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**Original Research Article**

# A study on otorhinolaryngological manifestations in pregnant women

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## ABSTRACT

**Background:** Pregnancy is characterized by various endocrinological and physiological changes affecting different organs including ear, nose and throat. Otorhinolaryngological manifestations in pregnant women are mainly due to changes in levels of sex hormones such as estrogen and progesterone. While majority of these conditions are benign and reverse after parturition, some do not. The study was conducted with an objective to find the incidence of various otorhinolaryngological manifestations among pregnant women and to create awareness among the medical professionals to diagnose these conditions.
**Methods**: This is a hospital based cross sectional study of 240 pregnant women who presented to the department of otorhinolaryngology with ENT symptoms. Detailed history, general physical examination and complete ENT examination was done on all subjects.
**Results**: 47.9% of the study cases had otological manifestations among which otitis media was the main finding.
16.7 % of the cases had nasal symptoms among which rhinits was the main condition predominantly observed in the 3rd trimester. 19.6% of the cases had oral cavity lesions with stomatitis being the most commonly found cause. 15.8% of the cases had throat complaints, among which gastroesophageal reflux disease (GERD) was the most common cause found during 2nd and 3rd trimester.
**Conclusions:** Recognition and understanding of pregnancy related ear, nose throat complaints will allow otolaryngologist to reassure and manage these patients, improving their experience of the gestational period.

**Keywords:** Pregnancy, ENT manifestations, Trimester, GERD, Laryngopathia gravidarum

## INTRODUCTION

The pregnant woman claims a unique position in the sphere of medicine, both physically and psychologically. The metabolic, endocrinological and physiologic alterations occurring during pregnancy affect to varying degrees, every organ system in every region of the body, with ear, nose and throat region being no exception.[1]

The basal metabolic rate begins to rise during second trimester and reaches its peak at term, resulting in an increased oxygen consumption reaching a maximum at term causing increased cardiac output and expansion of blood volume with associated increase in total body water. This results in boggy mucous membrane and dependent extremity oedema.[2]

Most of the ear, nose and throat conditions seen in pregnant women are due to physiologic and hormonal changes. Oestrogen and progesterone peaks around 3rd trimester and cause changes in ear, nasal, laryngeal and gingival mucosa. Ear conditions like Eustachian tube dysfunction occurs due to mucosal oedema that causes obstruction of the Eustachian tube leading to Otitis media

with effusion. The relative immunosuppression also occurs in pregnancy causing otomycosis.[3,4] Hearing loss has been noted in pregnant women which could be due to the Eustachian tube dysfunction and also due to hypercoagulable state leading to vascular occlusion of the microcirculation of the inner ear causing sudden onset of deafness (SNHL).[5]

The rhinological manifestations in pregnancy include rhinitis, epistaxis and nasal discharge. The vascular engorgement and increased mucous gland activity which gets worse in the third trimester tends to worsen the nasal discharge and nasal blockage in pregnant women. Epistaxis during pregnancy is common, occurring in up to 20% of pregnant women as compared to about 6% of non-pregnant women.[6]

GERD is thought to occur in approximately 30-50% of pregnancies, due to decrease in the lower esophageal sphincter pressure secondary to progesterone, giving rise to symptoms such as heart burn and hoarseness, chronic throat clearing, cough.[7] The voice changes can also occur due to alterations in the fluid content of the laryngeal lamina propria just below the mucosa which is believed to be due to hormonal changes in pregnancy. This is known as "laryngopathia gravidarum".[8] However, these changes seen in ear, nose and throat of pregnant women are often temporary and tend to resolve after pregnancy but a few may persist.

Thus, the present study is conducted with an aim to make the otorhinolaryngologist to be familiar with these physiological and hormonal changes associated with pregnancy.

## METHODS

The present study was a hospital based cross-sectional study conducted on 240 pregnant women with Ent symptoms who were referred from obstetrics and gynaecology clinic to our outpatient department of ENT W.E.F. October 2018 to March 2020. Institute's ethics committee approval and written informed consent was taken from all subjects before the study was commenced. Following were the exclusion criteria used in the study: Pregnancy associated with any other systemic disease like hypertension, diabetes, any history of trauma, previous history of ENT or head and neck surgery and pregnant women who refused to give consent.

