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Research Article

A study of neonatal and maternal outcomes of asthma during pregnancy

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ABSTRACT

Background: Asthma is a common problem all around the world with variable prevalence ranging from 1%–18% in different age and geographical distribution. There are proximately 300 million affected individuals. There are growing prevalence and morbidity, due to asthma associated with pregnancy. The course of asthma in pregnancy is unpredictable.
Methods: 2400 consecutive pregnant women attending the antenatal clinic of S.P. Medical College and AG of Hospitals, Bikaner, were screened using asthma questionnaire translated in Hindi based on the questionnaire developed for International Union against Tuberculosis and Lung Disease. 52 patients diagnosed as asthma were subjected for PFT and classified according to clinical severity as per GINA guidelines, 2006. All subjects were followed till delivery and postpartum charts reviewed to see neonate and maternal outcome.
Results: The prevalence of asthma during pregnancy was 2.1%, among them, 25 (48.1%) were categorized as having intermittent asthma, 6 (11.5%) with mild persistent asthma, 10 (19.2%) with moderate persistent asthma and 11 (21.2%) having severe persistent asthma. During the course of pregnancy, 36% had no change in the symptomatology, while (32.5%) experienced improvement and (32.5%) of worsening of asthma. 22 (42.31%) women were newly diagnosed during our study. There was no significant adverse maternal and fetal outcome in asthmatic group compared to control.
Conclusions: Asthma is an under diagnosed and under treated disorder, especially during pregnancy and overall morbidity of asthma among women & neonates does not change during pregnancy.

Keywords: Asthma, Pregnancy, Neonatal, Maternal

INTRODUCTION

Asthma is a common problem around the world with variable prevalence ranging from 1%-18%[1] in different age and geographical distribution. There are proximately 300 million affected individuals in the world. Study by Kwon HL et al suggests that approximately 4.1% of all pregnant women had experienced an asthma attack in previous year.[2] Recent study in USA suggests 3.7-8.4% of women had asthma in 1997–2001, as compared to 3.2% according to data in 1988–1994.[3] There are growing prevalence and morbidity, due to asthma associated with pregnancy. Course of asthma in pregnancy is unpredictable, studies suggest that about 1/3rd have exacerbation, 1/3rd improve and rest of 1/3rd show no change in symptoms.[4,5] On the contrary asthma also had adverse effect on fetus and maternal outcomes in pregnant women. Various historical and prospective cohort studies have investigated the effect of maternal asthma on pregnancy outcomes, studies suggest that asthmatic women are more at risk of low birth neonate, preterm delivery, IUGR, congenital deformities and increased hospital stay. Maternal risks includes; preterm labor, preeclampsia, hypertension, antepartum and postpartum hemorrhage, increased cesarean section and forceps delivery. There are fewer studies on asthma & its

morbidity in pregnancy. Due to high prevalence of asthma in our region, we planned this study.

METHODS

The study was carried out in the year 2006 through the months from January to December after taking permission from ethics committee of S.P. Medical College, Bikaner and written consent from patients. 2400 consecutive pregnant women attending the antenatal clinic of S.P. Medical College and Attached Group of Hospitals, Bikaner, were screened using asthma questionnaire translated in Hindi based on the questionnaire developed for International Union against Tuberculosis and Lung Disease (IUATLD). Screening was done on one day each week selected randomly. 52 patients diagnosed as asthma were subjected for PFT. Forced Vital Capacity (FVC) and forced expiratory volume in 1st second (FEV_1) were determined. A post bronchodilator FEV_1 value was also taken. The patients were classified according to clinical severity as per GINA guidelines, 2006. There were 4 groups intermittent asthma, mild persistent asthma, moderate persistent asthma, severe persistent asthma. The exacerbations were evaluated as mild and severe. Equal number of non asthmatic cases was randomly selected for comparison. All subjects were followed till delivery and postpartum charts reviewed to see neonatal and maternal outcome. A repeat PFT was performed at the end of the study in asthmatic subjects during 3rd trimester. Statistical comparisons of the data were done using student's t-test by SPSS 10 software.

