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Impact of Respiratory Diseases on Maternal and Perinatal Outcomes among Pregnant Women

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A B S T R A C T

Background: In recent years Acute and chronic respiratory complications in during pregnancy have become more common and significant. Physicians need to be aware about cardiopulmonary physiology in order to identify and treat pregnant women who have respiratory diseases such as adults with respiratory distress syndrome and asthma in an efficient way.

Objective: To study the effect of different respiratory diseases on Maternal and Perinatal Outcomes in Pregnant women.

Methodology: This retrospective study was conducted in the department of gynecology Ayub medical college Abbottabad and Jinnah hospital Abbottabad from January2021 to May 2021. This study encompassed all patients with respiratory diseases as well as those who were pregnant. All pregnant woman who experienced a respiratory problem during her pregnancy, as well as any new respiratory diseases or exacerbations of previous illnesses including bronchitis and asthma, were recorded. Data were analyzed using SPSS version 16. A value of less than 0.05 was deemed significant when using the Fisher's exact test and Pearson's Chi square as significance tests. Ethical approval was taken form ethical committee of the Ayub medical college Abbottabad.

Results: A total of 218 pregnant women who had reparatory complications were enrolled in this study. Of those with respiratory complications, 93.57% were between the ages of 20 to 35 years. Bronchial asthma being the most common 156 (71.55%) respiratory complication in pregnancy. The common respiratory complication was Bronchial asthma 156 (71.55%) followed by Respiratory tract infections 23(10.5%), Allergic bronchitis 17(7.7%) and Acute respiratory distress syndrome 9(4.12%). Premature rupture of the membranes (PROM) was seen in 4% women individuals with asthma. There was a 1.5% maternal death rate. Women with lower respiratory tract infections who also had sepsis and acute respiratory distress syndrome (ARDS) were frequently associated with poor prenatal outcomes, such as preterm (15.9%). Neonatal characteristics were recorded, 46.3% of all newborns were admitted to the NICU, and 6.1% of them received treatment for respiratory distress syndrome.

Conclusion: It was concluded from the current study that respiratory disorders during pregnancy put the mother at higher risk. The most common respiratory complication in our study was bronchial asthma (71.55%) resulted maternal death 1.4% death. Thorough prenatal investigation combined with pulmonary function tests improves the chance of a successful outcomes prenatal screening for mothers with respiratory disorders is recommended due to the increased risk of preterm birth and intrauterine growth restriction (IUGR) in the developing fetus.

Keywords: Respiratory Diseases; Pregnant Women; IUGR

Introduction

Pregnant women's chronic as well as acute respiratory disorders have remarkably raised in frequency and significance in recent years.[1] Cardiopulmonary physiology during pregnancy should be understood by doctors in order to rapidly diagnose and treat pregnant women with respiratory disorders that include asthma and severe adult respiratory distress syndrome.[1] As pregnancy continues on, there are notable changes in respiratory parameters. Reductions in expiratory reserve volume, residual volume, and total lung capacity are among them. The most significant physiological alteration in a typical pregnancy occurs in the third trimester, when there is a 20% reduction in functional residual capacity. The diaphragm's elevation as a result of the uterus's growth causes this change. Furthermore, there are changes in various lung volumes by the second half of the pregnancy.[1] Functional reserve capacity decreases by 9.5–25% when both the expiratory reserve volume & residual volume decrease.[2,3] Even yet, there is a modest reduction in overall lung capacity at term. It is crucial to know about the typical physiological changes that occur during pregnancy, such as basal atelectasis, lung venous congestion, and airway hypersensitivity, in order to identify and manage the most prevalent pulmonary conditions that exacerbate pregnancy.[4] In addition to these anatomical changes, pregnancy-related hormonal changes significantly impact respiratory mechanics. Serum progesterone is the hormone that steadily rises throughout pregnancy.[5] Because progesterone activates the brain's respiratory centres, it causes hyperventilation and a perception of dyspnea. Everybody experiences respiratory alkalosis, which causes the partial pressure of Co_2 to fall to about 30 mm Hg.[6] Even though pregnancy is associated with immunosuppression, around 0.04 and 1% of pregnant women have pneumonia; the infection frequency is the same as that of individuals who are not pregnant.[7] The most prevalent respiratory disorders that arise during pregnancy include acute respiratory distress syndrome, pneumonia, pulmonary edema, bronchial asthma flare-ups, and pulmonary embolism. Only 0.1% of pregnancies result in acute respiratory failure, but even so, it is one of the most frequent reasons for obstetric admissions to the (ICU) and has a very high morbidity and death rate for both the mother and the fetus.[6,7] It is necessary to offer assuring information about the safety of medications and reliable facts on the significance of disease control during pregnancy.[8] therefore the current study was carried out to explore the Maternal and Perinatal Outcomes in Pregnant Women with Respiratory Complications.

