RESULTS

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Statistical analysis was done for all the parameters undertaken in study along with some investigative parameters. The results are depicted in tabular form and explanation for each table is given in textual form. Table shows the mean, SD and range obtained for various parameters of the control, first trimester, second trimester and third trimester subjects also mentioned as early, mid and late pregnancy in the text. The figures of the range have been rounded off and trimesters are abbreviated as first, second and third respectively in tables. Percentage difference (% diff) for increase or decrease in any parameter was calculated considering the mean values of controls (nonpregnant subjects) as baseline when compared with the experimental group (three trimester groups). On comparing first trimester versus second trimester and third trimester, mean values of first trimester were taken as baseline. Second trimester mean values were considered 100% when this group was compared with third trimester group. The positive value in percent difference depicts the increase and negative value as the decrease for that parameter

Student s unpaired 't' test was done to find the level of significance as the sample was randomly selected, data is quantitative, variables follow normal distribution, samples in

each group is less than hundred and subjects for each group were different. This was done to find that at what level of significance are the changes occurring in various respiratory parameters and to find that changes in parameters were significant or insignificant when different states of pregnancy were compared with each other and with the non pregnant state.

The calculated 't' values and corresponding 'P' values are given for various sample groups for all the respiratory parameters. 't' values under different probabilities 0.1, 0.05 (5 percent level), 0.025 (2.5 percent level), 0.01 (1 percent level), 0.005 (0.5 percent level) and 0.001 (0.1 percent level) corresponding to degree of freedom (78) were seen from the table. Probability (P) is stated as the level of significance. 'P' value less than 0.001** and 0.005** were considered to be highly significant, less than 0.01*, 0.025* and 0.05* to be less significant and less than 0.1* as least significant. NS is abbreviation of non-significance or insignificant in the tables.

Graphical representation for the studied respiratory and calculated parameters given on the facing page of each parameter table shows the mean values to infer the findings at a glance.

Graph 1 showing respiratory rate per minute.

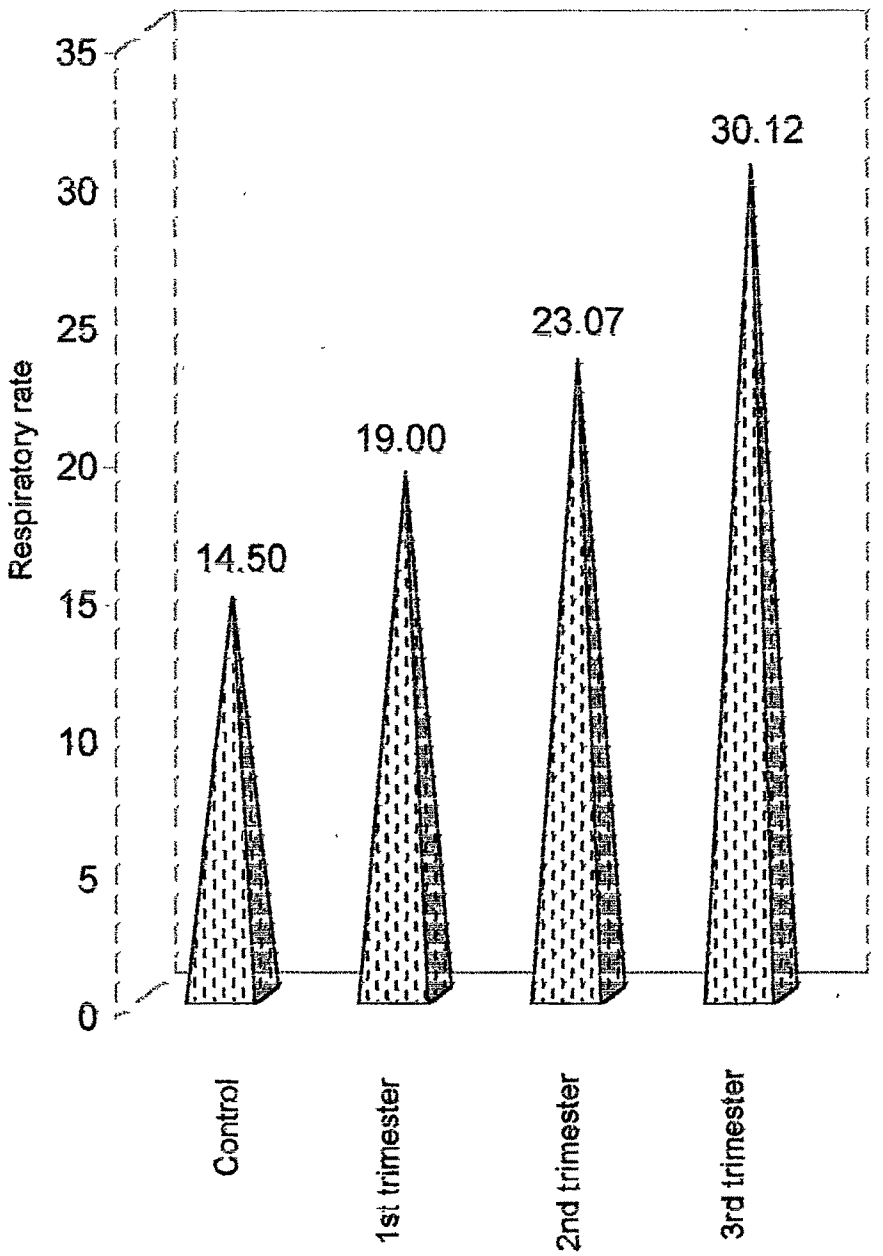

Table 1 showing statistical analysis of f (breaths / min).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	14.50 19 00	2 61 2 46	11 – 22 16 – 24	31.03	7.90	<0.001 **
Control vs Second	14 50 23.08	2 61 3 92	15 – 30	59 13	5.55	<0.001 **
Control vs Third	14 50 30 13	2 61 1 86	25 – 32	107 75	10 26	<0 001 **
First vs Second	19.00 23.08	2 48 3 92		21 44	11.50	<0.001 **
First vs Third	19 00 30 13	2 48 1 86		58 55	22.70	<0.001 **
Second vs Third	23 08 30 13	3 92 1 86		30 55	30.80	<0 001 **

The respiratory rate increases as the pregnancy advances The sample group results on comparison with each other showed the increase in respiratory rate being highly significant at 0 001 level The respiratory rate being minimal in control 14.50 breaths/min and gradually increases during gestation, reaching maximum 30 13 breaths/min in third trimester. This is almost 107 75 % increase than the normal respiratory rate of control subjects During pregnancy there is an average increase of 9 57 breaths/min i.e 66%

Graph 2 showing the mean tidal volume of the

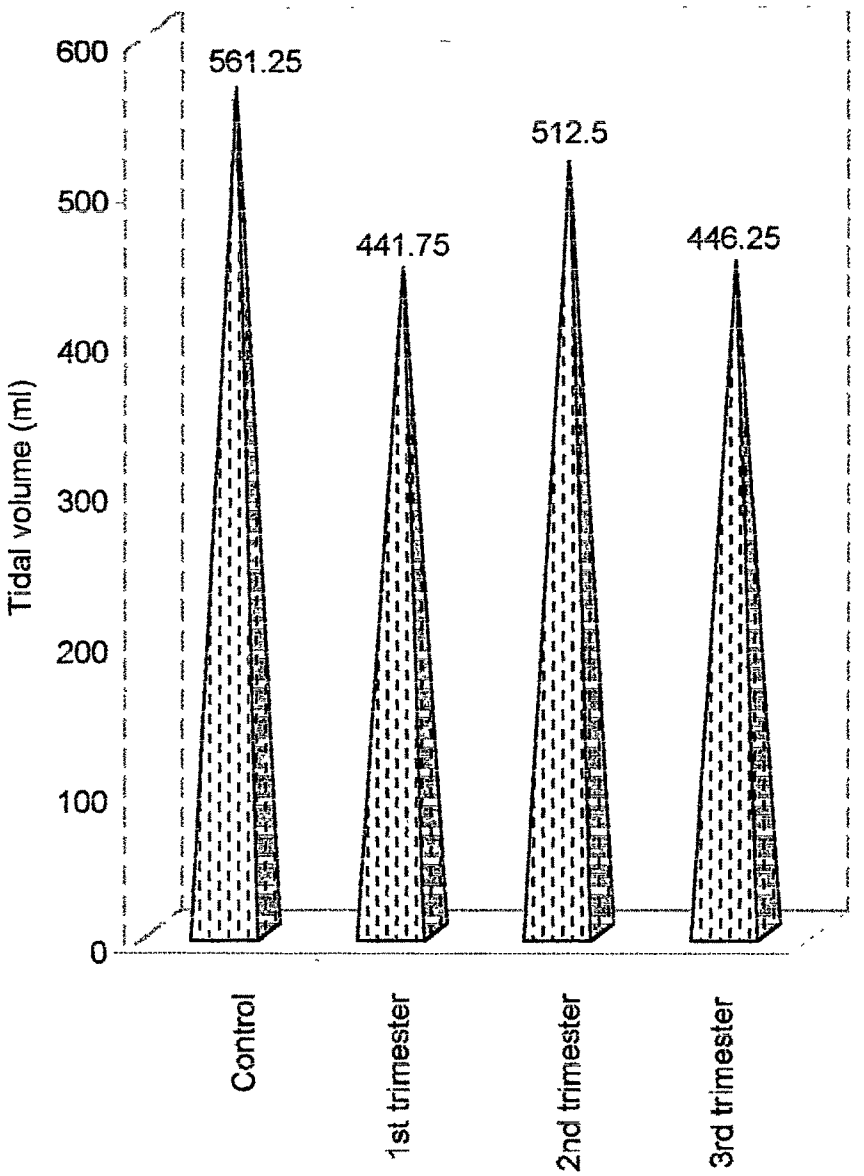

Table 2 showing statistical analysis for tidal volume (ml).

Sample	Mean	SD	Range	% diff.	't' value	P value
Control	561.25	±108.89	350–800	- 29.29	5 80	< 0.001
vs First	441.75	±71 28	300–600			**
Control vs	561 25	±108 89		- 8.68	2.04	< 0.05
Second	512.50	±104.24	400–900			*
Control	561 25	±108 89		- 20 49	5 91	< 0 001
vs Third	446.25	±57 05	350–550			**
First vs	441.75	±71.28		16 01	3 54	< 0.001
Second	512 50	±104 24				**
First vs	441.75	±71.28		1.01	0 31	N S
Third	446 25	±57 05				
Second vs	512 50	±104 24		- 12 92	3.52	< 0 001
Third	445.25	±57.05				**

Tidal volume shows fall and rise alternatively during pregnancy There is highly significant fall from control to first trimester and from second to third trimester. Rise in tidal volume from first to second trimester is also found to be highly significant On comparison it was seen that a rise in tidal volume from first to third trimester is insignificant and the difference in the mean is only 3 50 ml, while the difference of 48.75 ml is seen in control vs second trimester that is less significant From the values it can be said that tidal volume is less during any stage of pregnancy as compared to control subjects Average TV during pregnancy was found to be 466 83ml a decrease of 94.41 ml (16.82%) from nonpregnant state.

Graph 3 showing mean values of RMV.

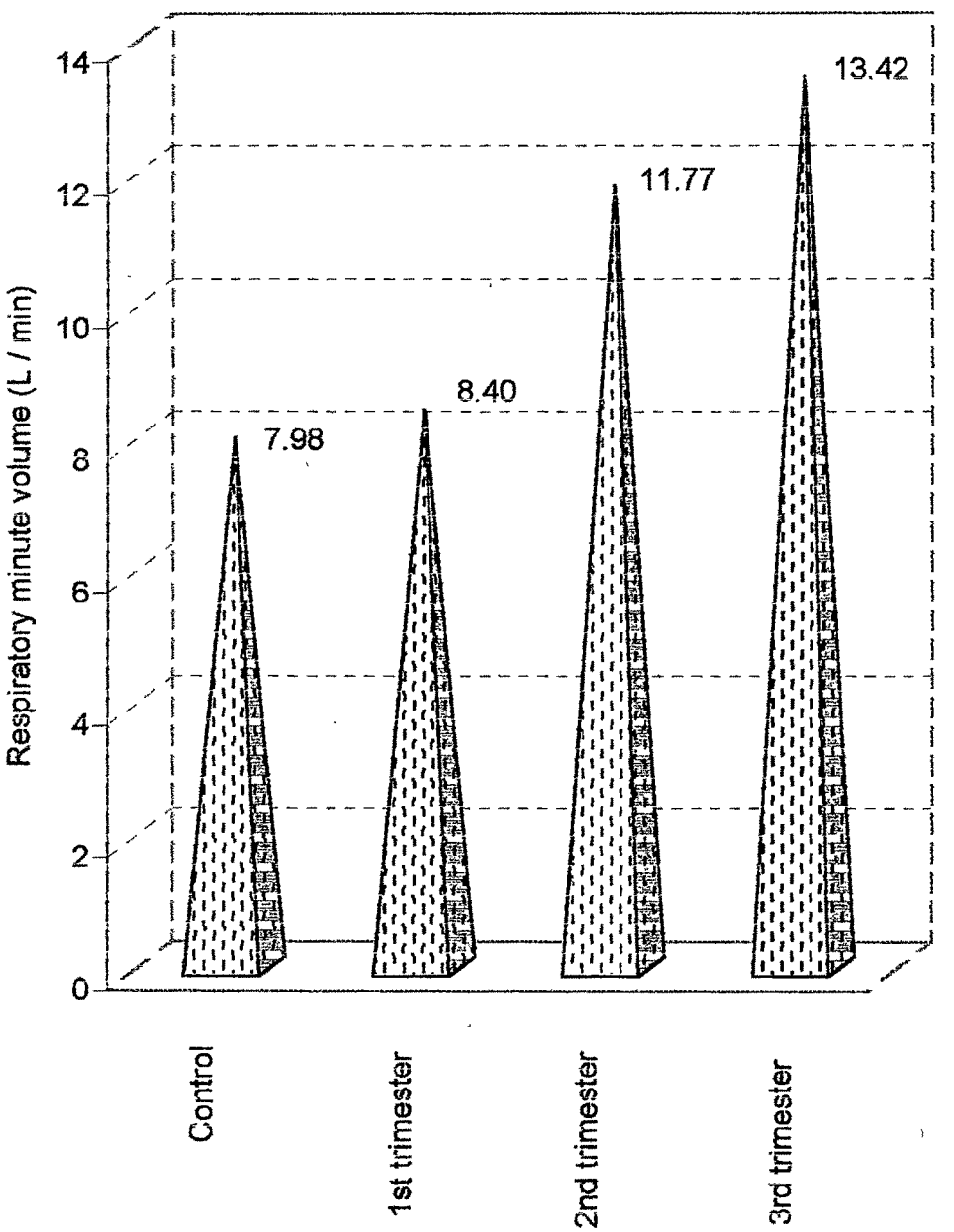

Table 3 showing statistical analysis for RMV (liters/minute).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	7.98 8.40	1.33 1.86	5.6-11.0 5.4-13.0	05.18	1.14	N S
Control vs Second	7.98 11 77	1.33 2.90	6 8-21.6	47.47	7.51	<0.001 **
Control vs Third	7:98 13.42	1.33 1.72	9.8-16.5	68.08	15.79	<0.001 **
First vs Second	8.40 11.77	1.86 2.90		40.21	6.20	<0.001 **
First vs Third	8.40 13.42	1.86 1.72		59.80	12.55	<0.001 **
Second vs Third	11.77 13.42	2.90 1.72		13.97	3.08	<0.005 **

Respiratory minute volume increases during pregnancy as compared to control subjects. The increase in respiratory minute volume is insignificant in first trimester from the non-pregnant state while in second trimester and third trimester it is highly significant at 0.001 level. The increase when compared within the three trimester subjects was also found to be highly significant at 0.001 or 0.005 level

Graph 4 showing mean values of ERV.

