



SPECTRUM OF DYSPNEA DURING PREGNANCY A TERTIARY CENTRE BASED STUDY IN NORTH WEST RAASTHAN

Medicine

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ABSTRACT

Physiological changes during pregnancy influence maternal respiratory function and gas exchange, and may cause dyspnea in normal pregnancy. On the other hand, dyspnea can be caused by pregnancy complications, cardio vascular and respiratory disorders.. In this review, the aim was to outline the mechanisms of change within the respiratory system during pregnancy, and thus to enable a differential diagnosis of dyspnea in normal pregnancy as opposed to pathological dyspnea. we found that out of 2400 females attending ANC clinic 70 was having pathological dyspnea among which 6 has involvement of cardio vascular system while remaining 64 was suffering from respiratory system involvement, hence we conclude that , a careful history, chest X-ray, pulmonary function test and arterial gas evaluation are warranted to diagnose pathological dyspnea in pregnancy and hence institution of proper therapy .

KEYWORDS

Pregnancy, dyspnea

INTRODUCTION:

Dyspnea in pregnancy is common. Physiological changes during pregnancy influence maternal respiratory function and gas exchange, and may cause dyspnea in normal pregnancy. On the other hand, dyspnea can be caused by pregnancy complications, thus requiring optimal medical treatment. Making a correct assessment requires an understanding of the cardiopulmonary changes that occur during normal pregnancy, so as to recognize the syndrome of dyspnea. In this review, the aim was to outline the mechanisms of change within the respiratory system during pregnancy, and thus to enable a differential diagnosis of dyspnea in normal pregnancy as opposed to pathological dyspnea.

Sixty to 70 percent of women experience a sensation of dyspnea (often described as "air hunger") during the course of normal pregnancy. This symptom commonly starts during the first or second trimester, the frequency rises during the second trimester, and then is reasonably stable during the third trimester. Dyspnea of pregnancy is usually worse when the pregnant woman is in the sitting position, and is not associated with exercise. The mechanism of dyspnea during normal pregnancy is not entirely clear. It occurs while the uterus is still relatively small, thus it cannot be attributed solely to an increase in abdominal girth. Progesterone-induced hyperventilation is likely to be at least partially responsible, perhaps due to the increase in ventilation above the level needed to meet the rise in metabolic demand. Clinical observations are consistent with this hypothesis. In one observational study, the presence of dyspnea during pregnancy correlated with a low PCO₂ and the women most likely to experience dyspnea were those who had relatively high baseline (ie, nonpregnant) values for PCO₂

Material and method:

The study was carried out in Respiratory Division, Department of Medicine and the Antenatal clinic in the Department of Obstetrics & Gynecology at the PBM Group of Hospitals Associated to S.P. Medical College, Bikaner.

1. The study was carried out in the year 2016 through the months from January till December selecting one day in each week.
2. 2400 consecutive pregnant women attending the antenatal clinic were taken as study population for screening.
3. Each of the women was evaluated for age, height, weight, gestational age, gravidity, parity, and number of living children. The hemoglobin levels of each of these women were noted.
4. Each of them was asked to fill out the asthma questionnaire translated in Hindi based on the questionnaire developed for International Union Against Tuberculosis and Lung Disease (IUATLD).
5. Females with breathing difficulty were identified, and detailed clinical examination was done to identify the underlying pathology.

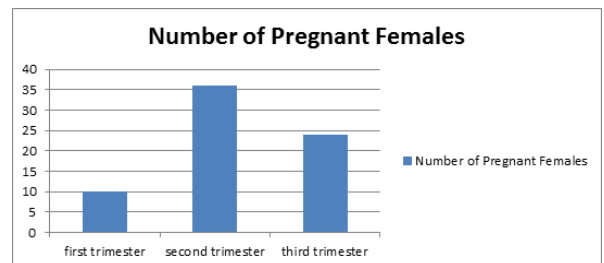
Observations:

Table 1 Spectrum of dyspnoea during pregnancy in females attending ANC

	Number
Study population	24000
Positive by questionnaire	70
Upon clinical evaluation	6
- Diagnosed as cardiovascular disease	
- Diagnosed as respiratory disease	64

Out of the 2400 pregnant women screened with the questionnaire, 70 pregnant women were declared positive by this questionnaire, 6 patients were found to be having purely cardiovascular disease, 64 women were found to be having respiratory disorders ,among patients suffering from respiratory disorders ,52 were found to be suffering from asthma while rest 12 were suffering from other respiratory disorder; 2 were suffering from ILD, 8 were having infective pathology while 2 were suffering from OSA

Of the 70 pregnant females 10 developed dyspnoea during first trimester while 36 and 24 developed dyspnoea during second and third trimester as shown below



Discussion:

PHYSIOLOGICAL CHANGES IN PREGNANCY POTENTIALLY AFFECTING RESPIRATION

Cardiovascular changes — The most striking cardiovascular changes during pregnancy are increases in blood volume and cardiac output³.