Objective

To study the effect of different respiratory diseases on Maternal and Perinatal Outcomes in Pregnant women.

Methodology

This retrospective study was conducted in the department of gynecology Ayub medical college Abbottabad and Jinnah hospital Abbottabad from January 2021 to May 2021. We studied medical information from patients to examine the impact of certain respiratory disorders upon the perinatal outcome during pregnancy. All pregnant woman who experienced a respiratory problem during her pregnancy, as well as any new respiratory diseases or exacerbations of previous illnesses including bronchitis and asthma, were recorded. Maternal mortality, ICU admissions, obstetric issues that have a secondary influence on the respiratory system, such as pulmonary edema, the necessity for labor induction, and the procedure of delivery were all observed. Management of participants during the antenatal, intrapartum, and postnatal period was also calculated. We recorded neonatal parameters including, placental weight, birth weight, preterm births and NICU admissions.

Data were entered into Microsoft Excel and then analyzed using SPSS version 16. For many factors, including gestational age and gestational age of diagnosis, interquartile ranges were calculated for analysis of pregnancy outcomes. A value of less than 0.05 was deemed significant when using the Fisher's exact test and Pearson's Chi square as significance tests.

Ethical approval certificate was obtained from Ethical committee of Ayub medical college Abbottabad for conducting of this study.

Results

A total of 218 pregnant women who had reparatory complications were enrolled in this study. Of those with respiratory complications, 93.57% were between the ages of 20 to 35, 51.37% were multiparous, and 44.0 % were primiparous. 45 (20.18%) received misoprostol induction, 100 (32.24%) underwent LSCS, and 116 (53.7%) underwent vaginal birth. 171 (78.44%) had a preexisting respiratory condition, bronchial asthma being the most common 156 71.55), and 3 participants with bronchial asthma had an acute exacerbation in gestation, due to noncompliance to controller medication. Among study cases, 46 (21.1%) individuals had a new onset respiratory complication in pregnancy of which Pneumonia (53.21%) were prevalent (Table 1).

Out of 218 individuals, majority of them were multigravida 112(51.37%). Respiratory disorders observed during pregnancy are depicted in table 2. The common respiratory complication was Bronchial asthma 156 (71.55%) followed by Respiratory tract infections 23(10.5%), Allergic bronchitis 17(7.7%) and Acute

Table 1. Demography of pregnancies convoluted by respiratory diseases (n= 218)

Variables		N (%)
Age	<19 years	2 (0.91)
	20–25 years	204 (93.57)
	>35 years	12 (5.5)
Parity	Primigravida	96 (44.0)
	Multigravida	112 (51.37)
	Grand multigravida	10 (4.5)
Gestational Age	Preterm (<36 + 6 weeks)	34 (15.5)
	Term (>37 weeks)	184 (84.4)

respiratory distress syndrome 9(4.12%) Pregnancy complications such as hypertensive disorders (17.7%), Gestational Diabetes Mellitus (12.3%), Anemia (8.8%), and an increased prevalence of caesarean sections (19.1%) were found to coexist with asthma in women (Figure 1). Anemia (17.7%) was linked to ARDS and pulmonary Edema in 25% cases (p <0.001) individuals. ARDS-related thrombocytopenia was seen in 12.5%, cases (p <0.001b). Two individuals had obstructive sleep apnea had moderate preeclampsia (p <0.001 b). Premature rupture of the membranes (PROM) was seen in (4%, p <0.001) women, while misoprostol induction was observed in (20.5%, p <0.001 b) individuals with asthma. The ultimate consequence of all ICU admissions was ARDS, and there was a 1.5% maternal death rate and 4.2% patients that required ICU admissions. Women with lower respiratory tract infections who also had sepsis and acute respiratory distress syndrome (ARDS) were frequently associated with poor prenatal outcomes, such as preterm (15.9%), IUGR (8%), and IUD (6.6%). Analysis was done on neonatal outcomes such as APGAR and birth problems. Neonatal characteristics were recorded, including birth weight, preterm deliveries, admissions to hospitals to the intensive care unit, and respiratory issues treated. Because of their low APGAR at delivery, 46.3% of all newborns were admitted to the NICU, and 6.1% of them received treatment for respiratory distress syndrome. The majority of newborns 117(53.66%)