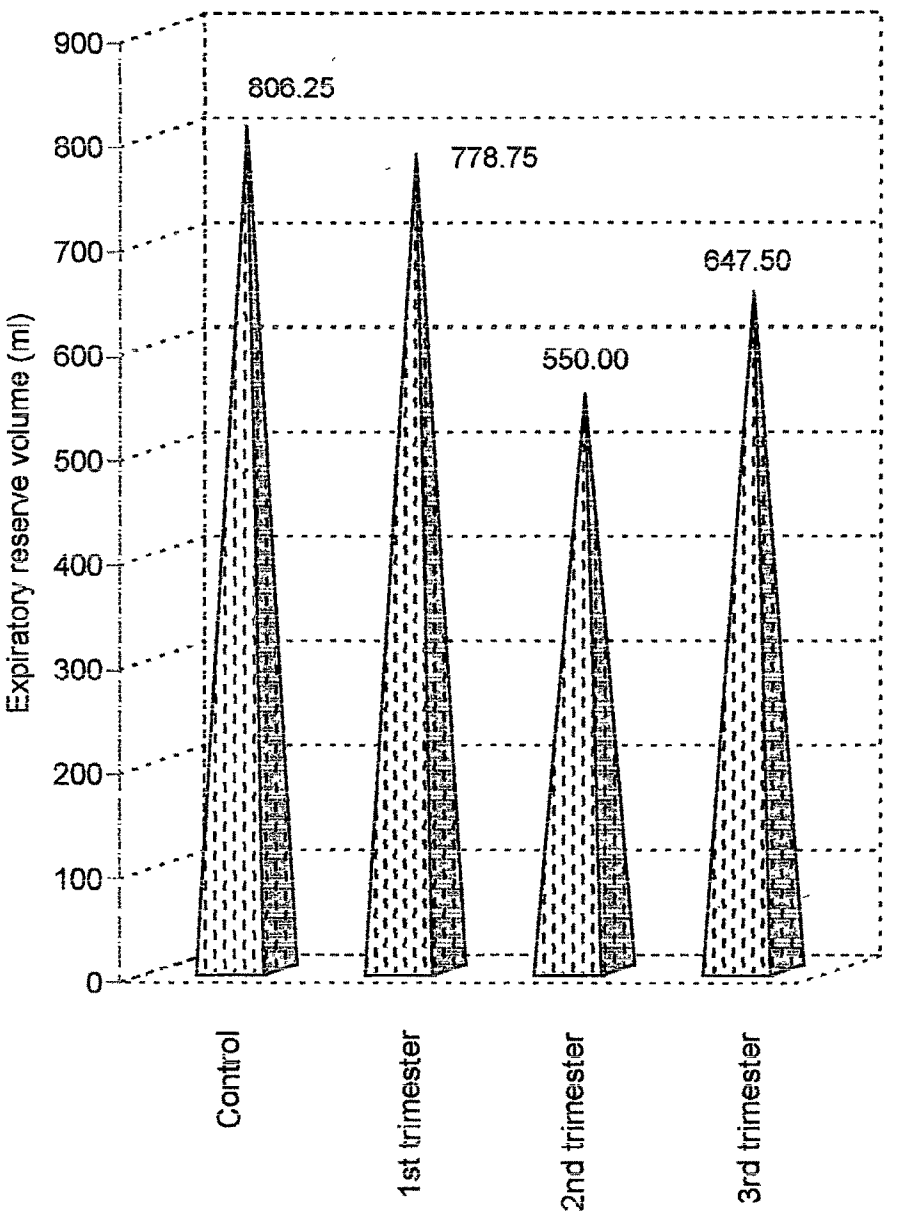

Table 4 showing statistical analysis for ERV (ml).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	806.25	146.40	550–1200	- 8.41	0.63	N S
vs First	778.75	232.02	400–1400			
Control vs	806.25	146.40		- 31.78	6.27	< 0.001
Second	550.00	212.74	200–1100			**
Control	806 25	146 40		-19.68	3.76	< 0 001
vs Third	647.50	223.31	400–1400			**
First vs	778.75	232.02		-29 37	4.59	< 0.001
Second	550.00	212.74				**
First vs	778.75	232.02		-16.85	2.57	< 0.02 *
Third	647.50	223.31				
Second vs	550 00	212.74		17.72	1.99	< 0.05 *
Third	647.50	223.31				

Above table shows that ERV in non-pregnant subjects is higher than in pregnant subjects. It also shows that ERV decreases up-to mid-pregnancy but in late pregnancy it increases to some extent only by 97.5 ml.

When compared with control the decrease by 27.50 ml in early pregnancy i e. first trimester is insignificant, while that in mid-pregnancy and late pregnancy i e second and third trimester is highly significant. Highly significant decline in ERV is further seen from first to second trimester. The increase in late pregnancy as compared to mid-pregnancy and decrease as compared with first trimester is less significant.

Graph 5 showing the mean IRV.

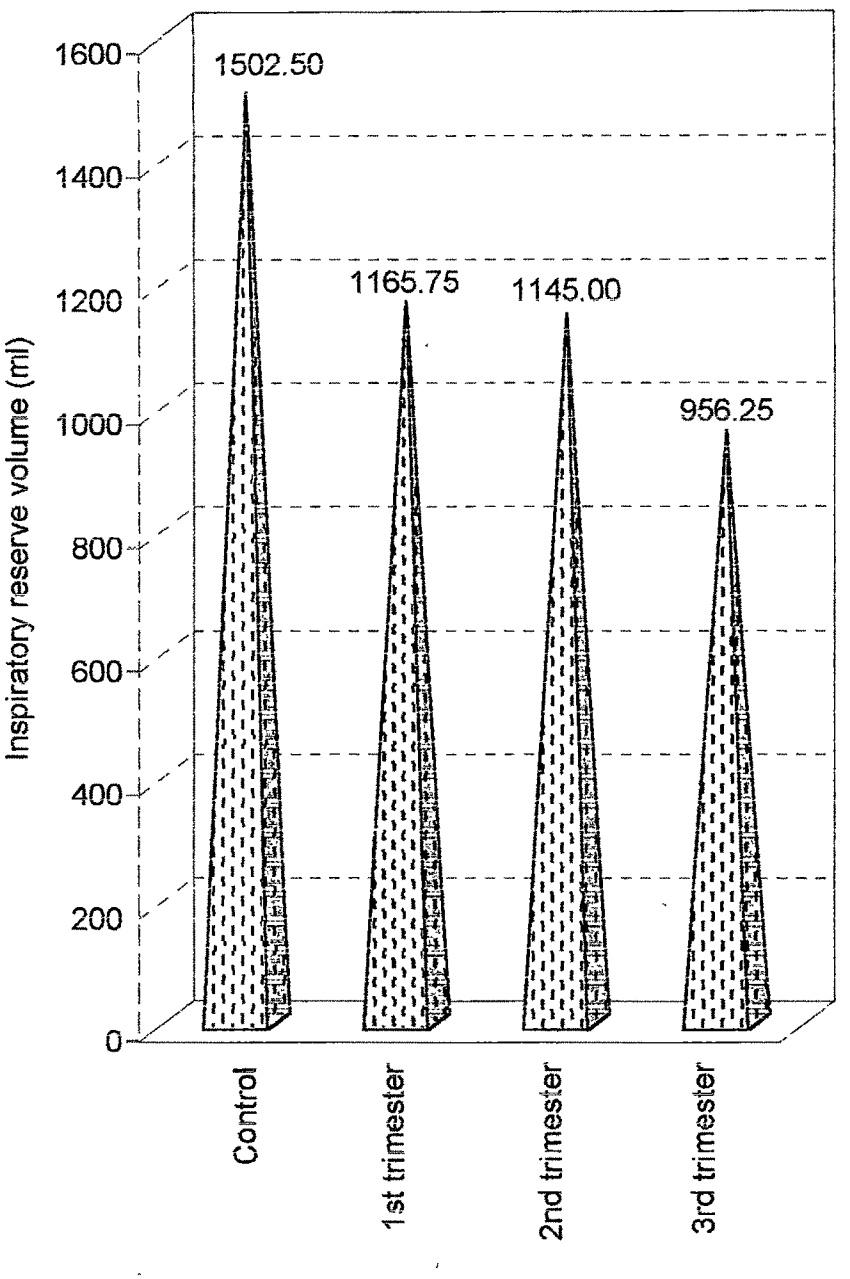

Table 5 showing statistical analysis for IRV (ml).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control	1502.50	274.78	1000–2200	- 22.41	5.81	< 0.001
vs First	1165.75	242.32	700–1560			**
Control vs	1502.50	274.78		- 23.79	5.10	< 0.001
Second	1145.00	347.85	600–1900			**
Control	1502.50	274.78		- 36.35	8.81	< 0.001
vs Third	956.25	279.24	350–1550			**
First vs	1165.75	242.32		- 1.77	0.30	N S
Second	1145.00	347.85				
First vs	1165.75	242.32		- 17.97	3.58	< 0.001
Third	956.25	279.24				**
Second vs	1145.00	347.85		- 16.48	2.67	< 0.01 *
Third	956.25	279.24				

On observing mean values, inspiratory reserve volume is seen to be decreasing with advancing pregnancy and the least volume being in third trimester. The difference between the first and second trimester is only of 20.75 ml and is statistically insignificant while that of second and third trimester is 188.75 ml and is statistically less significant. On comparing control with three trimesters the fall in IRV is observed to be highly significant. The same was observed between first trimester and third trimester. Total percentage fall from nonpregnant to pregnant was 27.52%.

Graph 6 showing mean values of IC(ml).

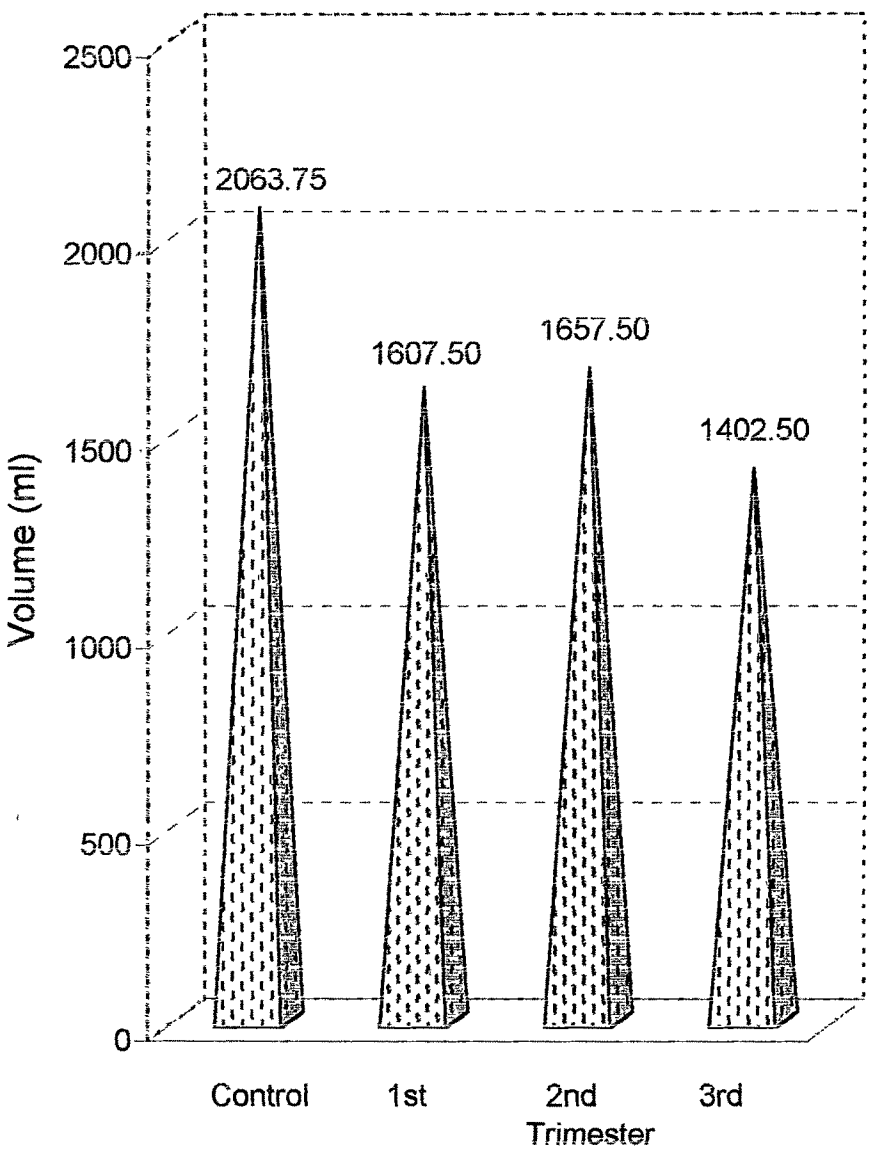

Table 6 showing statistical analysis for IC (ml).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control	2063.75	277.58	1350–2700	- 20.10	8.07	< 0.001
vs First	1607.50	225.12	1200–2100			**
Control vs	2063.75	277.58		- 19.68	5.54	< 0.001
Second	1657.50	370.65	1000–2400			**
Control	2063 75	277 58		- 32.04	10.14	< 0.001
vs Third	1402.50	304.86	700–2000			**
First vs	1607.50	225.12		3.11	0.72	N S
Second	1657.50	370.65				
First vs	1607.50	225.12		- 12.75	3.42	< 0.001
Third	1402.50	304.86				**
Second vs	1657.50	370.65		- 15.38	3.36	< 0.005
Third	1402.50	304.86				**

From the table it can be inferred that there is highly significant fall in IC from beginning of pregnancy to the third trimester. On collating it was seen that fall from non-pregnant state to any trimester is highly significant. Highly significant fall was also observed from first to third (t value = 10.14) and from second to third trimester but fall from first to second trimester was insignificant. IC for control subjects was found to be maximal and for third trimester subjects it was minimal. Average IC during pregnancy was 1555.83 ml showing fall of 507.92 ml from nonpregnant state

Graph 7 showing mean values of VC.