RESULTS

Out of the 2400 pregnant women screened with the questionnaire, 70 pregnant women were declared positive by this questionnaire, 6 patients were found to be having purely cardiovascular disease, 12 women were found to be having respiratory disorders other than asthma and 52 were clinically diagnosed as asthma. The prevalence of asthma was derived as 2.1% (Table 1).

Table 1: Prevalence of asthma during pregnancy in females attending ANC.

	Number
Study population	2400
Positive by questionnaire	70
Upon clinical evaluation	
– Diagnosed as cardiovascular disease	6
– Diagnosed as respiratory disease other than asthma	12
– Diagnosed as asthma	52

Table 2 shows the demographic profile of the study population. We have compared the means of the age, gestational age of antenatal visit, height, weight, BMI and gravidity. After applying the test of significance, the mean gestational age of first antenatal visit of an asthmatic woman was found to be significantly lower than the non asthmatic woman (p<0.001).

Table 2: Demographic profile of study population.

Characteristics	Non asthmatic pregnant women (n=52)		Asthmatic pregnant women (n=52)		t	p
	Mean	SD	Mean	SD		
Age (yrs)	24.03	4.42	24.52	4.10	-0.406	>0.05
Gestational age (months)	7.35	1.40	5.05	1.32	5.97	<0.001
Height (mts)	1.57	0.05	1.57	0.05	0	>0.05
Weight (kgs)	54.52	9.66	53.37	6.37	0.497	>0.05
BMI	22.05	3.83	21.77	2.90	0.291	>0.05
Gravida	2.41	0.98	2.29	1.11	0.405	>0.05

The 52 pregnant women with asthma were classified into four groups based on their baseline clinical severity. 25 were grouped as intermittent asthmatics, 6 were in the mild persistent group, 10 in the moderate persistent and 11 in the severe persistent group (Table 3).

The symptoms of asthma improved in 16 cases (32.5%), remained same in 18 cases (36%) & worsened in 16 cases (32.5%) during pregnancy.

Antepartum hemorrhage (APH) occurred in total 5 (9.6%) women in asthmatic group while in non asthmatic

control 4 (7.69%) women had APH. Out of total 5 cases of APH in asthmatic women, 2 cases (18.18%) occurred in severe persistent group & one each in intermittent (4%), mild persistent (16.7%) & moderate persistent group.

Table 3: Distribution of subjects as per their baseline clinical severity of asthma during pregnancy.

Severity	Number (*n*=52)	%
Intermittent	25	48.1
Mild persistent	6	11.5
Moderate persistent	10	19.2
Severe persistent	11	21.2

Postpartum hemorrhage (PPH) occurred in total 4 (7.6%) women in asthmatic group Vs 3 (5.77%) in non asthmatic group. Further, PPH occurred in 1 case (9.09%) in severe persistent group, 1(9.09%) in moderate persistent group and 2 (8%) in intermittent group.

Cesarean section was done in total of 12 asthmatic women in comparison with 9 non asthmatics. Of the total 12 asthmatic women with cesarean section, 3 (27.3%) were in severe persistent group, 1 (16.67%) in mild persistent group, 2 (20%) in moderate persistent group and 6 (24%) in intermittent group.

Preterm delivery (gestation <37 weeks) was observed in 4 (7.6%) asthmatic women Vs 3 (5.77%) non asthmatic women. Further it occurred one each in severe persistent group and moderate persistent group and 2(8%) in intermittent asthma group.

Gestational diabetes mellitus was found in 3 (5.7%) asthmatic women in comparison with 2 (3.85%) non asthmatics.

Pregnancy induced hypertension was found in 7 asthmatic vs 6 in non asthmatic. On further division PIH was found in 3 (27.27%) women in severe persistent group, 2 (20%) in moderate persistent group and one in each intermittent group and mild persistent asthma group (Table 4).

Table 4: Maternal outcomes in asthmatic women Vs non asthmatic.