- **Blood volume** — Blood volume starts to rise during the first trimester and eventually reaches a maximum that is 40 to 50 percent above the baseline, nonpregnant blood volume. Because plasma volume increases more than red cell mass, the hematocrit generally falls, resulting in the physiologic "anemia of pregnancy"
- **Cardiac output** — Cardiac output also starts to rise in the first trimester, reaching a peak at 20 to 32 weeks of gestation that is 30 to 50 percent above baseline⁴. Although the increase in cardiac output is initially due to a rise in stroke volume, the increase is maintained later in pregnancy by an increase in heart rate, as stroke

volume falls during the third trimester. A decrease in systemic vascular resistance accompanies the increase in cardiac output. Blood pressure during pregnancy is often notable for a rise in pulse pressure due to an unchanged systolic pressure accompanied by a decrease in diastolic pressure.

Respiratory changes — The normal respiratory tract changes during pregnancy result in a compensated respiratory alkalosis, with a higher PO₂ and a lower PCO₂ than in the nonpregnant state. The lower PCO₂ is thought to provide a diffusion gradient that may facilitate the fetus' ability to eliminate waste from aerobic metabolism.

- **Elevation of the diaphragm** — Although the progressively enlarging uterus causes diaphragm position to rise up to 4 cm above its usual resting position, diaphragmatic excursion during respiration is not impaired since chest wall mobility increases and there is flaring of the ribs⁵.
- **Decreased FRC and stable FEV1** — Functional residual capacity (FRC) decreases approximately 20 percent during the latter half of pregnancy, due to a decrease in both expiratory reserve volume (ERV) and residual volume (RV) . Variable and generally minor changes in vital capacity (VC) and total lung capacity (TLC) have also been observed, but the magnitude of these changes suggests they are not likely to be clinically significant.

Airway function is preserved during pregnancy, as reflected by an unchanged forced expiratory volume in one second (FEV1) and an unchanged FEV1/FVC ratio. Minor changes, which are of little clinical importance, have been described in diffusing capacity for carbon monoxide (DLCO): an increase during the first trimester followed by a decrease until 24 to 27 weeks of gestation².

- **Increased ventilation and respiratory drive** — Perhaps the most striking change in respiratory physiology during pregnancy is an increase in resting minute ventilation, which rises by nearly 50 percent at term. This is primarily due to a larger tidal volume, whereas the respiratory rate remains essentially unchanged⁶. The increase in ventilation is greater than the corresponding elevation in oxygen consumption (approximately 20 percent)

Increased levels of progesterone during pregnancy are thought to be responsible for the rise in ventilation above that explained by the enhanced metabolic requirements. Progesterone is a known stimulant of respiration and respiratory drive, and its levels gradually rise from approximately 25 ng/mL at six weeks to 150 ng/mL at term.

- **Respiratory acidosis and increased arterial O₂ tension** — As a result of the progesterone-induced increase in alveolar ventilation, arterial PCO₂ falls to a plateau of 27 to 32 mmHg during pregnancy. This respiratory alkalosis is followed by compensatory renal excretion of bicarbonate, so that the resultant arterial pH is normal to slightly alkalotic (usually between 7.40 to 7.45) .

Maternal oxygenation is preserved during pregnancy. In fact, the maternal arterial oxygen tension (PaO₂) is generally increased because of hyperventilation, ranging from 106 to 108 mmHg in the first trimester to 101 to 104 mmHg in the third trimester . Interpretation of the arterial PO₂ must take into account the corresponding level of PCO₂, which is generally accomplished most easily by calculation of the alveolar-arterial oxygen difference.

- Milne et al. studied the incidence of dyspnea in 62 normal pregnant women⁷. Nine were aware of dyspnea during the first trimester, 31 by week 19, and 46 by week 31. Since dyspnea commences in the first gestation trimester, it is likely that biochemical and mechanical changes co-contribute to dyspnea during pregnancy.
- Garcia-Rio et al. showed that normal pregnant women with dyspnea had a higher respiratory drive when responding to serum CO₂ and hypoxia, even though they had similar oxygen consumption, lung volume distribution and respiratory muscle strength to those with normal breathing

Conclusion

Dyspnea is common in pregnancy. The severity thereof relates to the sex hormone-related hyperventilation and pregnant-inducing

metabolism elevation. Since airway patency, tidal volume and gas exchange are not limited in normal pregnancy, a careful history, chest X-ray, pulmonary function test and arterial gas evaluation are warranted to exclude pathological dyspnea in pregnancy .

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