Table 2. Various respiratory complications in pregnancy (preexisting and new onset) n= 218

Respiratory complication	N (%)
Allergic Bronchitis	17 (7.7)
Acute Respiratory Distress Syndrome	9 (4.12)
Bronchial asthma	156 (71.55)
Obstructive sleep apnea	2 (0.91)
Pulmonary edema	6 (2.7)
Pleural effusion	3 (1.3)
Respiratory tract infections	23 (10.5)
Tuberculosis	2 (0.91)

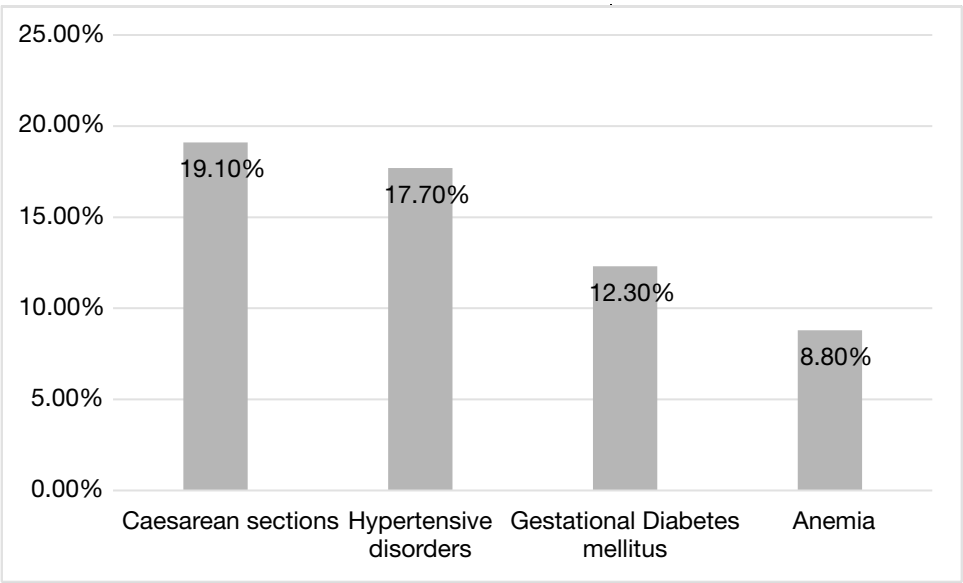

Figure 1. Coexisting complications with asthma during pregnancy among study cases

weighed between 2.5 and 3.5 kg. After taking sufficient precautions, more than 10% still had an APGAR score less than 8 at five minutes, compared to just 54.7% at one minute. APGAR scores were less than five in 62.5% pregnancies complicated with ARDS and tuberculosis in 50% individuals even at five minutes with satisfactory resuscitative measures ($p < 0.001^b$). About 81.25% ($p < 0.001^b$) pregnancies complicated with bronchitis had neonates with a good APGAR score at one minute (>8) (Table 3).

