

ORIGINAL RESEARCH

Pulmonary functions of women in the third trimester of uncomplicated pregnancy

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ABSTRACT

Background: The events in pregnancy provoke one of the best instances of selective anatomical, physiological and biochemical adaptations that occur throughout pregnancy and substantial changes in respiratory physiology are a part of the same process. The present study was conducted to assess the pulmonary functions of women in the third trimester of uncomplicated pregnancy. **Materials & Methods:** 65 pregnant women in their third trimester of uncomplicated pregnancy were kept in group I and non-pregnant women (control) in group II. A detailed history was recorded and complete clinical examination was done. The height as well as weight of the subject were noted. The assessment of PFT was carried out by Medspiror. Parameters such as FVC, FEV1, FEF25%-75%, PEFR and FEV1/FVC ratio was recorded. **Results:** The mean height was 164.3 cms in group I and 159.5 cms in group II, weight was 67.5 kgs in group I and 58.4 kgs in group II, hemoglobin was 11.3 g/dl in group I and 11.8 g/dl in group II, BMI was 27.4 kg/m² in group I and 22.3 kg/m² in group II. The mean heart rate was 81.3 beats/min in group I and 81.5 beats/min in group II. SBP was 120.4 mm Hg in group I and 118.2 mm Hg in group II and DBP was 78.6 mm Hg in group I and 72.6 mm Hg in group II. The difference was significant (P < 0.05). FVC (% predicted) was 90.4 and 95.2, FEV1 (% predicted) was 91.3 and 93.5, FEV1 / FVC ratio (actual) was 82.6 and 87.3, PEFR (% predicted) was 90.4 and 96.2, FEF_{25-75%} (% predicted) was 87.3 and 93.4 in group I and group II respectively. The difference was significant (P < 0.05). **Conclusion:** Respiratory parameters are significantly compromised due to gravid state in the last trimester of pregnancy.

Keywords: Breathing, pregnancy, pulmonary functions

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INTRODUCTION

The events in pregnancy provoke one of the best instances of selective anatomical, physiological and biochemical adaptations that occur throughout pregnancy and substantial changes in respiratory physiology are a part of the same process.¹ The growing size of the fetus with increasing gestation is the cause of the alterations in respiratory physiology because it creates a mechanical barrier to the regular breathing process.² The results of this study demonstrated the benefits and advantages of surgical surgery over conservative management for condylar fractures with mild displacement.³

Pregnant women's circulatory, respiratory, digestive, renal, endocrine, and metabolic systems have undergone physiological adjustments.⁴ With reference to prepregnancy standards, their exact understanding enables the doctor to confirm the degree of adaptation in pregnant women and helps prevent needless treatment of physiological changes that are mistakenly regarded as pathological alterations.⁵ Understanding

how the illness states affect pregnancy and vice versa requires an understanding of the expected or desirable changes in pulmonary parameters. Additionally, data on pulmonary function status is necessary to evaluate anesthesia suitability.⁶ The present study was conducted to assess the pulmonary functions of women in the third trimester of uncomplicated pregnancy.

MATERIALS & METHODS

The study was carried out 65 pregnant women in their third trimester of uncomplicated pregnancy. All gave their written consent to participate in the study.

Data such as name, age, etc. was recorded. Subjects were kept in group I and non-pregnant women (control) in group II. A detailed history was recorded and complete clinical examination was done. The height as well as weight of the subject were noted. The assessment of PFT was carried out by Medspiror. Parameters such as FVC, FEV1, FEF25%-75%, PEFR and FEV1/FVC ratio was recorded. Results thus

obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Baseline parameters

Parameters	Group I	Group II	P value
Height (cms)	164.3	159.5	0.81
Weight (Kgs)	67.5	58.4	0.05
Haemoglobin (g/dl)	11.3	11.8	0.29
BMI (kg/m ²)	27.4	22.3	0.05
Heart rate (beats/min)	81.3	81.5	0.92
SBP (mm Hg)	120.4	118.2	0.97
DBP (mm Hg)	78.6	72.6	0.14

Table I shows that mean height was 164.3 cms in group I and 159.5 cms in group II, weight was 67.5 kgs in group I and 58.4 kgs in group II, hemoglobin was 11.3 g/dl in group I and 11.8 g/dl in group II, BMI was 27.4 kg/m² in group I and 22.3 kg/m² in

group II. The mean heart rate was 81.3 beats/min in group I and 81.5 beats/min in group II. SBP was 120.4 mm Hg in group I and 118.2 mm Hg in group II and DBP was 78.6 mm Hg in group I and 72.6 mm Hg in group II. The difference was significant (P< 0.05).

