

The effect of pregnancy on peak expiratory flow rate in comparison with non-pregnant Iraqi women Sample in MARJAN Teaching Hospital

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Abstract:

Background: Profound alterations of respiratory function physiology accompany pregnancy; these conditions contribute to many of the disorders of the lung during pregnancy. The adaptive changes during the gravid period are designed to support maternal and fetal well-being during the special stresses of fetal growth and parturition Peak.

Objective: This study aimed to know the effect of pregnancy on peak expiratory flow rate in comparison with non-pregnant Iraqi women.

Method: This study was conducted on 255 healthy female at their reproductive ages, made up of 60 pregnant female in 1st trimester, 65 in 2nd trimester, 60 in 3rd trimester and 70 non pregnant as control group.

Results: There were a significant negative relation between PEFR % and gestational age. The PEFR % decrease progressively with advancing gestational age in comparison with control group ($p < 0.001$).

Conclusion: These results suggest that the effect of pregnancy on the respiratory function of healthy women is influenced by gestational age.

Keywords: pregnancy, peak expiratory flow rate percentage, gestational age.

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Introduction:

Pregnancy is a remarkable condition of physiological adaptation, in which a significant change in the functions of all the systems of the mother occurs to give the needs of the growing fetus (1). Many changes reported in the maternal lung function tests during pregnancy are also a part of this adaptation (2). In the course of pregnancy, the growing uterus result in an increase in abdominal pressure which decreases chest wall compliance causing a reduction in functional residual capacity and expiratory reserved volume(3). Routine measurements of airflow, such as peak flow rates are valuable in assessing dyspnea during pregnancy (4). Peak Expiratory Flow Rate (PEFR) is an important limb of Pulmonary Function Test. It is the maximum rate of airflow achieved during a forced expiration after maximum inspiration. It is cheap, accurate and has been used by many researchers (5, 6).

Method:

This study was conducted at the MARJAN TEACHING HOSPITAL (Hilla-Iraq) for the period between (February 2015 and February 2016), collected from respiratory out

patient's clinic. Two hundred fifty five healthy female at their reproductive ages had been involved in this study, made up of 60 pregnant female in 1st trimester (group A), 65 in 2nd trimester (group B), 60 in 3rd trimester (group C) and 70 non pregnant control (group D), PEFR%, height and age for each group are shown in table (1). Detailed personal, medical and family history was taken, and Peak flow meter was used in this study. After oral instruction, the subjects breathe out forcefully until three satisfactory values were reached. The highest values achieved were selected for analysis. The obtained values were also stated as a percentage of predicted value (PEFR %) according to age and height using the European Community of Coal and Steel (ECCS) reference equation (7).

Table (1) : Mean (\pm SD) for PEFR % , age and height for each group (N= 255)

GROUPS	N	PEFR %	AGE (year)	HEIGHT(cm)
A	60	68.9 \pm 8.4	25.8 \pm 6.4	159.08 \pm 3.8
B	65	56.52 \pm 11.5	27.14 \pm 6.2	155 \pm 2.6
C	60	50.06 \pm 6.9	26.6 \pm 6.02	154 \pm 2.7
D	70	73.5 \pm 5.98	28.1 \pm 9.2	156 \pm 4.96

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Results:

In this study, there were a significant negative relation between PEFR % and gestational age (GA) in each group. Figure (1) shows that PEFR % decrease progressively with advancing gestational age in comparison with control group. Table (2) shows a significant relation between each group.

Table (2): Comparison of PEFR % between four groups:

Relation between groups	P value
A vs B	P<0.001
A vs C	P<0.001
A vs D	P<0.001
B vs C	P<0.01
B vs D	P<0.001
C vs D	P<0.05

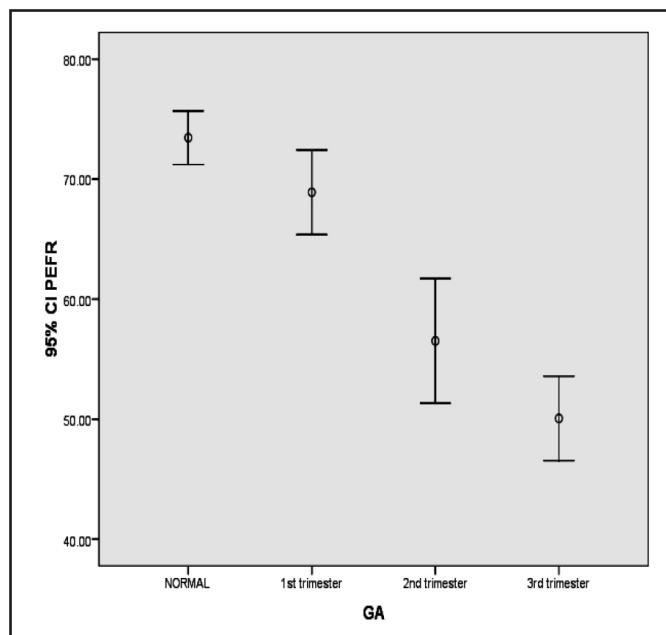


Fig (1): The relation of PEFR % with gestational age and control group

Discussion:

The present study was carried out to observe changes in PEFR % throughout pregnancy. Pregnancy is associated with several physiological changes that affect the respiratory performance with advancing gestational age (8,9). In this study we found that the PEFR % decrease progressively with advancing gestation compared with the control group. This was consistent with the results of Monika B and Chinko B, and this may be attributed to lower force of internal intercostal and anterior abdominal wall muscles contraction or could be due to effect of growing gravid uterus that affect vertical length by restricting

the diaphragmatic effort (10, 11). Also the external pressure on airways caused by the gravid uterus causes reduced PEFR especially in late pregnancy. (10, 17) In late pregnancy, airway closure may occur at a lung volume close to or greater than functional residual capacity. Increased gastric and esophageal pressure occurring in late pregnancy has been considered major factors that produce a decrease in trans pulmonary pressure leading to peripheral airway collapse (12). An increase in lung water, resulting in a change in the elastic properties of the lungs and in the tethering small airways, may also play a role (13). While our results were opposite to that of Grindheim G because he found a progressive increase in PEFR% after first trimester of gestation (14). That he explained his finding by the fact that Increasing size of the fetus associates with a maximum of 2.1 cm increase in transverse chest diameter on chest radiography and a maximum elevation of 4 cm in the level of the diaphragm (4,12).

Also our results was not goes with that of Brancusi et al, that they measured PEFR% throughout pregnancy, and did not find any change in the course of pregnancy (15,16,18). They explained their result by the increased transverse diameter of the chest, resulting from a widened subcostal angle, opposes the effect of the enlarging pregnant uterus and elevated diaphragm, leaving pulmonary function altered, but not compromised, during pregnancy (19,20).

Conclusion:

There were a significant negative relation between PEFR% and gestational age ,and the PEFR % decrease progressively with advancing gestational age

Authors' contributions:

Dr. Monqith Abdul Mohsin Al Janabi: Study design, Collecting samples ,analysis data and writing manuscript

Ameerah Jasim M. Ameen: Collecting samples and revision of the writing

Dalya Abd Ali M. Al-Eqabi: Collecting samples and writing manuscript

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