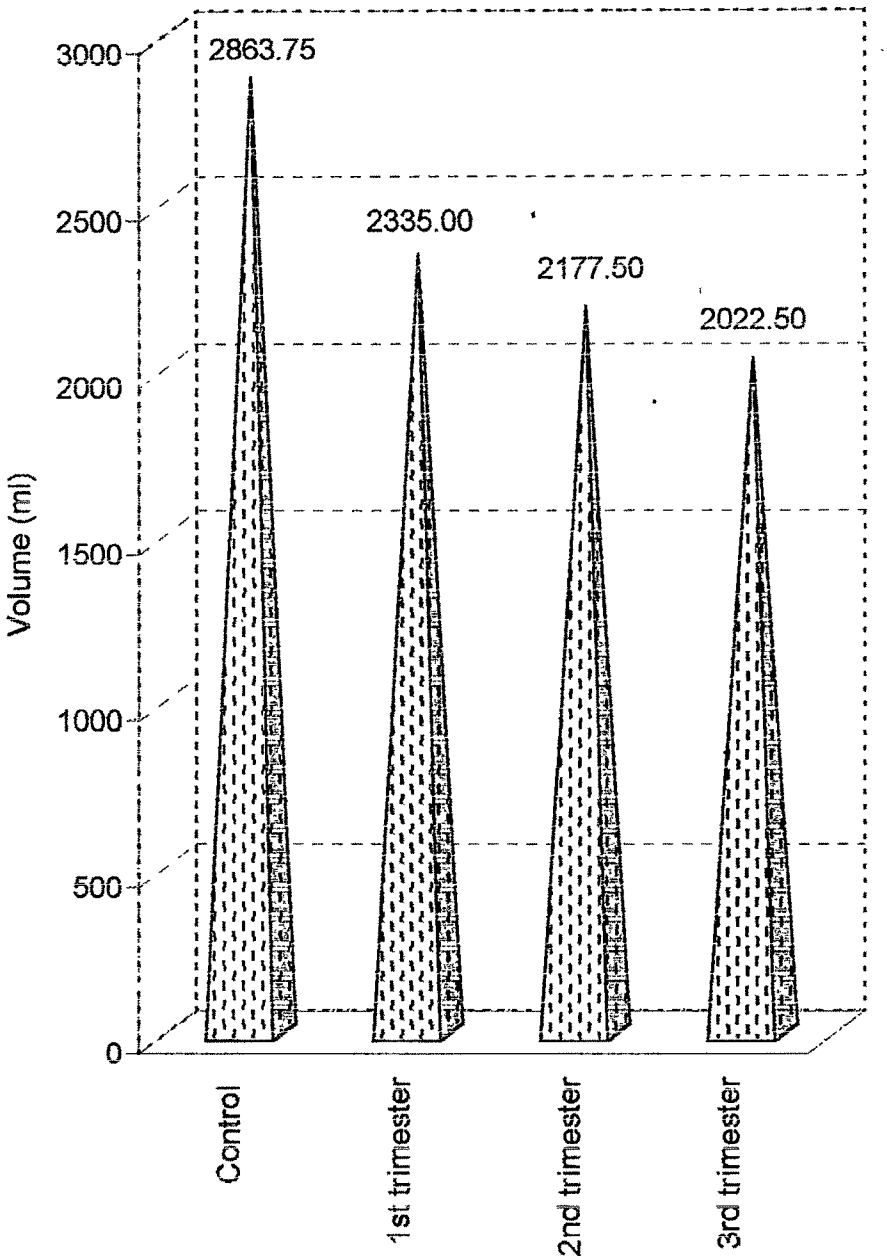

Table 7 showing statistical analysis for VC (ml).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	2863.75 2335.00	309.88 354.31	2100–3700 1700–3000	- 18.46	7.10	< 0.001 **
Control vs Second	2863.75 2177.50	309.88 410.59	1500–3000	- 23.96	8.43	< 0.001 **
Control vs Third	2863 75 2022.50	309 88 397.10	1100–2900	- 29.37	10.56	< 0 001 **
First vs Second	2335.00 2177.50	354.31 410.59		- 6.74	1.83	< 0.1*
First vs Third	2335.00 2022.50	354.31 397.10		- 13.38	3.71	< 0.001 **
Second vs Third	2177.50 2022.50	410.59 397.10		- 7.11	1.71	< 0.01 *

Highly significant decrease in vital capacity is found during the course of pregnancy when compared with the control subjects. As usual the vital capacity of control sample is more than experimental sample. Decrease in vital capacity from first trimester to second trimester and from second trimester to third trimester is less significant while decrease from first trimester to third trimester is highly significant.

The decrease of 685.42 ml was observed in pregnancy as compared to controls. Average VC was 2178.33 in pregnancy.

Graph 8 showing mean values of MVV in various groups

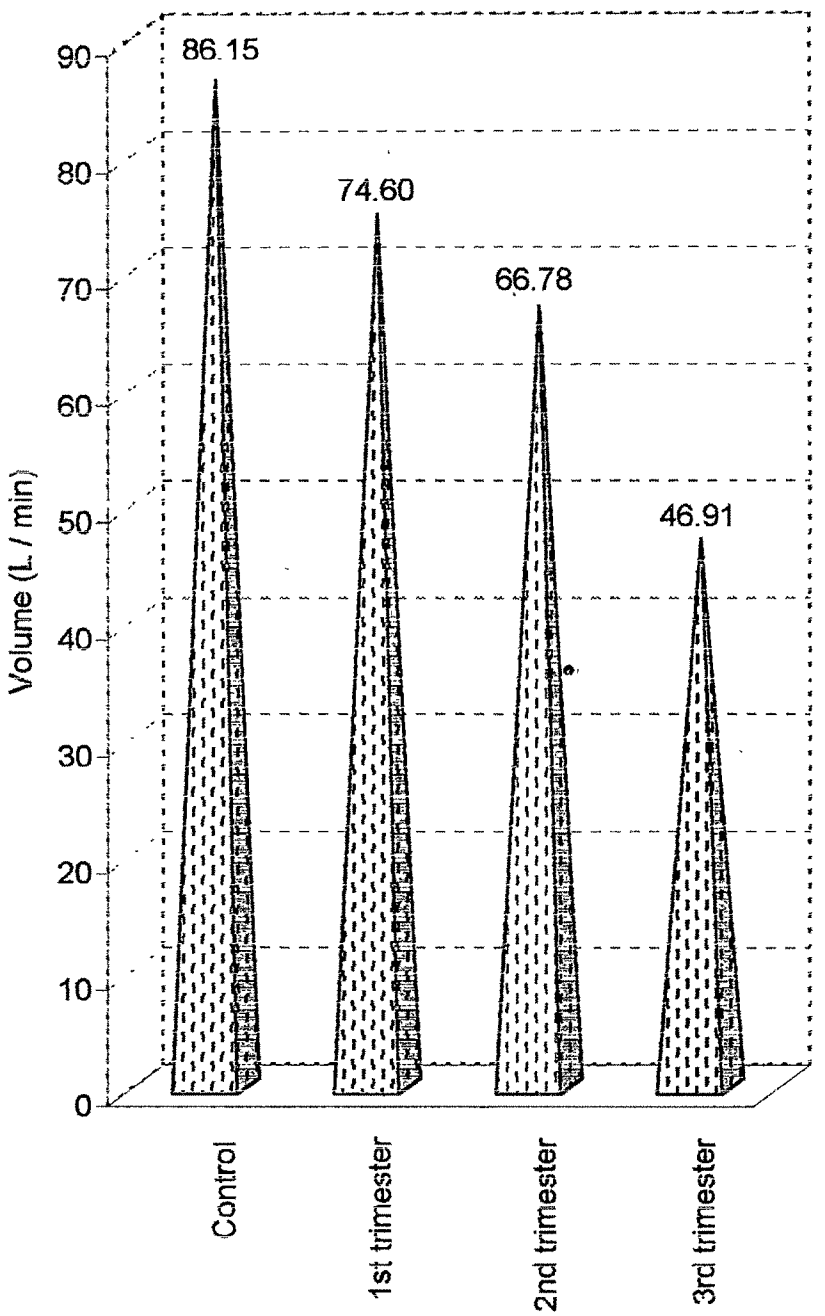

Table 8 showing statistical analysis for MVV (liters/minute).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	86.15 74 60	11.38 9.07	60–98 46–85	- 13.40	5.01	< 0.001 **
Control vs Second	86.15 66.78	11.38 11.16	46–88	- 22.47	7.68	< 0.001 **
Control vs Third	86 15 46.91	11 38 6.31	27–55	- 45 54	19.06	< 0 001 **
First vs Second	74.60 66.78	9.07 11.16		- 10.48	3.43	< 0.001 **
First vs Third	74.60 46.91	9.07 6 31		- 37.11	15.85	< 0.001 **
Second vs Third	66.78 46.91	11.16 6.31		- 29.75	9.80	< 0.001 **

Mean values in the table clearly depict that maximum voluntary ventilation per minute decreases to a great extent in experimental groups when compared with control group. Not only that it also decreases during the tenure of pregnancy. This is obvious from the high 't' values showing highly significant decrease in maximum voluntary ventilation. Maximum voluntary ventilation is decrease by almost half 39.24 L/min that is by 45.54% in late pregnancy as compared to non-pregnant state and by one-third 27.69 L/min that is 22.47% as compared to second trimester. MVV decreases by 37.11% from early to late pregnancy.

Graph 9 shows mean values of RR

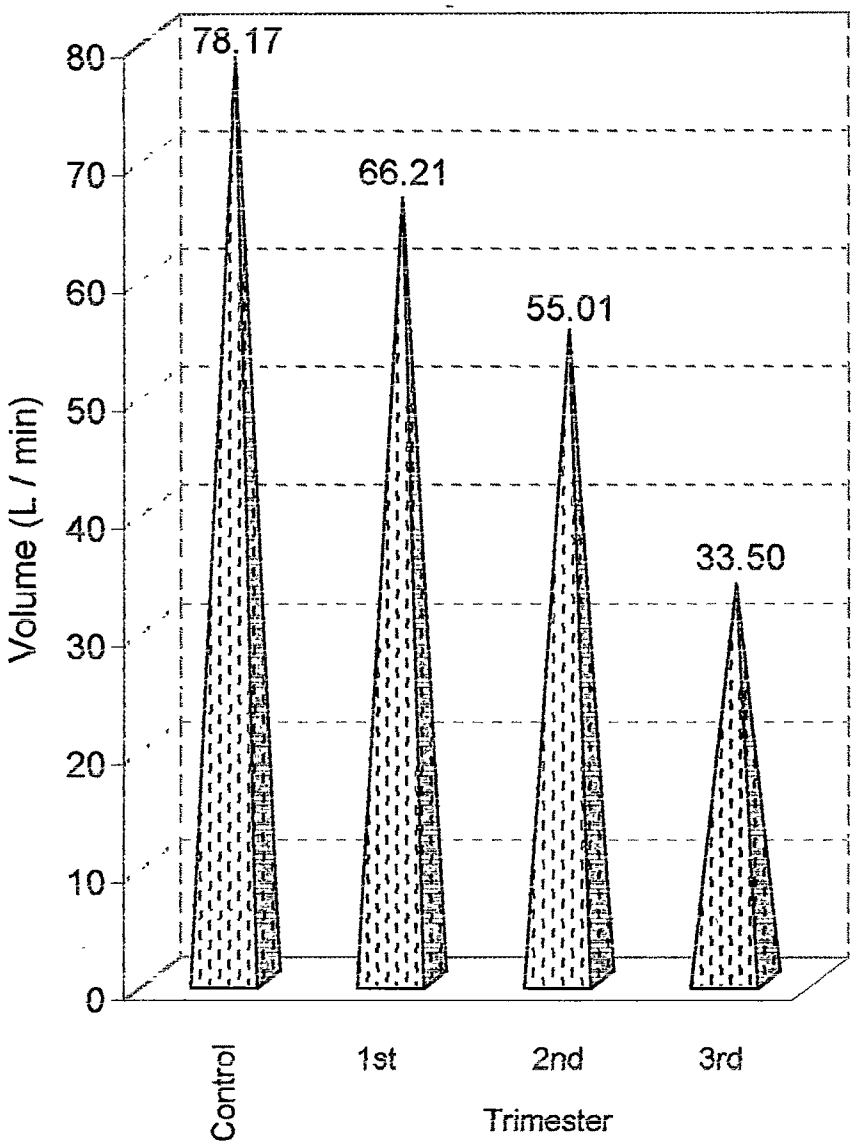

Table 9 showing statistical analysis for RR (liters/minute).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	78.17 66.21	11.57 10.12	51–91 35–80	- 5.29	4.92	< 0.001 **
Control vs Second	78.17 55.01	11.57 11.14	30–78	- 29.62	9.11	< 0.001 **
Control vs Third	78.17 33.50	11.57 6.08	16–43	- 57.14	21.62	< 0.001 **
First vs Second	66.21 55.01	10.12 11.14		- 16.91	4.70	< 0.001 **
First vs Third	66.21 33.50	10.12 6.08		- 49.40	17.52	< 0.001 **
Second vs Third	55.01 33.50	11.14 6.08		- 39.11	10.71	< 0.001 **

Mean values in the table show continuous fall in respiratory reserve during pregnancy as well as when compared with control subjects. Respiratory reserve falls by 57.14% in third trimester as compared to control. This was seen to be maximum fall and is equal to 44.67 L/min. Minimum fall was found between first trimester and second trimester that is 11.20 L/min. The decrease in respiratory reserve throughout was found to be highly significant when values were compared among the groups in sample. Least decline of 10.91% was noted from early pregnancy to mid pregnancy with a rise of 39.11% from mid pregnancy to late pregnancy.

Graph 10 shows mean of BRR.

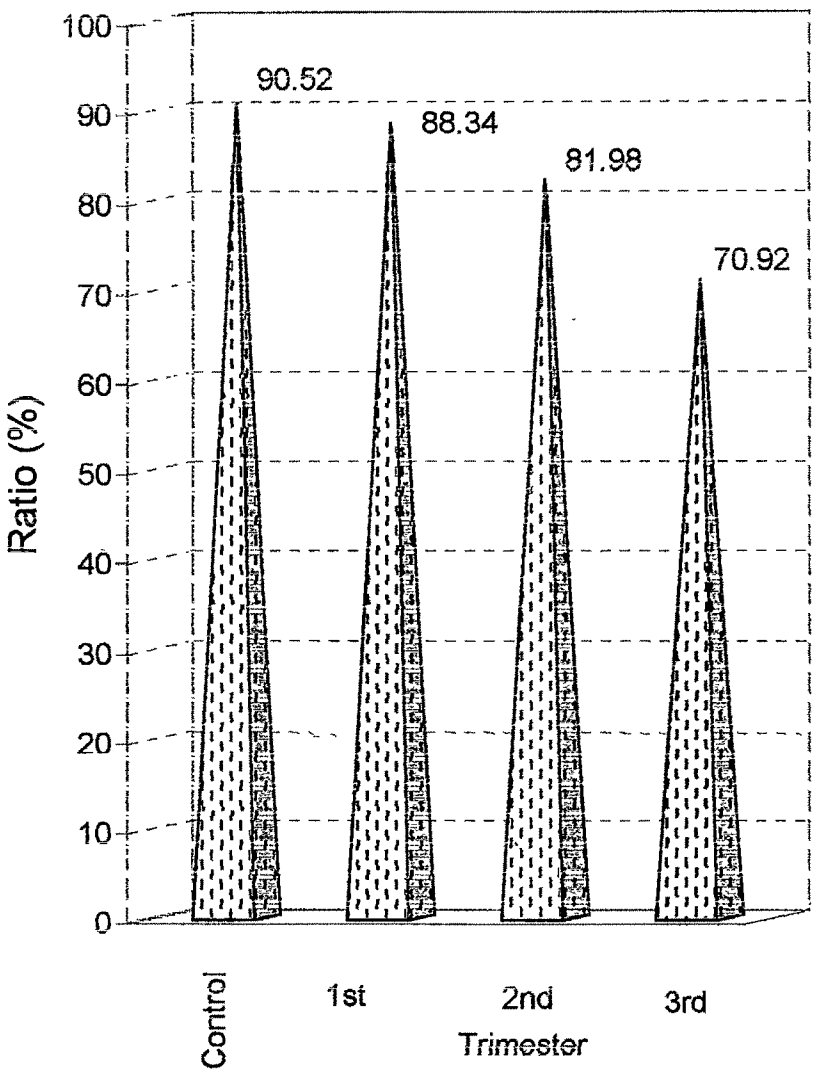

Table 10 showing statistical analysis for BRR.

Sample	Mean	SD(±)	Range	% diff	't' value	P value
Control vs First	90.52 88.34	2.37 4.05	83 – 94 77 – 94	- 02.40	2.93	< 0.005 **
Control vs Second	90.52 81.98	2.37 5.44	63 – 89	- 09.43	9.10	< 0.001 **
Control vs Third	90.52 70.92	2.37 5.07	58 – 78	- 21.65	22.14	< 0.001 **
First vs Second	88.34 81.98	4.05 5.44		-07.20	5.93	< 0.001 **
First vs Third	88.34 70.92	4.05 5.07		- 19.72	16.97	< 0.001 **
Second vs Third	81.98 70.92	5.44 5.07		- 13.49	9.40	< 0.001 **

Breathing reserve ratio was found to be decreasing in same way as respiratory reserve. Table illustrates the decrease during all three trimesters of pregnancy as compared to control and within trimesters. The decrease was found to be highly significant on comparing the mean values of BRR among the four groups. Maximum fall was observed between control and third trimester by 21.65% while minimum fall was seen to occur between control and first trimester by 2.4%.