Discussion

Now a days Acute and chronic respiratory complications in during pregnancy have become more common and significant. Physicians need to identify and treat pregnant women who have respiratory diseases in an efficient way. In this study we explored the Maternal and Perinatal Outcomes in Pregnant Women with Respiratory Complications. A total of 218 pregnant women with respiratory complications were studied. Previous studies also determined the frequency of respiratory disorder during pregnancy.[8] In our study the incidence of asthma was 71.55% .these findings are not similar with the previous study conducted by Kwon et al in which he reported 3.7–8.4% asthma of all pregnancies.[9] According to Jana et al., of 79 pregnant women, 46.8% were primigravidae, and 62% had a TB diagnosis. This study revealed that 34.2% of the study group had preterm births and low birth weight infants, which was significant.[10] 51.37% of the participants in our research were primigravida, which appears to be a comparatively higher percentage than other respiratory conditions. According to Getahun et al., acute respiratory disorders (viral or bacterial) were linked to PROM, whereas acute bronchitis (3.4%) was not. PROM was linked to 6% of cases of bronchial asthma but not 2.1% of cases of chronic bronchitis, probably as a result of pharmacological side effects such as steroid use during pregnancy.[11] Our study reveals that obstetric complications such as proliferative disorders (4%, p <0.001b), hypertensive disorders (17.7%), gestational diabetes mellitus (12.3%), caesarean section (19.1%) and anemia (8.8%), and were observed in women with bronchial asthma. Schatz et al. reported that, in comparison to controls, there was no higher prevalence of preterm labour (5.8%) in pregnant women with asthma.[12] According to a Tennessee research, bronchial asthma did not correlate with preterm delivery in a cohort of pregnant women, 40.8% of whom were black and 59.2% of whom were white.[13] Similar results were seen in our study, where preterm neonates had lower APGAR scores at 1 minute and even at 5 minutes than those delivered at term, and preterm had no statistical significance. A US study revealed that 11.1% of babies born to pregnant asthmatic moms had meconium-stained liquor.[14] In our study, 11.2% of moms with asthma-like gestational diabetes mellitus also experienced additional obstetric problems. High rates of caesarean sections are associated with a greater chance of preterm and low birth weight infants, according to a US research on birth outcomes in asthmatic pregnancies.[14] Although asthma was not linked to a higher incidence of preterm labour in our study either, individuals with obstructive sleep apnea and asthma were delivered by emergency lower respiratory care system (LSCS). Seven women were identified by Hartert et al. to require an ICU

Table 3. Neonatal outcomes of pregnancies complicated by respiratory illness

APGAR at one minute					
Variable		<5	6–7	>8	p value
Gestational age	<32 weeks	465.7%	232.3%	00.0%	<0.001[b]
	32 + 1–36 + 6 week	518.1%	1037.4%	1141.2%	
	37–39 + 6 weeks	157.5%	5731.5%	10357.8%	
	>40 weeks	116.6%	233.2%	350.0%	
APGAR at 5 minutes					
Variable		<5	6–7	>8	p value
Gestational age	<32 weeks	351.0%	233.2%	116.6%	<0.001[b]
	32 + 1–36 + 6 week	519.2%	00.0%	2180.7%	
	37–39 + 6 weeks	95.0%	42.2%	16292.5%	
	>40 weeks	00.1%	116.6%	583.3%	
*Statistically significant ; at α = 5% and p <0.05 [a]Chi-square; [b]Fisher exact					

hospitalisation following the second trimester.[15] Six individuals were seen in another investigation by Wong et al. to have been hospitalised to the intensive care unit due to low blood oxygenation.[16] According to a Lapinsky et al. study, 1 to 9 out of every 1,000 pregnancies had an overall incidence of obstetric patients in need of urgent care.[17] (62.5%, p <0.001) of the pregnancies in our research that were affected by ARDS necessitated an ICU hospitalization. In severely sick patients with respiratory impairment, a research by Panchal et al. Reported fatality rates of 2–20% .[18] our study found a mortality rate of 1.5%. in our study 50% women with ARDS and 6.2% mother with TB had IUDs, and mothers with allergic bronchitis were linked to stillbirths (p <0.001). Significantly, IUDs were more common between 32 and 36 weeks of gestation (15.4%, p = 0.001), rather than at a later gestational age. In our study, after asthma respiratory tract infections (10.5%) were the second most common cause of respiratory complications during pregnancy. Madinger et,al. Revealed a strong correlation of pneumonia in 44% of premature births.[19] A research conducted in Israel found that 246 women were admitted for infections of the upper respiratory tract and that the prevalence of low birth infants (20.3%) and preterm births (15.9%) was significantly greater among these women.[20] However, there was no apparent association between infections and premature labour in our research.

Conclusion

It was concluded from the current study that respiratory disorders during pregnancy put the mother at higher risk. The most common respiratory complication in our study was bronchial asthma (71.55%) resulted maternal death 1.4% death. Thorough prenatal investigation combined with pulmonary function tests improves the chance of a successful outcomes prenatal screening for mothers with respiratory disorders is recommended due to the increased risk of preterm birth and intrauterine growth restriction (IUGR) in the developing fetus.

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