Original Research Paper

Physiology

A COMPARATIVE STUDY OF PEAK EXPIRATORY FLOW RATE IN DIFFERENT TRIMESTER OF PREGNANCY

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ABSTRACT The anatomic and physiological changes of pregnancy have major pulmonary and cardiovascular consequences throughout the gravid period. Hence the present study has been conducted to compare Peak Expiratory Flow Rate in different trimester of pregnancy. This study was carried upon 45 pregnant women. The subject were divided into three groups. Group A- 15 pregnant women (First trimester), Group B- 15 pregnant women (second trimester) and Group C- 15 pregnant women (Third trimester). There was significant variation in PEFR in different trimester and according to present study the higher PEFR was found in group A (I[st] trimester) followed by group B (IInd trimester) and then group C (IIIrd trimester) were found.

KEYWORDS : Peak Expiratory Flow Rate, Pregnant women

INTRODUCTION

Peak expiratory flow rate measurement gives the idea of status of airway calibre of respiratory system and regulatory function of respiration which some time affected by certain progressive neurological disease.

Peak expiratory flow rate is the maximal expiratory flow rate sustained by a subject for at least 10milliseconds expressed in Litre per minute (L/min).[1-3]

Pulmonary function tests of various types are utilized clinically and epidemiologically to measure functional status in order to assess the disease.[4] Though they do not provide a specific diagnosis, they help us to understand the physiology, course and progress of the respiratory diseases, assess the severity and help in the management of number of respiratory diseases.[5]

Asthma is most common medical condition to complicate pregnancy (NAEPP, 2005). Occurring in 4-6% of the general population and occurring in pregnancy at the same rate.[6] The prevalence of asthma during pregnancy was 2.1%, among them, 48.1% were categorized as having intermittent asthma,11.5% with mild persistent asthma,19.2% with moderate persistent asthma and 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 Because of inflammation in airway mucosa, forced expiratory volume measured with spirometer or peak expiratory flow rate measured with peak expiratory flow meter. PEFR depends on factors such as age, sex, weight and height, ethnic and posture difference has been found.

PEFR <80%, it indicates pulmonary function are compromised. Likewise, the respiratory functions in various stages of pregnancy as well as in postnatal period are monitored and compared.

There are anatomical changes like enlargement of uterus, elevation of diaphragm and physiological changes like increase in progesterone and estrogen level occur in course of pregnancy and advancing gestation that affects PEFR. It was observed that due to mechanical effects, progressively increased size of uterus decrease lung volume and capacities by 5 month.

So, present study is aimed to see whether PEFR will be altered in any trimesters of pregnancy.

MATERIAL AND METHOD

This cross sectional prospective study was conducted in Department of Physiology and Department of Gynecology & Obstetrics Shrimati Heera Kunwar Baa Mahila Hospital, Jhalawar Medical College, Jhalawar. The subject was selected from of O.P.D.

and I.P.D. Department of Gynaecology and Obstetrics.

DISTRIBUTION OF SUBJECTS

Group A- 15 pregnant women (First trimester)
Group B- 15 pregnant women (second trimester)
Group C- 15 pregnant women (Third trimester)

The nature and purpose of the study was explained to the subjects who were volunteer for study. A Performa was used to record the relevant information from each selected individual who were included. The subjects who have exclusion criteria were dropped from study. A thorough physical & systemic examination of each subject will be done. In our study

Well functioning mini Wright peak Flow meter (mWPFM) was used to record PEFR. Before asking to perform peak Flow, subject was demonstrated how to use mWPFM correctly. For each determination the subject was instructed to make a maximum inspiratory effort and then to make the maximum and most rapid expiratory effort possible in sitting position.

Inclusion criteria

• Age group : 18-35 years
• Non-tobbaco users.
• Multipara (2 kids).
• Normal cardio respiration status
• Adequately co-operative.

Exclusion criteria

• Subject with acute and chronic infection in last three months .
• H/o cardio pulmonary disease
• Alcohol intake.
• Tobacco consumption.
• Obese/ underweight.
• H/o thoracic deformity or ARI with in two weeks.

Statistical Analysis

The data were expressed as mean±SD. Statistical analysis were performed according to an intention to treat strategy. The One Way ANOVA test was used to compare the differences. Analysis was performed by using SPSS version 6.0 computer software.

OBSERVATION

Table1: Comparison of PEFR (L/min.) in different Trimester among Pregnant Women

	N	Mean	Std. Deviation	F Value	P value
I Trimester	15	332.0000	15.67528	315.778	<0.0001*
II Trimester	15	218.6667	20.65591		
III Trimester	15	139.3333	25.76450		

Graph: 1 Compression of PEFR (L/Min) in different Trimester among Pregnant Women
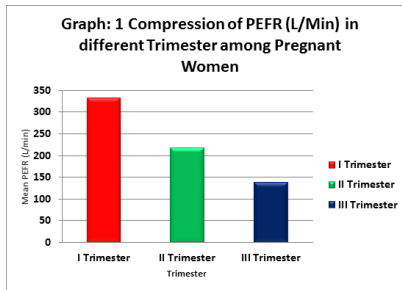
RESULT

In our study there was significant variation in PEFR in different trimester (p<0.0001) shows in Table 1 and Graph-1. The mean PEFR value in I Trimester 332.00, II Trimester 218.66 and in III Trimester 139.33. The higher PEFR was found in I Trimester followed by II Trimester and then III Trimester. We found that lesser value of PEFR in III Trimester.

DISCUSSION

The present study was conducted on total number of 90 subjects, out of which 45 were pregnant women and 45 were non pregnant women. PEFR in pregnant women group and in non pregnant women group studied with reference to age, height and weight. Value of PEFR was determined by Wright's Peak Flow Meter. The values thus obtained were subjected to statistical analysis was done by help of SPSS 20.0 Software (trail Version) And One Way ANOVA test is use in data analysis.

In the later months of pregnancy causes elevation of diaphragm (4cm) and due to lesser force of contraction of main expiratory muscles like anterior abdominal wall muscles and internal intercostals muscle, decrease was attributable to the decline in alveolar Pco_2 which act as bronchoconstrictor and decline in PEFR could be due to increased progesterone in blood affecting expiratory muscles.

In present study there was significant variation in PEFR in different trimester with (p<0.0001) (shows in table:1 and in graph-1) and the higher PEFR was found in group A (I trimester) followed by group B(II trimester) and then group C (III trimester) Similar results were reported by Hemant Deshpande et al,2013, Memon et al,2012, Ganeriwal SK et al,1984, Sahebjami h,1998, /B.M. Puranik et al,1994, Chinko B.C. et al ,2014, Sunyal DK et al,2007, Neeraj et al,2010.7-11.[7-12]

SUMMARY AND CONCLUSIONS

Peak expiratory flow rate is the maximal expiratory flow rate sustained by a subject for at least 10 milliseconds expressed in Liter per minute (L/min.).It does not provide a specific diagnosis, rather it help us to understand the physiology, course and progress of the respiratory diseases, it also helps to assess the severity in the management of number of respiratory diseases. PEFR is affected in normal pregnancy because of alteration in lung volume and capacities. So we were compared Peak Expiratory Flow Rate in different Trimester of pregnancy. There was significant variation in PEFR in different trimester and according to present study the higher PEFR was found in group A (I trimester) followed by group B(II trimester) and then group C (III trimester) were found.

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