Graph 11 showing mean values of FEVC.

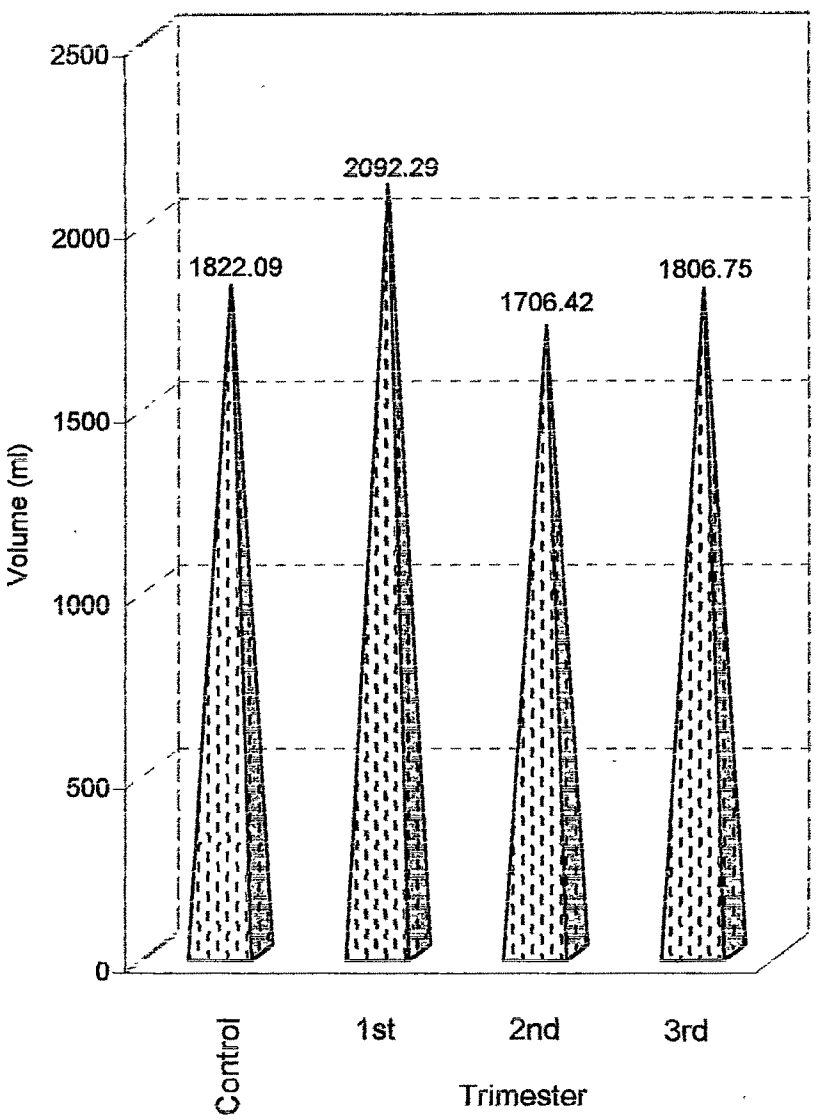

Table 11 showing statistical analysis for FEVC (ml).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	1822.09 2092.29	572.81 536.27	1024–3341 1219–2927	14.82	2.17	< 0.05 *
Control vs Second	1822.09 1706.42	572.81 476.99	878–2683	- 6.34	0.98	N S
Control vs Third	1822.09 1806.75	572.81 506.04	1024–3220	- 0.84	0.12	N S
First vs Second	2092.29 1706.42	536.27 476.99		- 18.44	3.40	< 0.005 **
First vs Third	2092.29 1806.75	536.27 506.04		- 13.64	2.44	< 0.02 *
Second vs Third	1706.42 1806.75	476.99 506.04		5.87	0.91	N S

Decrease in FEVC is highly significant from first trimester to second trimester while less significant from first to third trimester. Fall in FEVC when compared between control versus second trimester and third trimester and a rise from second trimester to third trimester is found to be statistically insignificant. FEVC also shows fluctuations during the pregnancy. The capacity decreases initially that is from first to second trimester and later increases from second to third trimester but increase is not more than the first trimester value. It is seen that there is very little difference between the mean values of FEVC of control and third trimester subjects and it is 15.34 ml. there is a rise of 270.2 ml from control to first trimester.

Graph 12 showing mean values of F E $V_{0.75}$ %

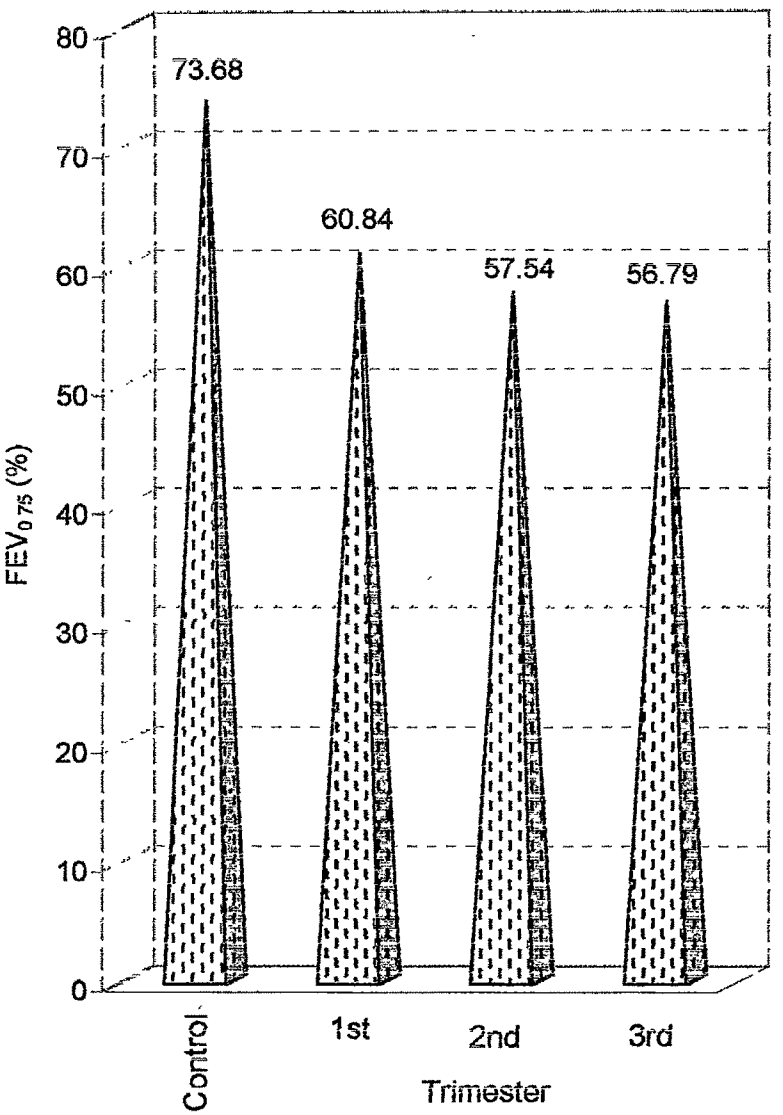

Table 12 showing statistical analysis for $FEV_{0.75}$%

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	73.68 60.84	12.94 19.07	52–97 17–94	- 17.43	3.52	< 0.001 **
Control vs Second	73.68 57.54	12.94 18.14	23–85	- 21.91	4.58	< 0.001 **
Control vs Third	73.68 56.79	12.94 22.69	18–97	- 22.92	4.09	< 0.001 **
First vs Second	60.84 57.54	19.07 18.14		- 05.42	0.79	N S
First vs Third	60.84 56.79	19.07 22.69		- 06.66	0.86	N S
Second vs Third	57.54 56.79	18.14 22.69		- 01.30	0.16	N S

From the mean values it can be said that percent of expired air in 0.75 sec decreases throughout the pregnancy as compared to non-pregnant state. This shows that control subjects are able to expire almost 74 % of total volume in 0.75 sec while during pregnancy the subjects are able to expire only 61 % to 56 % as the pregnancy advances. There was highly significant decrease observed in forced expiratory volume in 0.75 sec when its percent value of control subjects were compared with first, second and third trimester subjects. The decrease during pregnancy in percentage of expired air in 0.75 sec when compared within the three trimesters was found to be insignificant.

Graph 13 showing mean values of F E $V_{1.00}$%

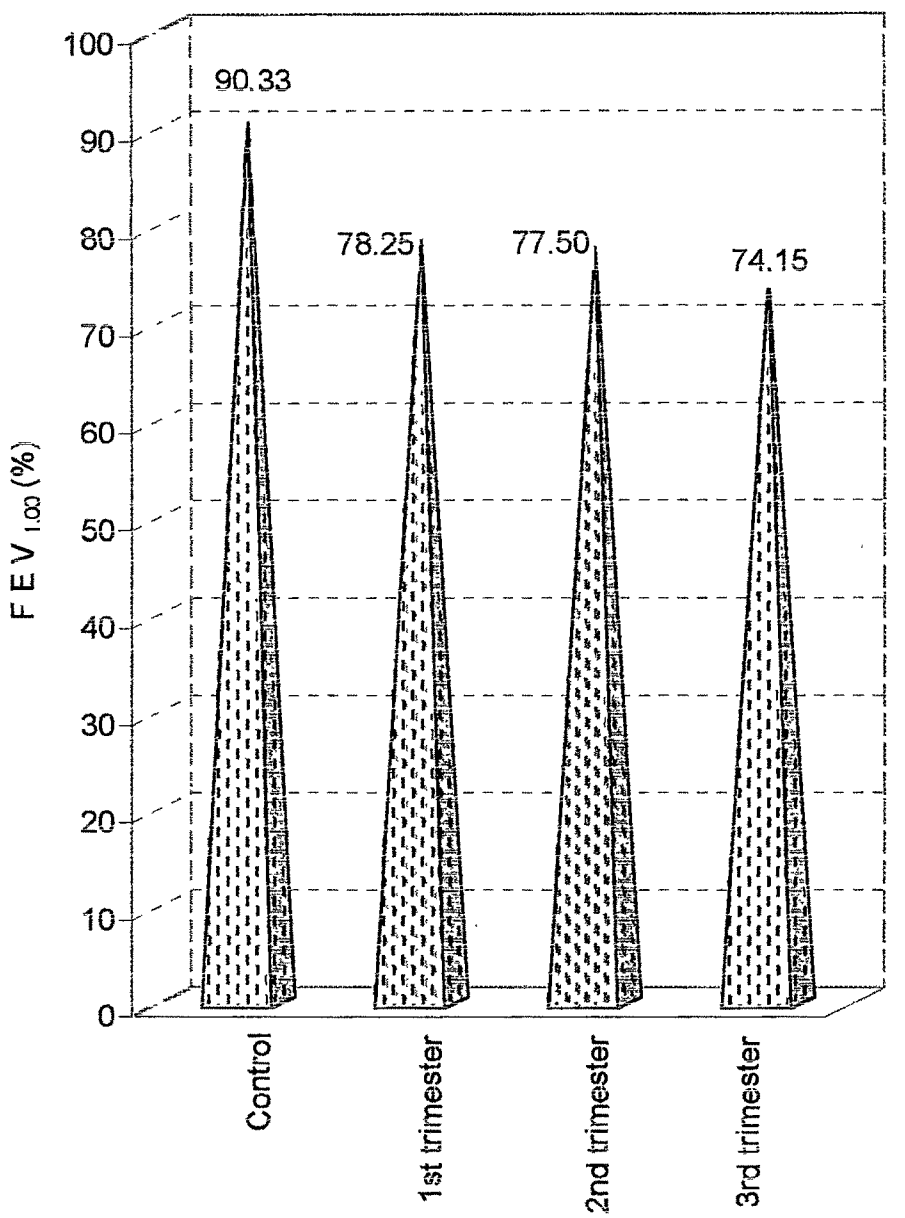

Table 13 showing statistical analysis for FEV $_{1.00}$ (%).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	90.33 78.25	8.44 17.64	74–100 31–100	- 13.37	3.90	< 0.001 **
Control vs Second	90.33 77.50	8.44 18.06	40–100	- 14.21	4.07	< 0.001 **
Control vs Third	90.33 74.15	8.44 21.43	26–100	-17.91	4.44	< 0.001 **
First vs Second	78.25 77.50	17.64 18.06		- 00.96	0.18	N S
First vs Third	78.25 74.15	17.64 21.43		- 05.24	0.93	N S
Second vs Third	77.50 74.15	18.06 21.43		- 04.32	0.75	N S

Changes in forced expiratory volume percent in 1.00 sec also show same pattern as that of FEV $_{0.75}$ %. Mean values suggest that control subjects can exhale almost 90 % of air in 1.00 sec while pregnant subjects were able to exhale less amount of air. The percent of exhaled air with advanced pregnancy declined from 78.25 % to 74.15 % with average being 76.63, a decline of 13.6. This parameter also showed highly significant decrease on comparison of controls with experimental group of any trimester. Decrease percentage of expired air within the trimesters on comparison was found to be insignificant.

Graph 14 showing the mean values of FIVC (ml) of the sample.

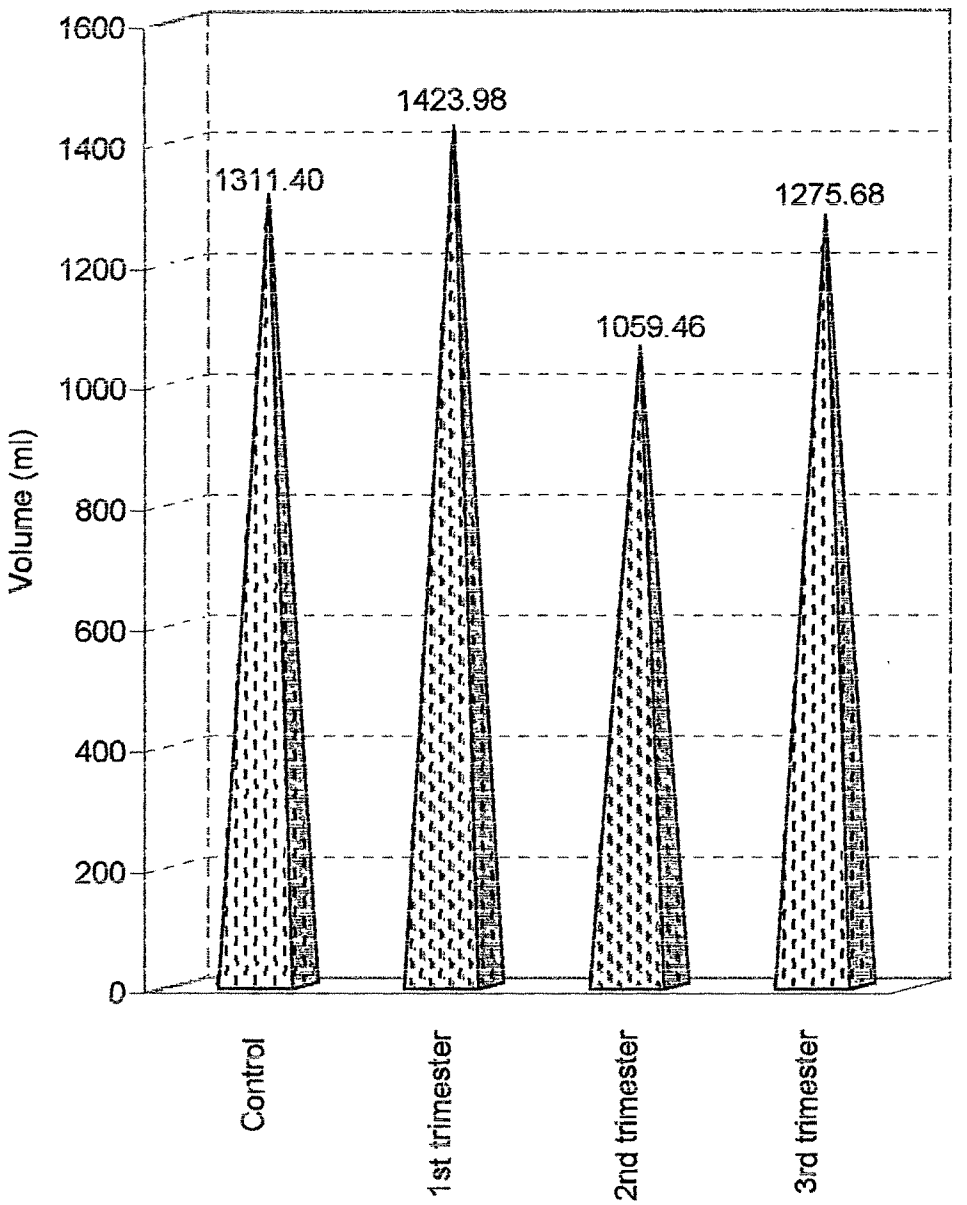

Table 14 showing statistical analysis for FIVC (ml).