Detailed history with routine physical checkup and entire Ear nose throat examination was conducted and findings were noted. Any past history of ENT disorders was also noted to know if there was worsening of these disorders in pregnancy.

The examination of ear included examination of external pinna, external auditory canal, tympanic membrane, middle ear and mastoid region, otoscopy, tuning fork examination (Rinne's and Weber's tests), facial nerve (VII) examination. Hearing was evaluated by pure tone audiometry, impedence audiometry. Short increment sensitivity index and tone decay was executed wherever required. Examination of nose included examination of external nose and vestibule, anterior rhinoscopy, posterior rhinoscopy, diagnostic nasal endoscopy (if required), perception of smell. Complete inspection of oral cavity was done including laryngeal examination and vocal cords by indirect laryngoscopy, flexible or rigid endoscopy wherever required. Neck was examined for thyroid enlargement and any enlargement of cervical lymph nodes.

Routine hematological investigations included hemoglobin levels, bleeding time, clotting time, total leucocyte counts, platelet counts, renal function tests, liver function tests, random blood sugar and thyroid function tests were done. All the procedures wherever required, were done without giving anaesthesia to avoid risk of toxicity to the foetus. The medical treatment was given only in cases with emergency situations.

### *Statistical analysis*

Data were entered in Excel sheet and results were presented in the form of proportions. Mean and standard deviation were calculated.

## RESULTS

Two hundred and forty pregnant women were enrolled in the study who presented to the ENT out-patient department

Out of 240, the maximum number of pregnant women were in the age group of 26-30 years (40%). Mean±SD was 31.2±9.8. The 92 cases (38.3%) were primigravida, 68 cases (28.3%) were gravida 2, 46 cases (19.2%) were gravida 3 and 34 cases (14.2%) were in gravida > 3 (Table 1).

**Table 1: Distribution of cases according to age group, trimester and gravida.**

| Variables | No. of cases | Percentage (%) |
|---|---|---|
| **Age group (years)** | | |
| 18-25 | 78 | 32.5 |
| 26-30 | 96 | 40 |
| >30 | 66 | 27.5 |
| **Trimesters** | | |
| First | 49 | 20.4 |
| Second | 74 | 30.8 |
| Third | 117 | 48.8 |
| **Gravida** | | |
| Primigravida | 92 | 38.3 |
| Gravida 2 | 68 | 28.3 |
| Gravida 3 | 46 | 19.2 |
| Gravida 4 | 34 | 14.2 |

Majority of the cases (47.9%) had otological symptoms seen in 2nd and 3rd trimester. 16.7% of the cases had nasal complaints and 15.8% had laryngeal/throat complaints which were again seen in 2nd and 3rd trimester.

Oral manifestations were found in 19.6% of the cases which were mainly seen in 3rd trimester as depicted in Figure 1.

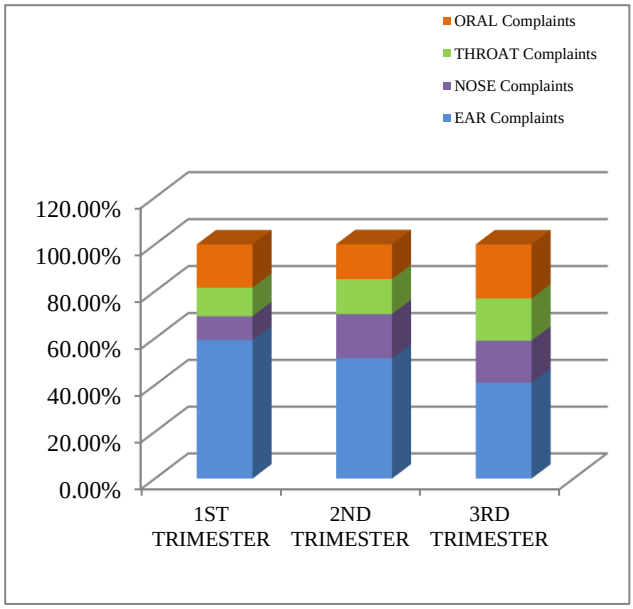


**Figure 1: Distributions of complaints trimester-wise.**

In the present study, 30 cases (12.5%) were diagnosed with acute otitis media, 10 cases (8.3%) had otomycosis and 7 cases (7.1%) had otitis externa and presented with earache. Ear blockade was present in 26 cases (22.6%), and were diagnosed with Otitis media with effusion and Eustachian tube dysfunction. Ear discharge was the presenting complaint in 20 cases (8.3%) which were diagnosed with chronic otitis media. Ringing sensation in ear was present in 8 cases (3.3%) seen in both second and third trimester. Two cases (0.8%) had hearing loss of sudden onset (SNHL). Unilateral facial palsy of sudden onset, diagnosed as Bell's palsy was seen in 4 cases (1.7%) in 3$^{rd}$ trimester.

