

Original article:

Study of Peak Expiratory Flow Rate in different trimester of pregnancy in rural area

Vikhe B B , Latti R G. Sabade S B

Department of Physiology, RMC, Pravara Institute of Medical Sciences,(DU) Loni, Maharashtra

Corresponding author: Mr Vikhe B B

Abstract:

Introduction: The present study was designed to pulmonary function test in normal pregnancy and compare them with non-pregnant controls. All types of hormonal changes occur in women especially during reproductive life. To assess Peak Expiratory Flow Rate was during different trimester of pregnancy. These would also help to predict any existing pulmonary function test during various phases of woman's life.

Objectives: The present study was designed to the physiological responses of PEFR in different trimester of pregnancy and non pregnant women in rural area.

Materials and Methods: Peak Expiratory Flow Rate was carried out in the Department of Physiology in Rural Medical College, Loni, Maharashtra during the period of Feb2013 to June 2015. Study population was 160 pregnant and non-pregnant women, pregnant and non-pregnant women are equally divided in to four groups during study period. Hence the total 160 women were interviewed and examined. Data were analysed statistically using One way ANOVA Comparison analysis.

Results: In the present study, For pulmonary function test was observed, that PEFR test response were significant ($p < 0.05$) in both pregnant and non-pregnant women.

Conclusion: The study showed significant decrease PEFR in the different trimester of pregnancy, reflecting Lung function test was compared to non pregnant group.

Key words: Pulmonary function tests, pregnant women.

Introduction:

The present study was designed to evaluate the physiological responses to noninvasive Pulmonary function test in normal pregnancy and compare them with non- pregnant controls. All types of behavioral and hormonal changes occur in women especially during reproductive life. Therefore, it is worth, while to assess Pulmonary functions during various phases of woman's reproductive life. These would also help to predict any existing PEFR during various phases of woman's life.

Materials and Methods:

Total 160 healthy normotensive pregnant & non pregnant women ranging in age group between 18 to 40 years attending regular Antenatal Clinic of Pravara Rural Hospital were considered for the study as soon as pregnancy was established. Pregnancy was confirmed by urinary human chorionic gonadotropin determination test. The study design was approved by ethical committee of the institute.

Subjects were divided into four groups.

Group I: Control group (non-pregnant women).

Group II: women during first trimester of pregnancy.

Group III: women during second trimester of pregnancy.

Group IV: women during third trimester of pregnancy.

The study consists of recording the Lung Function Tests of four groups of female

subjects including both normal and pregnant.

Anthropometric measures such as Age, height, weight & Hemoglobin was noted after taking consent.

The study was approved by the Institutional Ethical Committee. All the subjects were called for Morning between 10 to 12noon. All the subjects are given instructions and demonstration. The tracings in the Mini Wrights peak flow meter were taken after being fully satisfied that the subject has understood the procedure of the test. Two to three tracings were taken out of which the best is taken as final reading

was considered. Adequate rest was given in between the readings.

Statistical analysis of data: The mean and standard deviation of Pulmonary function test results were calculated. One way ANOVA & t test to compare mean between the different groups of study population and controls was performed

. Table I shows the mean value of age, height, weight & Hb(anthropometric data) in the four groups (n=160). It revealed statistically insignificant results for the mean value of age and height between the four groups Non –pregnant, Ist trimester, IInd trimester, and IIIrd trimester and (p>0.05). However, the mean value for weight showed statistically significant results between group IIIrd trimester and Ist trimester and between group IIIrd trimester and IInd trimester (p<0.05). and Table II shows P value calculated. These results are depicted in table 2.

Result:

Table No-1

Anthropometric value measures of pregnant women in three trimesters & in non- pregnant women

Anthropometric Parameter	Non-pregnant n=40		1st Trimester n = 40		2nd Trimester n = 40		3rd Trimester n = 40	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (Years)	22.01	1.78	22.01	2.50	21.06	1.78	21.80	2.36
Height (Cm)	155	4.55	155	4.50	155	4.40	155	4.78
Weight (Kg)	45.25	0.05	48.14	0.74	47.98	7.14	51.40	8.03
Hb(gm%)	11.41	0.88	10.79	0.69	10.77	0.65	10.74	0.60