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	1311.40 1423.98	458.07 379.87	610–2585 780–2439	8.58	1.19	N S
Control vs Second	1311.40 1059.46	458.07 275.56	610–1976	- 19.21	2.98	< 0.005 **
Control vs Third	1311.40 1275.68	458.07 282.24	804–1707	- 2.72	0.41	N S
First vs Second	1423.98 1059.46	379.87 275.56		- 25.59	4.91	< 0.001 **
First vs Third	1423.98 1275.68	379.87 282.24		- 10.41	1.98	< 0.1*
Second vs Third	1059.46 1275.68	275.56 282.24		20.40	3.46	< 0.001 **

It was observed that changes in forced inspiratory vital capacity follow the same pattern as that of forced expiratory vital capacity. It was more for first trimester subjects as compared to the control subjects. There was decrease in second trimester and again increase in forced inspiratory vital capacity was seen in third trimester but this rise was not same as that of in first trimester. Statistically insignificant changes were observed on comparing values of control with first trimester and third trimester subjects. Changes between first trimester and third trimester subjects are less significant while highly significant changes on comparing control with second trimester, first with second trimester and second with third trimester were observed.

Graph 15 showing mean values of F I $V_{0.75}$%

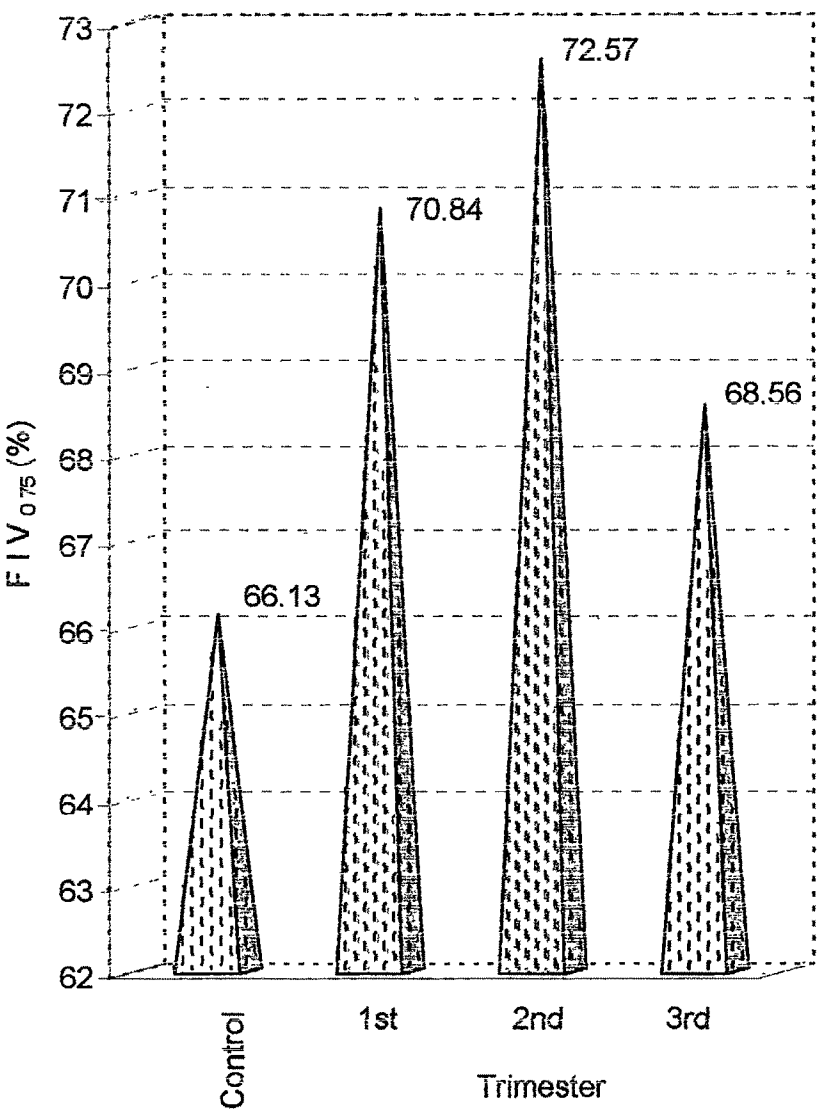

Table 15 showing statistical analysis for FIV $_{0.75}$ (%).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	66.13	16.05	36–100	07.12	1.16	N S
vs First	70.84	19.62	21–100			
Control vs	66.13	16.05		09.73	1.67	< 0.1*
Second	72.57	19.16	33–100			
Control	66.13	16.05		03.67	0.64	N S
vs Third	68.56	17.49	18–89			
First vs	70.84	19.62		02.43	0.39	N S
Second	72.57	19.16				
First vs	70.84	19.62		- 03.22	0.54	N S
Third	68.56	17.49				
Second	72.57	19.16		- 05.52	0.97	N S
vs Third	68.56	17.49				

Statistically non-significant rise of 4.74 % and 2.43 % in mean values of FIV $_{0.75}$ % from control to first trimester and from control to third trimester was observed respectively while less significant increase of 6.44 % in mean from non-pregnant to mid pregnant state (second trimester) was observed. The changes in FIV $_{0.75}$ % when compared within the experimental groups were found to be insignificant. This shows the percentage of inspired air increases slightly as the pregnancy advances but in late pregnancy that is third trimester it decreases slightly.

Graph 16 showing mean values of F I $V_{1.00}$%

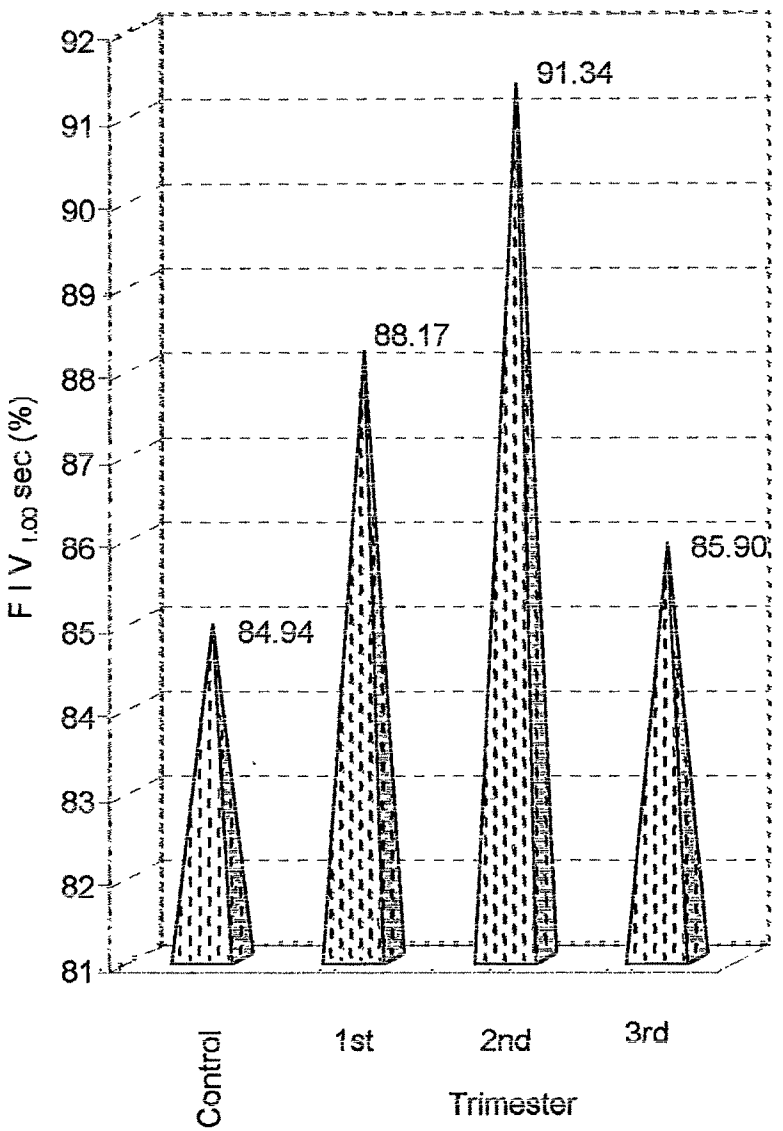

Table 16 showing statistical analysis for $FIV_{1.00}$%.

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control	84.94	12.84	57–100	03.80	1.09	N S
vs First	88.17	13.63	51–100			
Control vs	84.94	12.84		07.53	2.24	< 0.05
Second	91.34	12.66	60–100			*
Control	84.94	12.84		01.12	0.28	N S
vs Third	85.90	16.72	34–100			
First vs	88.17	13.63		03.59	1.07	N S
Second	91.34	12.66				
First vs	88.17	13.63		-02.58	0.66	N S
Third	85.90	16.72				
Second	91.34	12.66		-05.95	1.67	< 0.1*
vs Third	85.90	16.72				

Similar changes were seen in $FIV_{1.00}$% as were seen in $FIV_{0.75}$%. Insignificant rise of 3.23 in $FIV_{1.00}$% from control (84.94) to first trimester (88.17) and of 0.96 from control to third trimester (85.90) was observed while less significant increase of 6.40 from control to second trimester (91.34) was observed. The changes in $FIV_{1.00}$% when compared within the experimental groups were found to be insignificant except in second trimester and third trimester group. This shows the percentage of inspired air increases slightly as the pregnancy advances but in late pregnancy that is in third trimester it decreases at 0.1 level of significance.

Graph 17 showing statistical analysis of $FIV_{.75}/FEV_{.75}$ ratio.

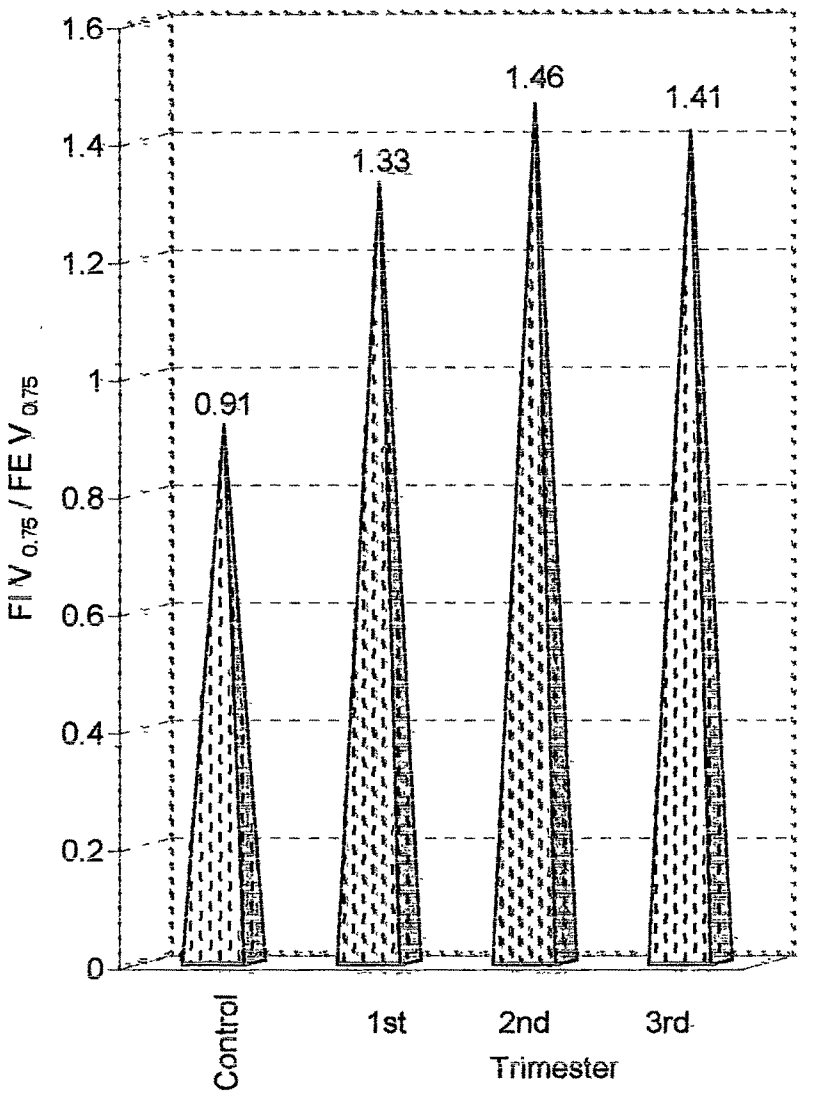

Table 17 showing statistical analysis for $FIV_{0.75}/FEV_{0.75}$

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	0.91 1.33	0.24 0.73	0.45–1.70 0.37–4.80	45.22	3.39	< 0.05 *
Control vs Second	0.91 1.46	0.24 0.90	0.49–4.39	59.72	3.70	< 0.001 **
Control vs Third	0.91 1.41	0.24 0.68	0.45–3.50	54.53	4.30	< 0.001 **
First vs Second	1.33 1.46	0.73 0.90		09.98	0.72	N S
First vs Third	1.33 1.41	0.73 0.68		06.41	0.53	N S
Second vs Third	1.46 1.41	0.90 0.68		-03.25	0.26	N S

Looking at mean values it was seen that ratio of $FIV_{0.75}$ / $FEV_{0.75}$ was more in three trimesters as compared to control. This slight increase was observed to be statistically significant. From the mean values it can be said that the ratio increases from first to second trimester and decreases in third trimester. The mentioned increase and decrease was found to be statistically insignificant within the trimesters.

Graph 18 showing mean values of F I V $_{1.00}$ / FEV $_{1.00}$ ratio.