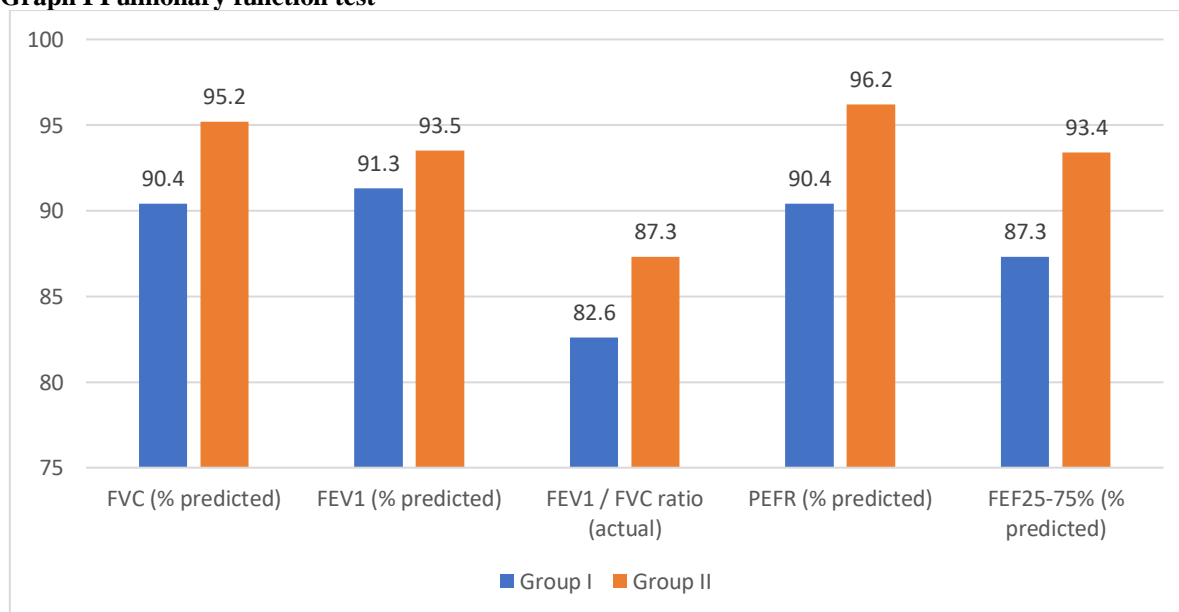
Table II Pulmonary function test

Parameters	Group I	Group II	P value
FVC (% predicted)	90.4	95.2	0.04
FEV1 (% predicted)	91.3	93.5	0.05
FEV1 / FVC ratio (actual)	82.6	87.3	0.04
PEFR (% predicted)	90.4	96.2	0.02
FEF _{25-75%} (% predicted)	87.3	93.4	0.05

Table II, graph I shows that FVC (% predicted) was 90.4 and 95.2, FEV1 (% predicted) was 91.3 and 93.5, FEV1 / FVC ratio (actual) was 82.6 and 87.3, PEFR

(% predicted) was 90.4 and 96.2, FEF_{25-75%} (% predicted) was 87.3 and 93.4 in group I and group II respectively. The difference was significant (P< 0.05).

Graph I Pulmonary function test



DISCUSSION

In pregnancy profound alterations in the functioning of all the systems metabolic, digestive, renal, endocrine, behavioral and cardiopulmonary system of the mother occur to accommodate the needs of the developing fetus. Pregnancy is associated with significant changes in respiratory functions even in

healthy women.⁷ Multiple biochemical alterations like increase in progesterone, estrogen, prostaglandins, corticosteroid and cyclic nucleotide levels occur concomitantly during the course of pregnancy, additionally, capillary engorgement throughout the respiratory tract results in mucosal edema and hyperemia. The effect of air pollution includes