Characteristics	Non asthmatic controls (*n*)		Intermittent		Mild persistent		Moderate persistent		Severe persistent	
	No.	%	No.	%	No.	%	No.	%	No.	%
Antepartum hemorrhage	4	7.69	1	4	1	16.67	1	10	2	18.18
Postpartum hemorrhage	3	5.77	2	8	0	0	1	10	1	9.09
Cesarean section	9	17.31	6	24	1	16.67	2	20	3	27.27
Delivery <37 weeks	3	5.77	2	8		-	1	10	1	9.09
Gestational Diabetes mellitus	2	3.85	1	4	0	-	1	10	1	9.09
Pregnancy induced hypertension	6	11.54	1	4	1	16.67	2	20	3	27.27

Table 5: Neonatal outcomes in asthmatic women Vs non asthmatic.

Characteristics	Non asthmatic controls (*n*)		Intermittent		Mild persistent		Moderate persistent		Severe persistent	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low birth weight	3	5.77	2	8	0	-	1	10	1	9.09
Intra Uterine Growth retardation	3	5.77	2	8	0	-	1	10	1	9.09
Congenital anomaly	0	-	0	-	0	-	0	-	0	-
Hyperbilirubinemia	5	9.62	3	12	1	16.67	1	10	1	9.09
Hospital stay >3 days	18	34.62	9	36	4	66.67	3	30	5	45.45

Table 6: Comparison of PFT at start of the study and at the end of study.

PFT Tests	At enrolment of study		At the end of study		t	*p*
	Mean	SD	Mean	SD		
FVC	78.3	8.43	77.99	8.38	1.995	0.051
FEV_1	78.34	15.50	78.21	15.82	0.086	0.932
FEV_1/FVC	101.22	15.62	101.14	15.55	0.732	0.468

We observed low birth weight neonate in 3 nonasthmatic women (5.7%) vs 4 (7.6%) in asthmatic women. Intrauterine growth retardation was observed in 3 (5.7%) nonasthmatic women and 4 (7.6%) asthmatic women. Hyperbilirubinemia was observed in neonates of 9.6% non asthmatic as compared to 11.5% in asthmatic women (Table 5).

PFT values at start of study and once in 3rd trimester were evaluated. There was no significant difference in FVC, FEV1 and FEV1/FVC (Table 6).

DISCUSSION

The prevalence of asthma during pregnancy was found to be 2.1% in present study. There are only few papers published about the prevalence of asthma during pregnancy. In a multicentric study by Aggarwal et al[6], prevalence of asthma among women was found to be 2.51%, 1.84%, 2.06% and 3.75% in Chandigarh, Delhi, Kanpur and Bangaluru respectively and the overall prevalence among women was 2.56%. Demisse et al[7] in his publication had dealt on this matter and had mentioned that asthma affected between 0.4 and 1.3% of pregnant women. More recently Kwon et al[2] had discussed that recent estimates in the USA showed 3.7-8.4% of pregnant females as having asthma in 1997-2001; it was previously 3.2% according to data from the year 1994-1998.

Asthmatic women were classified on the basis of their level of control as per GINA guidelines in present study. 51.9%, 42.3% and 5.8% were classified controlled, uncontrolled and partially controlled respectively. Bracken[8] in his study had also stated 1/3 of the pregnant females remain under controlled which is comparable to our study.

Course of asthma in pregnancy is unpredictable, studies suggest that about 1/3rd have exacerbation, 1/3rd improve and rest of 1/3rd show no change in symptoms.[5] Our study had also shown that 1/3 of the patients remained with the same status during pregnancy, 1/3 showed exacerbations and 1/3 were improved. The data of present study is also comparable to the study by Schatz et al.[5]