Nasal manifestations were present in 40 cases (16.7%) among which 22 cases (9.2%) were diagnosed with allergic rhinitis. Epistaxis was present in 13 cases (5.4%) and one of the cases was diagnosed with pyogenic granuloma. Decreased sense of smell was seen in four cases (1.7%).

Throat related complaints were present in 38 cases (15.8%). The most common symptom was throat pain and foreign body sensation/sticking sensation in the throat. 20 cases (8.3%) accounted these symptoms to GERD, seen more during third trimester of pregnancy. Change in voice was observed in four cases, which was attributed to 'laryngopathia gravidarum'.

A great variety of oral cavity lesions were identified in pregnant women. The main lesions were Stomatitis seen in 15 cases (6.2%), gingivitis and apthous ulcerations in 16 cases (34%), geographical tongue in 5 cases (2.1%). Oral thrush in 7 cases (2.9%). Pyogenic granuloma was diagnosed in only 1 case (0.4%) (Table 2 and 3).

**Table 2: Otorhinolaryngological findings in pregnancy.**

| Diagnosis | No. of cases | Percentage (%) |
|---|---|---|
| **Otological findings** | | |
| AOM | 30 | 12.5 |
| COM | 20 | 8.3 |
| Otitis externa and otomycosis | 17 | 7.1 |
| Glue ear and Eustachian tube dysfunction | 26 | 10.8 |
| Bell's palsy | 4 | 1.7 |
| Sudden SNHL | 2 | 0.8 |
| Otospongiosis | 3 | 1.2 |
| Tinnitus | 8 | 3.3 |
| Vertigo | 4 | 1.7 |
| Meniere's disease | 1 | 0.4 |
| **Nasal findings** | | |
| Epistaxis | 13 | 5.4 |
| Allergic rhinitis | 22 | 9.2 |
| Pyogenic granuloma | 1 | 0.4 |
| Olfactory disturbances | 4 | 1.7 |
| **Laryngeal/neck findings** | | |
| GERD | 20 | 8.3 |
| Phonesthesia | 4 | 1.7 |
| Ludwig's angina | 1 | 0.4 |
| Parotid abscess | 1 | 0.4 |
| Acute suppurative lymphadenitis | 5 | 2.1 |
| Subacute thyroiditis | 5 | 2.1 |
| T.B (latent) | 2 | 0.8 |
| Oral cavity findings | | |
| Apthous ulcers | 8 | 3.3 |
| Stomatitis | 15 | 6.2 |
| Oral thrush | 7 | 2.9 |
| Gingivitis | 8 | 3.3 |
| Vincent's angina | 3 | 1.2 |
| Geographical tongue | 5 | 2.1 |
| Pyogenic granuloma | 1 | 0.4 |

