the severity of asthma or control.[24] According to Aggarwal AN et al that as populations become more

Table 3. Issues happen in the second and third trimesters of pregnancy in asthmatic and non-asthmatic women's

Complications	Asthmatics n = 62	Non-Asthmatics n = 59	p-value
GDM	6.13%	2.1%	0.021
HBP/PE	3.13%	2.89%	0.771
UTI, s during gestation	3.01	1.91	0.001
Vomiting	23.19%	19.87%	0.231
Placental issues	3.98%	1.1%	0.018
Bleeding before 3 weeks of delivery	19.76%	17.51%	0.003

urbanized and adopt Western habits, the number of cases of asthma rises. There is expected to be an enormous spike in the prevalence of asthmatics globally over the next 20 years due to the anticipated growth in the share of the global population that lives in cities between 45% - 59% by 2025. By 2025, it's predicted that there might be 100 million more people suffering from asthma. Given that urbanization is increasing and that the majority of people in these nations are from lower socioeconomic classes, which have the highest prevalence of asthma, this trend is even more alarming for South Asian countries together with other emerging states.[25] In the present study high blood pressure and pre-eclampsia were found in 3.13% of asthmatic and 2.89% in non-asthmatic. Gestational diabetes was common (6.13%) among asthmatic patients, in addition to the bleeding before 3 weeks of delivery which was 19.76%. Similarly, another study concluded that when having a female fetus, pregnant women experiencing asthma are more likely than when carrying a male fetus to experience premature delivery as well as pre-eclampsia.[26] It is highlighted that parental asthma be included in the group of illnesses that raise the risk of poor pregnancy outcomes in light of these correlations.[27] It appears that using systemic corticosteroids or having severe asthma during pregnancy increases the risk of moderate preeclampsia in the expectant mother and hypoglycemia in the unborn child.[28] Additionally, in comparison with non-asthmatic mothers, kids born to asthmatic mothers have a marginally higher risk of developing clubfoot.

Conclusion

The present study concluded that pregnant mothers with asthma were more likely to suffer from adverse perinatal outcomes such as premature rupture of membrane, low birth weight, and lower gestation age than those without asthma. There was also less prevalence of UTIs and hospitalization among non-asthmatic pregnant females.

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