In our study we found that 9.6% of asthmatic women and 7.6% of control were having antepartum hemorrhage. Alexander et al had also found that APH occurred in 8% in control group and 8.6% in asthmatic group. Incidence of PPH was 7.6% in asthmatic group and 5.7% in control group in present study which also supports results of previous study by Dombrowski et al[9] where it was observed 5.3% non asthmatic and 7.0% asthmatic women had PPH. We also found increased evidence of delivery <37 weeks of gestation. 5.7% women in control group and 7.6% in asthmatic group had preterm delivery. There was also increased incidence of cesarean delivery in asthmatic women. 17% of non asthmatic women had cesarean section vs 23.07% of asthmatic women. Our results are comparable with results of Dombrowski et al[9] who showed cesarean delivery was done in 18.2% non asthmatic women and in 20.8% asthmatic women. Further these were more in severe persistent asthma group in our study. In our study we found pregnancy induced hypertension or preeclampsia in 11.54% control women vs 13% in asthmatic women. Our data is comparable to Dombrowski et al[9], who also showed that of PIH was found in 11.2% in control women and 12.2% in pregnant asthmatics. We observed low birth weight neonates in 3 (5.7%) non asthmatic women vs 4 (7.6%) in asthmatic women. Intra uterine growth retardation was observed in 3 (5.7%) control and 4 (7.6%) in asthmatic women. Our data also supports study by Dombrowski et al[9] which showed that prevalence of low birth weight was 5.9% in control and 6.8% in asthmatic women. Hyperbilirubinemia was observed 9.6% in control as compared to 11.5% in asthmatic women. Our results also supports previous studies by Alexander et al[10] who showed prevalence of hyperbilirubinemia was 8.8% in neonates of asthmatic women and 5.7% in neonates of non asthmatic women.

There was no change in FEV_1, FVC & FEV_1/VC at the start of study and at end of study. Earlier Sim's et al[11] performed lung function tests on asthmatic females during pregnancy and postpartum period and found no pregnancy related change.

CONCLUSION

Maternal asthma is a risk factor for some of poor pregnancy outcomes and that asthma itself may be altered by pregnancy. Our finding favour the possibility that suboptimal controlled asthma during pregnancy is associated with increased risk to the mother or baby. More studies are required to establish the prevalence of asthma in pregnancy and neonatal outcome.

REFERENCES

1. Masoli M, Fabian D, Holt S, Beasley R. The global burden of asthma: executive summary of the GINA Dissemination Committee report. Allergy 2004;59:469-78.
2. Kwon HL, Triche EW, Belanger K, Bracken MB. The epidemiology of asthma during pregnancy: prevalence, diagnosis, and symptoms. Immunol Allergy Clin North Am 2006;26:29-62.
3. Kwon HL, Belanger K, Bracken MB. Asthma prevalence among pregnant and child bearing-aged women in the United States: estimates from national health surveys. Ann Epidemiol 2003;13:317-24.
4. Gluck JC, Gluck P. The effects of pregnancy on asthma: a prospective study. Ann Allergy 1976;37:164-8.
5. Schatz M, Harden K, Forsythe A, et al. The course of asthma during pregnancy, post partum, and with successive pregnancies: a prospective analysis. J Allergy Clin Immunol 1988;81:509-17.
6. Aggarwal AN, Chaudhry K, Chhabra SK, D'Souza GA, Gupta D, Jindal SK, et al. Asthma Epidemiology Study Group. Prevalence and risk factors for bronchial asthma in Indian adults: a multicentre study. Indian J Chest Dis Allied Sci 2006;48:13-22.
7. Demissie K, Breckenridge MB, Rhoads GG. Infant and maternal outcomes in the pregnancies of asthmatic women. Am J Respir Crit Care Med 1998;158:1091-5.
8. Bracken MB, Triche EW, Belanger K, Saftlas A, Beckett WS, Leaderer BP. Asthma symptoms, severity, and drug therapy: a prospective study of effects on 2,205 pregnancies. Obstet Gynecol 2003;102:739-52.
9. Dombrowski MP, Bottoms SF, Boike GM, Wald J. Incidence of preeclampsia among asthmatic patients lower with theophylline. Am J Obstet Gynecol 1986;155:265-7.
10. Alexander S, Dodds L, Armson BA. Perinatal outcomes in women with asthma during pregnancy. Obstet Gynecol 1998;92:435-40.
11. Sims CD, Chamberlain GV, de Swiet M. Lung function tests in bronchial asthma during and after pregnancy. Br J Obstet Gynecol 1976;83:434-7.

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