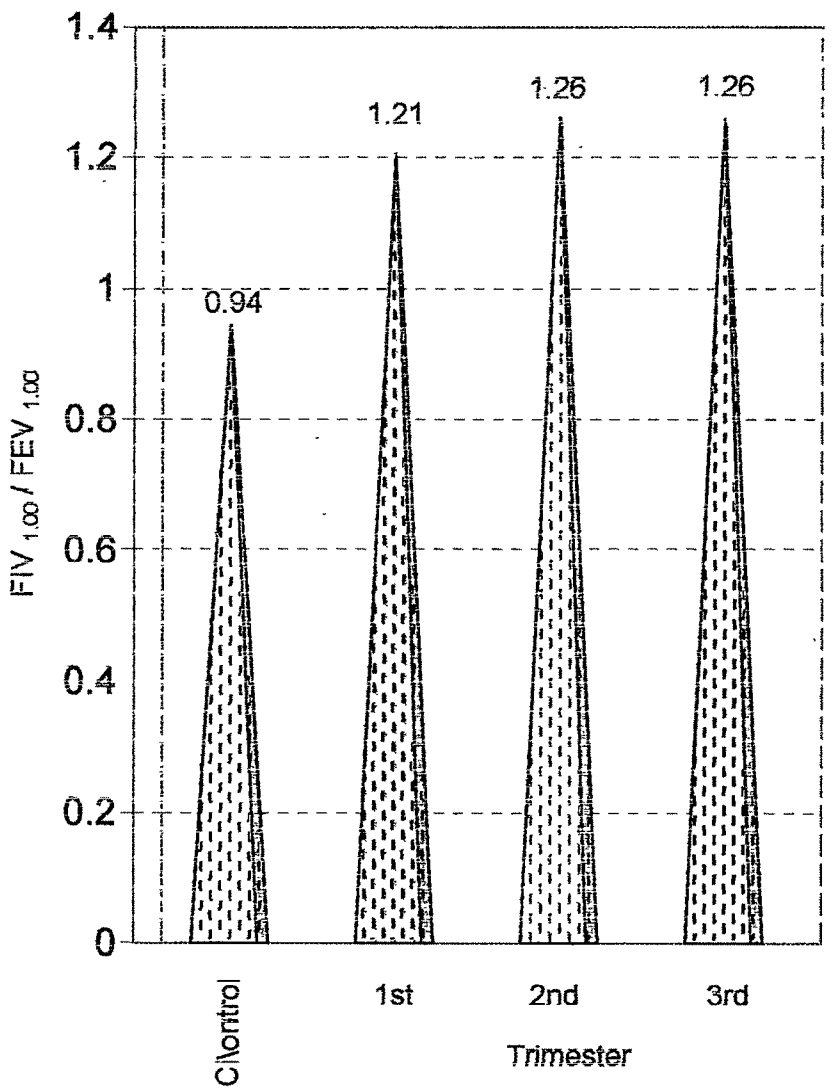

Table 18 showing statistical analysis for $FIV_{1.00}/FEV_{1.00}$

Sample	Mean	SD (±)	Range	% diff.	't' value	P value
Control vs First	0.94 1.21	0.14 0.41	0.60–1.20 0.62–2.80	27.71	3.80	< 0.001 **
Control vs Second	0.94 1.26	0.14 0.43	0.67–2.40	33.53	4.44	< 0.001 **
Control vs Third	0.94 1.26	0.14 0.43	0.58–2.50	33.23	4.37	< 0.001 **
First vs Second	1.21 1.26	0.41 0 43		04.55	0.58	N S
First vs Third	1.21 1.26	0.41 0.43		04.31	0.55	N S
Second vs Third	1.26 1.26	0.43 0.43		-00.22	0.02	N S

As compared to control subjects ratio of $FIV_{1.00}$ / $FEV_{1.00}$ in three trimesters was observed to be high as is seen from the mean values. This increase was observed to be statistically significant. From the mean values it can be said that the ratio increases from first to second trimester but is same in second and third trimester. The change in the ratio was found to be statistically insignificant within the trimesters.

Graph 19 showing the mean values of MEFR (lt./min)

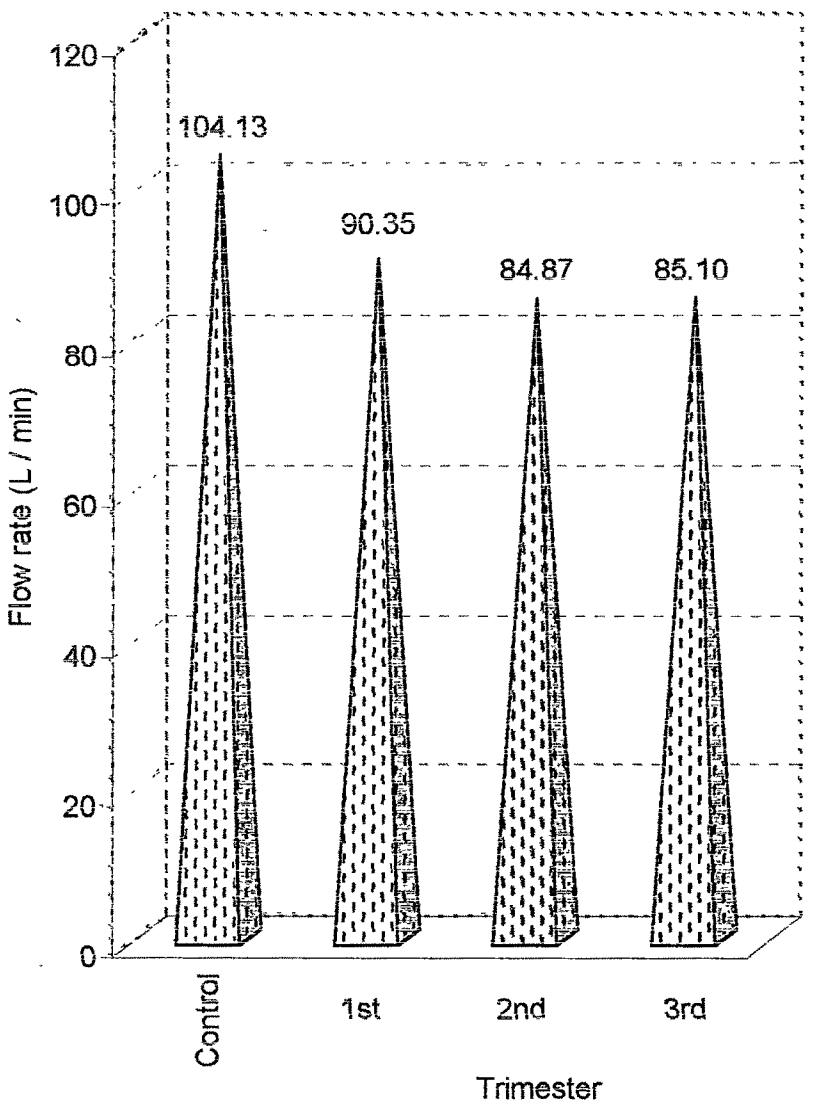

Table 19 showing statistical analysis for MEFR (liters/minute)

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	103.60 90.35	34.63 35.71	52–171 43–171	- 12.78	1.61	N S
Control vs Second	103.60 84.87	34.63 26.29	51–162	- 18.07	2.56	< 0.025 *
Control vs Third	103.60 85.10	34.63 24.55	42–136	- 17.85	2.59	< 0.025 *
First vs Second	90.35 84.87	35.71 26.29		- 06.06	0.78	N S
First vs Third	90.35 85.10	35.71 24.55		- 05.80	0.76	N S
Second vs Third	84.87 85.10	26.29 24.55		00.27	0.04	N S

Decrease in maximum expiratory flow rate was observed from non-pregnant control to different trimesters of pregnancy. The decline when compared between the control group and first trimester was found to be insignificant, while that between control versus second and control versus third trimester subjects was found to be less significant. Insignificant decrease (first trimester versus second trimester and first trimester versus third trimester) and increase (second trimester versus third trimester) in maximum expiratory flow rate was found within experimental groups.

Graph 20 showing mean values of MIFR (lt./min)

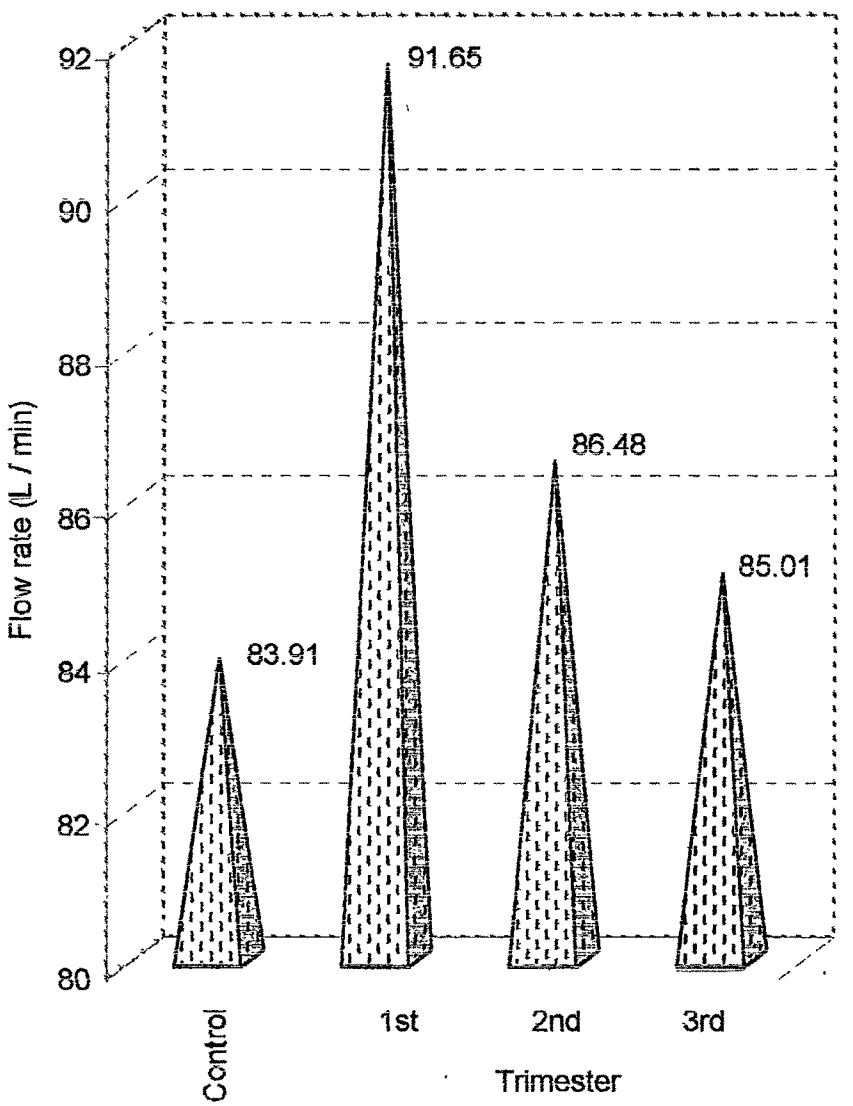

Table 20 showing statistical analysis for MIFR (liters/minute).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	83.91	27.02	37–171	09.22	1.36	N S
vs First	91.65	23.75	56–136			
Control vs	83.91	27.02		03.06	0.44	N S
Second	86.48	24.57	50–171			
Control	83.91	27.02		01.30	0.18	N S
vs Third	85.01	27.58	38–150			
First vs	91.65	23.75		-	0.95	N S
Second	86.48	24.57		-05.63		
First vs	91.65	23.75		-	1.16	N S
Third	85.01	27.58		-07.24		
Second	86.48	24.57		-	0.25	N S
vs Third	85.01	27.58		-01.70		

MIFR was seen to increase in pregnant state as compared to non-pregnant state. The increase in different trimesters when compared with controls was found to be non-significant. Moreover it was also seen that there is gradual decrease in MIFR with advancing pregnancy. The decrease in different trimesters on comparison was also found to be statistically insignificant.

Graph 21 showing mean values of ratio of MIFR / MEFR

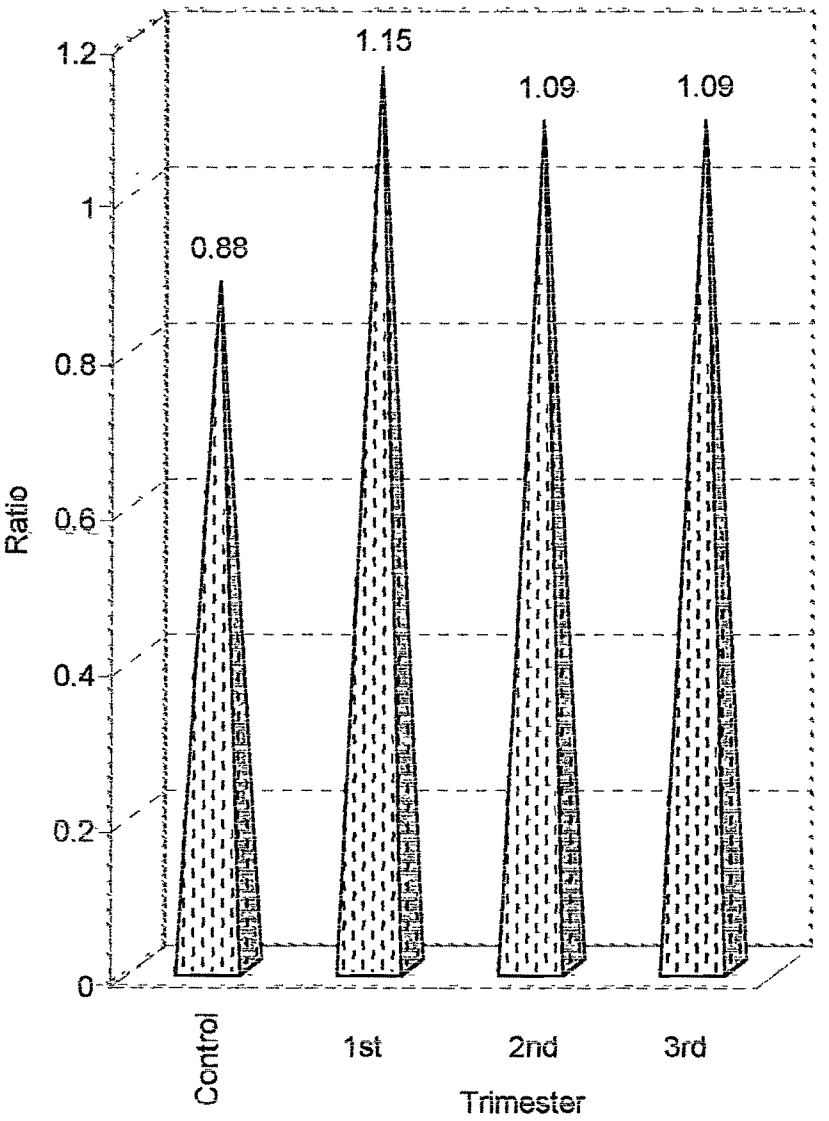

Table 21 showing statistical analysis for MIFR / MEFR.

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	0.88 1.15	0.31 0.52	0.30–1.70 0.44–2.24	31.15	2.85	< 0.01 *
Control vs Second	0.88 1.09	0.31 0.36	0.34–1.70	23.51	2.73	< 0.01 *
Control vs Third	0.88 1.01	0.31 0.41	0.50–2.80	23.44	2.14	< 0.05 *
First vs Second	1.15 1.09	0.52 0.36		- 05 82	0.66	N S
First vs Third	1.15 1.01	0.52 0.41		- 05.87	0.57	N S
Second vs Third	1.09 1.01	0.36 0.41		- 00.05	0.01	N S

The ratio of MIFR / MEFR was seen to be high in three trimesters as compared to control when mean values are taken in account. This slight increase was observed to be statistically less significant. From the mean values it can be said that the ratio decreases from first to third trimester. This decrease was found to be statistically insignificant.