breathing and respiratory problems, aggravations of existing respiratory and cardiovascular diseases, alterations in the body defense system against foreign materials and damage to lung tissue and carcinogenesis.⁸ Prolonged exposure to dust can result in chronic bronchial problems. Investigations of the respiratory health effects due to exposure to vehicular pollution exposures are necessary in order to predict the risk factors that may cause asthmatic response.⁹ The timing of exposure and the specific components of air pollution that possibly impact fetal development and birth outcome preterm birth and low birth weight mostly with high levels of carbon monoxide and particulate matter during the first trimester and the final months before birth.¹⁰ The present study was conducted to assess the pulmonary functions of women in the third trimester of uncomplicated pregnancy.

We found that the mean height was 164.3 cms in group I and 159.5 cms in group II, weight was 67.5 kgs in group I and 58.4 kgs in group II, hemoglobin was 11.3 g/dl in group I and 11.8 g/dl in group II, BMI was 27.4 kg/m² in group I and 22.3 kg/m² in group II. The mean heart rate was 81.3 beats/min in group I and 81.5 beats/min in group II. SBP was 120.4 mm Hg in group I and 118.2 mm Hg in group II and DBP was 78.6 mm Hg in group I and 72.6 mm Hg in group II. Dudhamal et al¹¹ assessed whether any changes occur in pulmonary function tests in the three trimesters of pregnancy as compared with that of control group. Four respiratory parameters FVC, FEV1, FEV3, MVV & PEFR were determined in both, 70 pregnant women as cases & control group of 30 non-pregnant women of same age groups. Expiratory Reserve Volume (ERV) and mean residual Volume (RV) in the pregnant subjects as the pregnancy advances reaching its maximum decrease by the end of III trimester. Mean Tidal Volume progressively increased as pregnancy advances reaching its maximum value at term, there is a gradual increase in the mean Minute Volume (MV) of the pregnant subjects as they proceed to term when compared with the controls. The mean Vital Capacity (VC) of the subjects in the I trimester pregnancy showed a non-significant increase of 3.48%. The same parameter relating to the subjects in the II and III trimester pregnancy showed a statistically significant increase of 3.50 % and 8.60% respectively as compared with control subjects.

We found that FVC (% predicted) was 90.4 and 95.2, FEV1 (% predicted) was 91.3 and 93.5, FEV1/FVC ratio (actual) was 82.6 and 87.3, PEFR (% predicted) was 90.4 and 96.2, FEF_{25-75%} (% predicted) was 87.3 and 93.4 in group I and group II respectively. Vijayan et al¹² evaluated pulmonary function tests (spirometry and maximal expiratory flow rates) in 469 South Indian healthy children (246 boys and 223 girls) between 7-19 years of age to derive regression equations to predict pulmonary function. The correlations of forced vital capacity (FVC) and forced

expiratory volume in one second (FEV1) were, in general highest with height followed by weight and age. Peak expiratory flow rate (PEFR), forced mid-expiratory flow (FMF) and forced expiratory flow rates at 25%, 50% and 75% of FVC (FEF_{25%} FVC, FEF_{50%} FVC and FEF_{75%} FVC) were also significantly correlated with physical characteristics (age, height and weight). With a view to find out regression equations to predict spirometric functions based on physical characteristics (age, height and/or weight), the functions were regressed over all possible combinations of regressor variables, i.e. age, height and weight separately for boys and girls. The height influences the prediction equation in males to a great extent, whereas age and weight had greater influence in girls. Regression equations were derived for boys and girls for predicting normal pulmonary functions for children in South India.

Kaur et al¹³ conducted a study on 100 pregnant women in third trimester of uncomplicated pregnancy (Test group) and 100 age-matched non-pregnant women (Control group) in the age group of 25 to 35 years. Pulmonary function test parameters FVC, FEV1, PEFR and FEF_{25-75%} recorded using Medspiror. The decrease in FEV1 with pregnancy was not of such amplitude as decrease in FVC, and hence FEV1/FVC ratio was seen to increase. This study validates the physiological changes in pulmonary function brought by pregnancy and highlights the need to compile expected and accepted alterations in predicted values of PFT in comparison with the non gravid states for safer outcome of the pregnancy

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that respiratory parameters are significantly compromised due to gravid state in the last trimester of pregnancy.

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