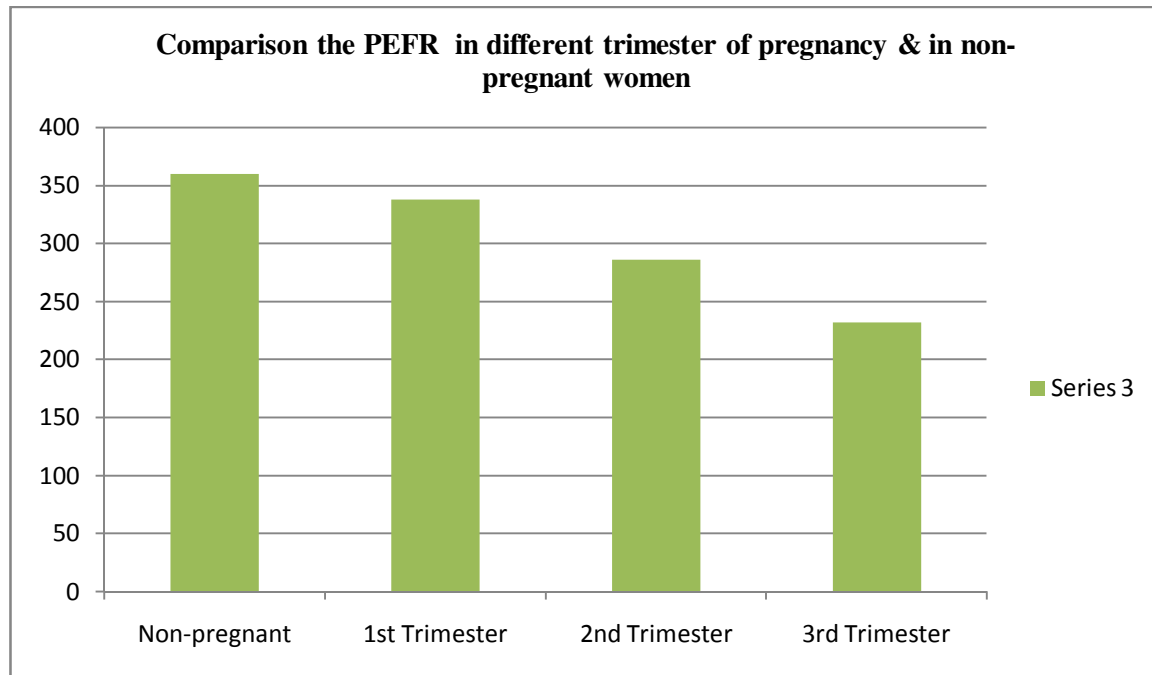
*: statistically significant as compared to group Non-pregnant & 1st Trimester (p<0.05)

Table No-2

Comparison the Value Mean and standard deviation of PEFR in different trimester of pregnancy & in non-pregnant women

Parameters	Non-pregnant n=40		1st Trimester n = 40		2nd Trimester n = 40		3rd Trimester n = 40		p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
PEFR	360.36	19.50	338.13	23.86	286.04	31.48	232.72	20.80	p < 0.05*

* Statistically significant difference at 5 % level.



Discussion:

Peak expiratory flow rate and their percentage of predicted values were significantly lower during third trimester of pregnancy compared to controls and It progressively decreased from first to third trimester. Similar results were seen in a study conducted by Memon et al , (2012).[4] The enlarged full term uterus, in later months of pregnancy, causes elevation of diaphragm (4cm). The lower ribs flare out resulting in increase in sub costal angle and there

is also increase in transverse diameter of the chest. The cardiorespiratory embarrassment is relieved during light ening, when a sense of relief of pressure symptoms is obtained due to engagement of the presenting part. It occurs 3 weeks before the expected date of delivery in primigravida. In multiparous women, the same occurs in late first stage of labour with rupture of membranes. The pulmonary changes are more marked in the presence of over distention of

gravid uterus like hydramnios & multiple pregnancy.

We have excluded such

cases from our study to maintain uniformity in the

results. There is marginal increase in respiratory rate.

The 'Tidal volume' and 'Minute ventilation' increases

by 30-40%. The 'Functional Reserve Capacity' and 'Inspiratory Reserve Volume' may diminish by

20%. A study conducted by Neeraj et al (2010) states

that the decrease in pulmonary function may be due

to a decline in alveolar Pco₂ (caused by

hyperventilation) which acts as

bronchoconstrictor.[6]

There is increase predisposition of upper respiratory

tract to hyperemia & congestion.[5] Alteration in

blood gases is common. Po₂ increases above

100mmHg, PCo₂ decreases to 27-32mmHg, pH

remains normal with increased renal bicarbonate

excretion.[7] Dyspnoea & hyperventilation during

pregnancy are common. Fetal well being and birth

weight depend on a number of maternal and placental

factors which includes maternal nutrition (height and

weight), diet, rest, supplementation of Iron, calcium,

proteins and the lung status of a woman.

PEFR varies with age, height & sex of

patient.[9,10,11]. . The anaemic pregnant women

showed lower PEFR when compared with PEFR of

non anaemic pregnant women.[10] Lung status of

women during pregnancy is of great importance.

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Their efficacy should be assessed for maternal as well as fetal well being.

Conclusion:

. In 1st, 2nd & 3rd trimester the lung functions are

relatively decrease in PEFR. The respiratory distress

experienced during pregnancy is purely physiological

& completely reversible once the pregnancy is over.

Comparative study of pulmonary function tests in

different trimesters of pregnancy showed a decrease

in PEFR significantly which may be due to

mechanical pressure of gravid uterus, diaphragm

restricting the movement of lungs in the pregnancy.

There was a decrease in respiratory parameters like

PEFR from first to third trimesters of pregnancy

which may also be due to poor nutrition. To establish

the precise cause of decrease in different lung

function parameters, further studies are to be

undertaken like hormonal assay in different

trimesters to study the effect of hormones on

different lung function parameters. Continuous

Monitoring of lung function in different trimesters

provide adequate information regarding maternal

healthcare. Obstructive / restrictive lung disorders

during pregnancy can be identified early which can

be prevented by proper management. Pregnant

women need regular monitoring of lung function by

spirometry in order to optimize their lung function

throughout pregnancy.

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