Graph 22 showing mean values of MMEFR (lt./min)

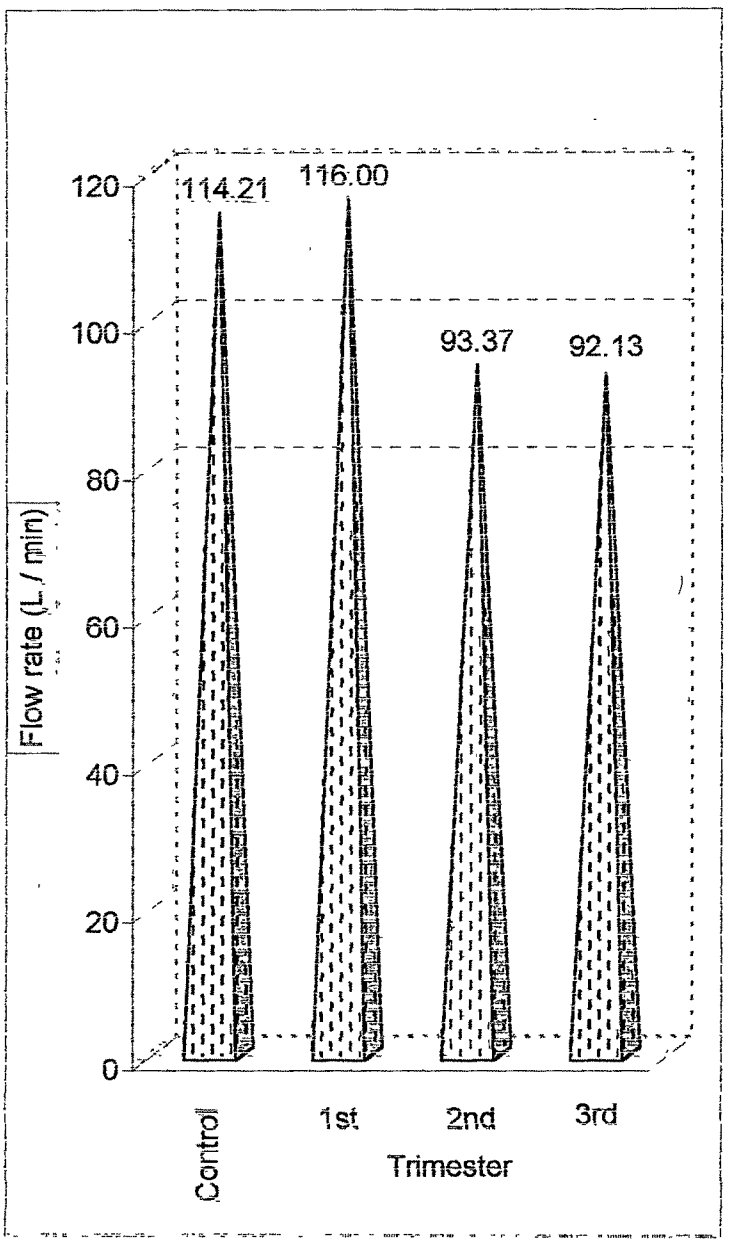

Table 22 showing statistical analysis for MMEFR (liters/minute)

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	114.21 116.00	43.92 45.31	66–199 37–204	01.57	0.17	N S
Control vs Second	114.21 93.37	43.92 32.86	53–179	- 18.24	2.40	< 0.025 *
Control vs Third	114.21 92.13	43.92 24.99	39–146	- 19.33	2.75	< 0.01 *
First vs Second	116.00 93.37	45.31 32.86		- 19.51	2.55	< 0.025 *
First vs Third	116.00 92.13	45.31 24.99		- 20.58	2.91	< 0.005 **
Second vs Third	93.37 92.13	32.86 24.99		- 01.32	0.19	N S

There is statistically insignificant increase in MMEFR from non-pregnant to early pregnant state that is first trimester. There on MMEFR seems to decrease up-to-late pregnancy that is third trimester. This decrease in second trimester and third trimester when was compared with non-pregnant state was found to be statistically less significant. Decrease in MMEFR from first trimester to second trimester was less significant, from first trimester to third trimester was highly significant while that from second trimester to third trimester was insignificant.

Graph 23 shows mean values of MMIFR (lt./min)

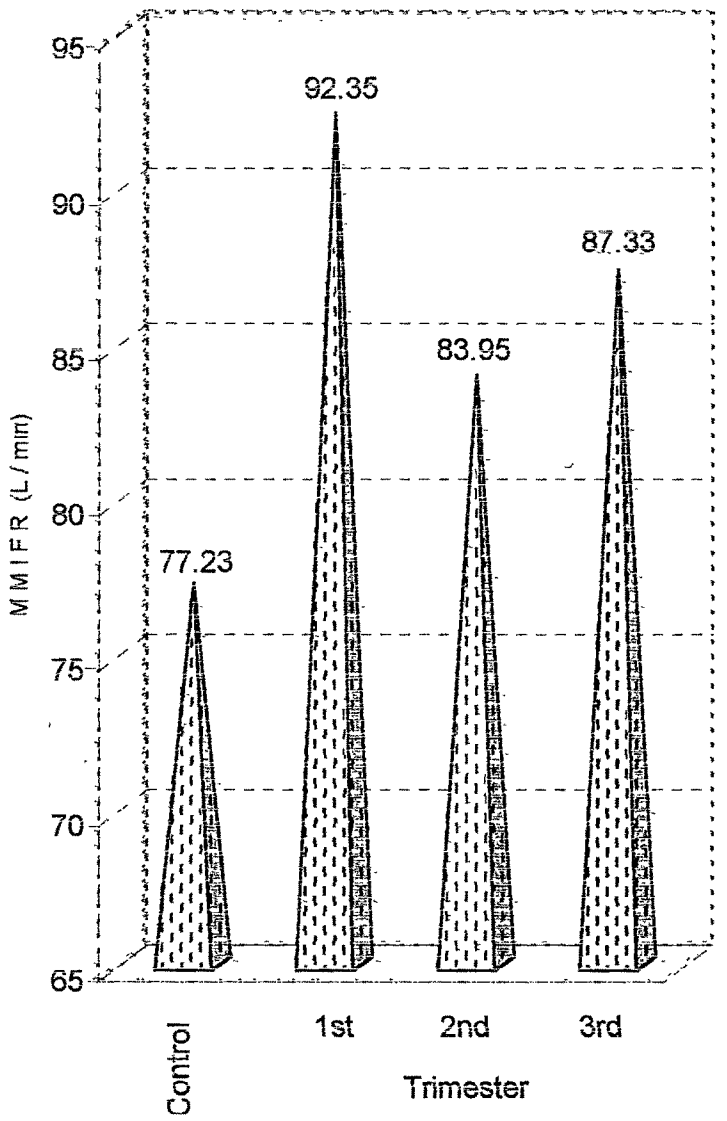

Table 23 showing statistical analysis for MMIFR (liters/minute)

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	77.23	27.91	30–134	19.57	2.50	< 0.025
vs First	92.35	26.02	59–140			*
Control vs	77.23	27.91		08.70	0.99	N S
Second	83.95	32.11	31–166			
Control	77.23	27.91		13.07	1.49	N S
vs Third	87.33	32.33	39–160			
First vs	92.35	26.02		- 09.08	1.28	N S
Second	83.95	32.11				
First vs	92.35	26.02		- 05.43	0.76	N S
Third	87.33	32.33				
Second	83.95	32.11		04.01	0.46	N S
vs Third	87.33	32.33				

MMIFR is more in pregnant subjects as compared to normal non-pregnant subject. The increase during first trimester was found to be statistically less significant but in later pregnancy the increase was insignificant. It was observed that there is decrease in MMIFR from first to second trimester, thereon a rise from second to third trimester. The fall and rise in MMIFR were found to be insignificant. The changes in MMIFR within the trimesters on comparison were found to be insignificant.

Graph 24 showing mean ratio of MMIFR / MMEFR of sample

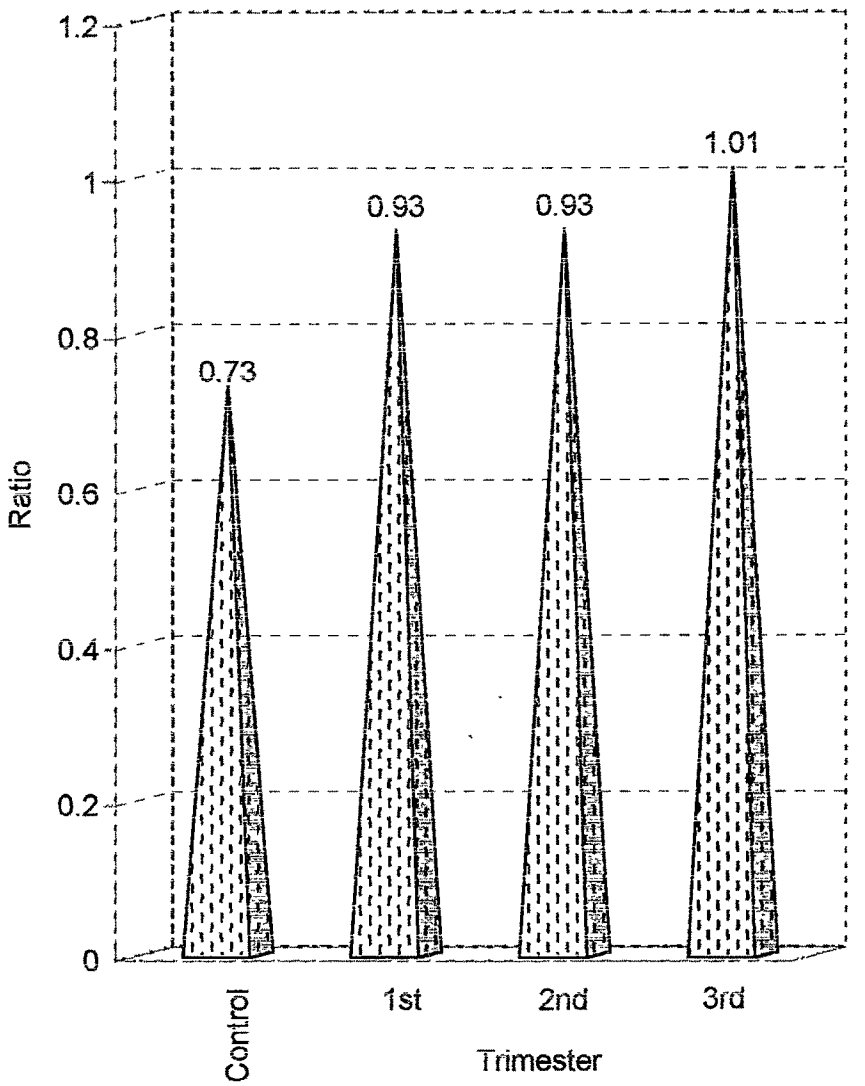

Table 24 showing statistical analysis for MMIFR / MMEFR.

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	0.73	0.32	0.29–2.00	27.42	2.24	< 0.05
vs First	0.93	0.47	0.31–2.30			*
Control vs	0.73	0.32		27.66	2.91	< 0.005
Second	0.93	0.30	0.45–1.50			**
Control	0.73	0.32		38.45	3.43	< 0.001
vs Third	1.01	0.41	0.34–1.70			**
First vs	0.93	0.47		00.18	0.01	N S
Second	0.93	0.30				
First vs	0.93	0.47		08.65	0.82	N S
Third	1.01	0.41				
Second	0.93	0.30		08.45	0.98	N S
vs Third	1.01	0.41				

There is significant increase in ratio of MMIFR / MMEFR from non-pregnant to pregnant state as can be seen from mean values as well. On comparing control with first trimester less significant rise was observed while when compared with second trimester highly significant rise was observed even though mean values for first trimester and second trimester are being same. The change (slight rise) in ratio within the experimental sample was found to be insignificant.

Graph 25 shows mean values of BHT (sec).

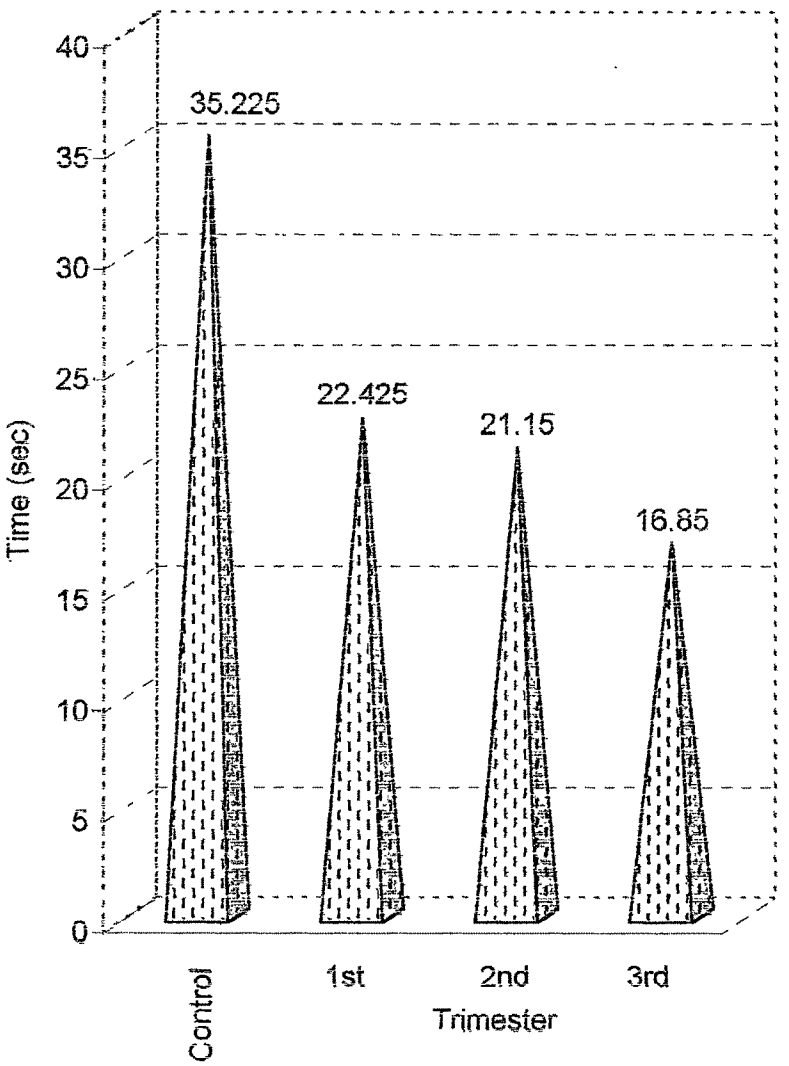

Table 25 showing statistical analysis for BHT (seconds).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control vs First	35.23 22.43	3.56 4.33	30–42 14–29	- 36.33	14.44	< 0.001 **
Control vs Second	35.23 21.15	3.56 4.84	13–33	- 39.95	14.80	< 0.001 **
Control vs Third	35.23 16.85	3.56 5.56	7–39	- 52.16	17.59	< 0.001 **
First vs Second	22.43 21.15	4.33 4.84		- 5.68	1.24	N S
First vs Third	22.43 16.85	4.33 5.56		- 24.86	5.00	< 0.001 **
Second vs Third	21.15 16.85	4.84 5.56		- 20.33	3.68	< 0.001 **

Breath holding time test also exemplifies the same pattern as that of 40 mm Hg test or maximum expiratory test. It is seen that control subjects are able to hold breath for longer time as compared to the pregnant subjects and this was found to be highly significant statistically. Subjects of third trimester (16.85 sec) could hold breath for a short time while subjects of first trimester (22.43 sec) and second trimester (21.15 sec) could hold for little longer. On comparing within the experimental groups the difference in breath holding time was found to be highly significant except between the first trimester with second trimester where it is insignificant.

Graph 26 shows mean values of time for
40 mm Hg ET(sec)

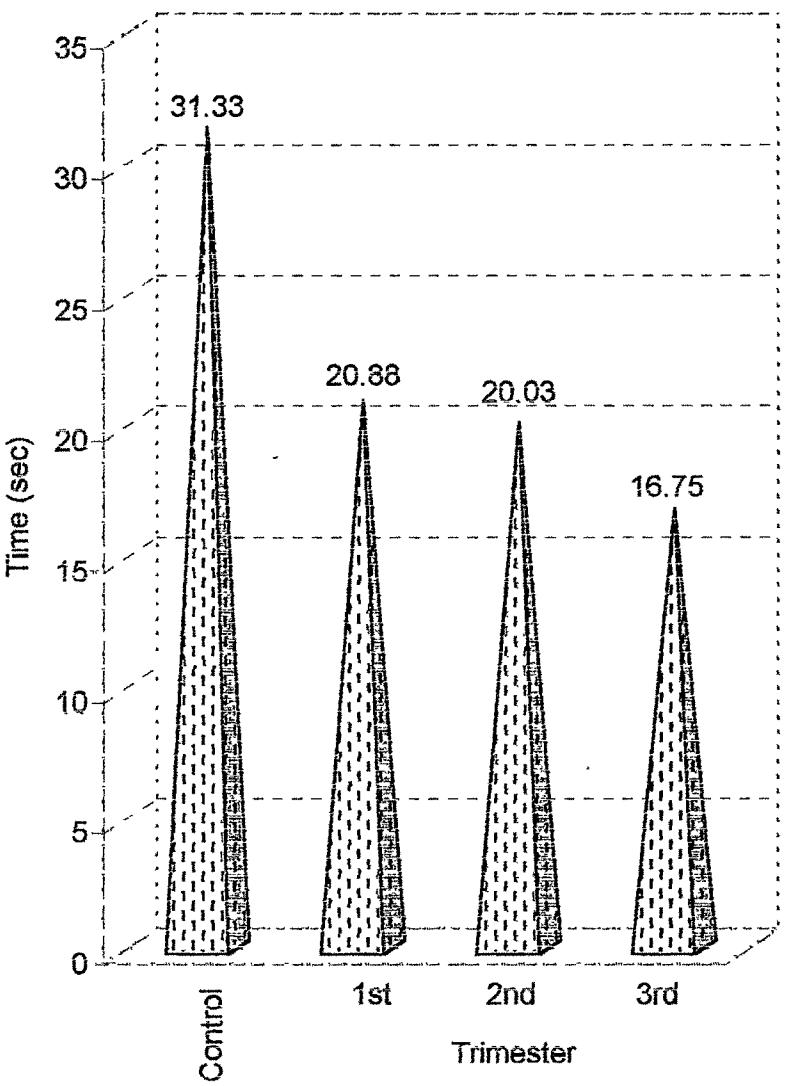

Table 26 showing statistical analysis for 40 mm Hg (seconds).

Sample	Mean	SD(±)	Range	% diff.	't' value	P value
Control	31.33	3.12	22–38	- 33.35	15.12	< 0.001
vs First	20.88	3.07	14–28			**
Control vs	31.33	3.12		- 36.07	10.30	< 0.001
Second	20.03	6.20	11–36			**
Control	31.33	3.12		- 46.52	16.47	< 0.001
vs Third	16.75	4.65	9–26			**
First vs	20.88	3.07		- 4.07	0.77	N S
Second	20.03	6.20				
First vs	20.88	3.07		- 19.76	4.68	< 0.001
Third	16.75	4.65				**
Second	20.03	6.20		- 16.35	2.67	< 0.01
vs Third	16.75	4.65				*

For 40 mm Hg endurance test the time taken to raise and keep the mercury level raised at 40 mm Hg in manometer decreases in pregnancy as compared to non-pregnancy. The time taken drastically decreases in early pregnancy and late pregnancy. This is obvious from 't' values being high as 15.12 and 16.47 proving highly significant decrease. The decrease within first trimester to third trimester was highly significant and within second trimester to third trimester was less significant. There is no change in the time noted between the first trimester and second trimester subjects in raising the mercury level and sustaining it at 40 mm Hg and is statistically seen to be insignificant.

Graph 27 shows mean value of MEPT (mm Hg)

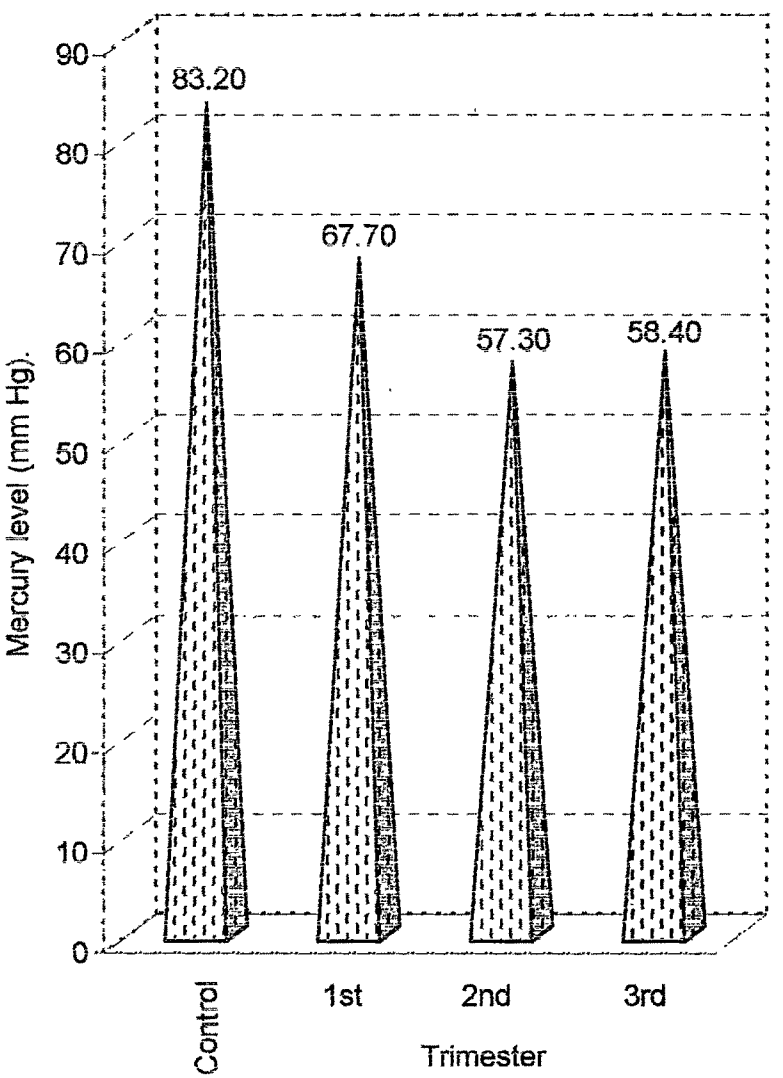

Table 27 showing statistical analysis for MEPT(mm Hg).

Sample	Mean	±SD	Range	% diff.	't' value	P value
Control	83.20	6.29	70–96	- 18.62	6.55	< 0.001
vs First	67.70	13.57	30–90			**
Control vs	83.20	6.29		- 32.48	10.97	< 0.001
Second	56.18	14.25	5–90			**
Control	83.20	6.29		- 29.80	11.58	< 0.001
vs Third	58.40	11.98	40–90			**
First vs	67.70	13.57		- 17.02	3.70	< 0.001
Second	56.18	14.25				**
First vs	67.70	13.57		- 13.73	3.24	< 0.005
Third	58.40	11.98				**
Second	56.18	14.25		3.96	0.75	N S
vs Third	58.40	11.98				

For maximum expiratory test control subjects could raise the mercury level to 83.20 mm but pregnant subjects of different trimesters could raise it in the range of 56.18 mm to 67.70 mm. The decreased level of mercury raised when compared with control subjects was found to be highly significant. The difference in the level of mercury raised by first trimester as compared to second trimester and third trimester was found to be highly significant while the difference between the second trimester when compared with third trimester was found to be insignificant.

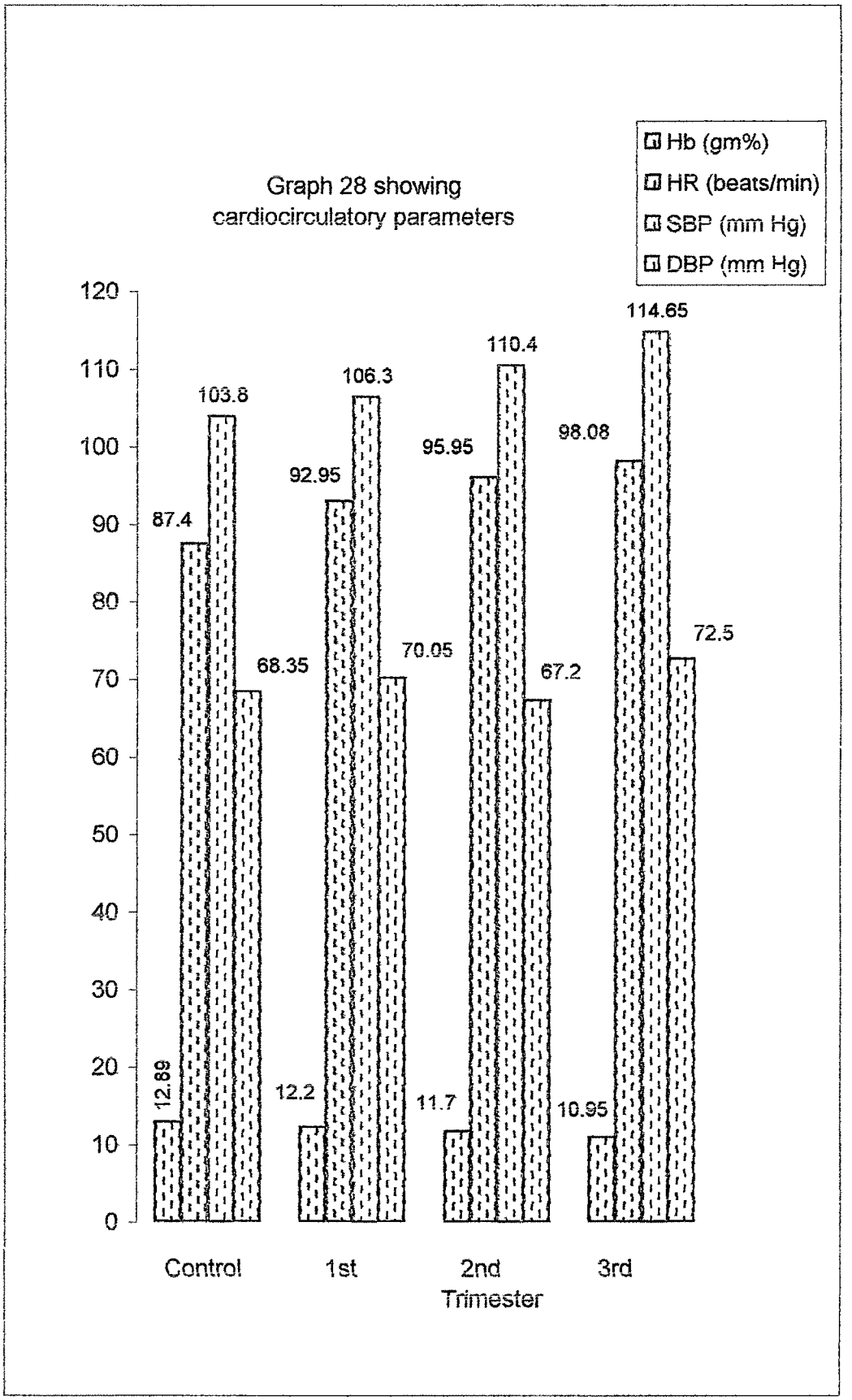
Graph 28 showing
cardiocirculatory parameters
Hb (gm%)
HR (beats/min)
SBP (mm Hg)
DBP (mm Hg)
120
110
100
90
80
70
60
50
40
30
20
10
0
87.4
103.8
68.35
92.95
106.3
70.05
95.95
110.4
67.2
98.08
114.65
72.5
12.89
12.2
11.7
10.95
Control
1st
2nd
3rd
Trimester

Table 28 showing statistical analysis for hemoglobin (gm%).

Sample	Mean	±SD	Range	% diff.	't' value	P value
Control vs First	12.87 12.2	0.93 1.02	11–14 10–14	- 5.33	3.15	<0.005 **
Control vs Second	12.87 11.7	0.93 1.94	8.5–14	- 9.21	4.38	<0.001 **
Control vs Third	12.87 10.95	0.93 1.19	9–14	- 15.03	8.12	<0.001 **
First vs Second	12.2 11.7	1.02 1.94		- 4.09	1.79	< 0.10 (NS)
First vs Third	12.2 10.95	1.02 1.19		- 10.24	5.05	<0.001 **
Second vs Third	11.7 10.95	1.94 1.19		- 6.41	2.54	<0.025 *

A significant decrease in Hb is observed during pregnancy. Maximum fall of 15.03 % from nonpregnant state to late pregnant state and an insignificant fall 4.09 % was observed from first to second trimester subjects. Minimal reduction found between mean values of first and second trimester subjects.

Table 29 showing statistical analysis for pulse rate/HR (beats/minute).

Sample	Mean	±SD	Range	% diff.	't' value	P value
Control vs First	87.40 92.95	4.33 3.46	80–96 88–102	6.35	06.33	< 0.001 **
Control vs Second	87.40 95.95	4.33 6.13	88–112	9.78	07.21	< 0.001 **
Control vs Third	87.40 98.08	4.33 8.1	80–120	12.21	07.35	< 0.001 **
First vs Second	92.95 95.95	3.46 6.13		3.22	02.69	< 0.01 *
First vs Third	92.95 98.08	3.46 8.1		5.51	03.68	< 0.001 **
Second vs Third	95.95 98.08	6.13 8.1		2.21	01.32	NS

Pulse rate increases during pregnancy and is more as compared to controls. The increase is less significant in prenatal phase and insignificant in later half of gestation. Maximum and significant rise (mean difference of 10.68 per minute, 12.21%) has been observed in non pregnant state to late pregnancy.

Table 30 showing statistical analysis for systolic BP (mm Hg).

Sample	Mean	±SD	Range	% diff.	't' value	P value
Control	103.8	3.24	100–110	2.40	2.92	<00.01
vs First	106.3	2.46	100–116			*
Control vs	103.8	3.24		6.35	6.30	<0.001
Second	110.4	5.75	100–110			**
Control	103.8	3.24		10.45	6.80	<0.001
vs Third	114.65	9.43	98–128			**
First vs	106.3	2.46		3.85	3.61	<0.001
Second	110.4	5.75				**
First vs	106.3	2.46		7.85	5.09	<0.001
Third	114.65	9.43				**
Second	110.4	5.75		3.84	2.43	<0.025
vs Third	114.65	9.43				*

Significant increase in systolic blood pressure was measured as the pregnancy advances. Maximum (10.45%) increase was observed in the difference of mean values of control and third trimester subjects. A less significant rise of 7.85 % was observed in early to late pregnant state. SBP increase significant during first of pregnancy and later the increase is less significant.

Table 31 showing statistical analysis for diastolic BP (mm Hg).

Sample	Mean	± SD	Range	% diff.	't' value	P value
Control vs First	68.35 70.95	4.29 2.46	60–88 60–74	2.48	01.59	NS
Control vs Second	68.35 67.20	4.29 5.06	60–80	- 1.68	00.90	NS
Control vs Third	68.35 72.05	4.29 7.24	58–88	6.07	02.73	< 0.01 *
First vs Second	70.95 67.20	2.46 5.06		- 4.06	03.20	< 0.005 **
First vs Third	70.95 72.50	2.46 7.24		3.49	02.02	< 0.05 *
Second vs Third	67.20 72.50	5.06 7.24		7.88	03.79	< 0.001 **

Mean values 68.35, 70.95, 67.02 and 72.5 has been observed in control, first, second and third trimester subjects respectively. This results show fluctuation in diastolic blood pressure during pregnancy. Non significant fall (1.68%) has been reported between non pregnant and mid pregnant state while significant fall (4.06%) found during early to mid pregnancy.