**Table 3: Trimester wise distribution of cases.**

| Findings | No. of cases (%) | | | Total |
|---|---|---|---|---|
| | 1st trimester | 2nd trimester | 3rd trimester | |
| **Otological findings** | | | | |
| AOM | 10 (4.2) | 11 (4.6) | 9 (3.7) | 30 |
| COM | 7 (2.9) | 8 (3.3) | 5 (2.1) | 20 |
| Otitis externa and Otomycosis | 2 (0.8) | 4 (1.7) | 11 (4.6) | 17 |
| Glue ear and Eustachian tube dysfunction | 6 (2.5) | 7 (2.9) | 13 (5.4) | 26 |
| Bell's palsy | | 1 (0.4) | 3 (1.2) | 4 |
| Sudden SNHL | | 1 (0.4) | 1 (0.4) | 2 |
| Otospongiosis | | 1 (0.4) | 2 (0.8) | 3 |
| Tinnitus | 1 (0.4) | 3 (1.2) | 4 (1.7) | 8 |
| Vertigo | 3 (1.2) | 1 (0.4) | | 4 |
| Meniere's disease | | 1 (0.4) | | 1 |
| **Nasal findings** | | | | |
| Epistaxis | | 6 (2.5) | 7 (2.9) | 13 |
| Allergic rhinitis | 2 (0.8) | 6 (2.5) | 14 (5.8) | 22 |
| Pyogenic granuloma | | 1 (0.4) | | 1 |
| Olfactory disturbances | 3 (1.2) | 1 (0.4) | | 4 |
| **Laryngeal/Neck findings** | | | | |
| GERD | 3 (1.2) | 7 (2.9) | 10 (4.2) | 20 |
| Phonesthesia | | 1 (0.4) | 3 (1.2) | 4 |
| Ludwig's angina | | 1 (0.4) | | 1 |
| Parotid abscess | | | 1 (0.4) | 1 |
| Acute suppurative lymphadenitis | 1 (0.4) | | 4 (1.7) | 5 |
| Subacute thyroiditis | 1 (0.4) | 2 (0.8) | 2 (0.8) | 5 |
| TB (latent) | 1 (0.4) | | 1 (0.4) | 2 |
| **Oral findings** | | | | |
| Apthous ulcers | 1 (0.4) | 1 (0.4) | 6 (2.5) | 8 |
| Stomatitis | 3 (1.2) | 5 (2.1) | 7 (2.9) | 15 |
| Oral thrush | 2 (0.8) | 1 (0.4) | 4 (1.7) | 7 |
| Gingivitis | 1 (0.4) | 1 (0.4) | 6 (2.5) | 8 |
| Pyogenic granuloma | | | 1 (0.4) | 1 |
| Vincent's angina | 2 (0.8) | 1 (0.4) | | 3 |
| Geographical tongue | | 2 (0.8) | 3 (1.2) | 5 |

## DISCUSSION

There are considerable alterations seen in the body of pregnant women, majority of which are harmless to the expectant mother and foetus, whereas some may cause pathological effects.

In present study, 240 pregnant women were studied and out of these 47.9% had otological complaints, 19.6% had nasal complaints, 16.7% had oral cavity lesions and 15.8% had laryngeal and neck related conditions.

Maximum number of pregnant women were in the age group of 26-30 years which is alike to the study of Ajiya et al where most females were in the age group of 25-30 years.[9] Majority of the cases were seen in multigravida (61.7%) and most of them were in their second and third trimester of pregnancy. Otological manifestations appeared to be the commonest complaint in these women, seen in 47.9% which is similar to the findings of the study conducted by Tsunoda.[10] Ear ache and ear discharge were the most common ear symptoms caused due to acute otitis media, otitis externa and chronic otitis media. It is observed that preexisting chronic otitis media may get worsened during the gestational period and patients may present with ear discharge during pregnancy. The 17 cases (7.1%) had otitis externa and otomycosis whereas 26 cases (10.8%) had eustachian tube dysfunction who presented with symptoms of ear fullness and ear block, which is mainly due to mucosal oedema causing obstruction of eustachian tube and otitis media with effusion.[11] Impedance audiometry was done to confirm the diagnosis of Eustachian tube dysfunction which showed type-C tympanometry curve.

Tinnitus was noted in 8 cases who presented with ringing sensation in both ears. Tinnitus or ringing sensation in ear is a frequent auditory symptom seen during pregnancy

which might be due to hyperdynamic circulation, increase in perilymphatic fluid pressure and hormonal changes in the body of pregnant women.[12] Two cases presented with sudden SNHL of mild to moderate degree. SSNHL could be due to hypercoagulable state during pregnancy which leads to occlusion of microcirculation in the inner ear that causes sudden deafness.

Otosclerosis was seen in 3 cases which was diagnosed by pure tone audiometry, impedance audiometry along with tuning fork tests. Otosclerosis is mostly associated with pregnancy and gets aggravated during the gestational period due to endocrine factors.[13]

Four cases presented with lower motor neuron unilateral facial palsy diagnosed as Bell's palsy in third trimester. There is increased risk of Bell's palsy, with sudden onset, around 3.3 times during the third trimester of pregnancy due to edema of facial nerve from raised interstitial fluid volume which can lead to ischemia of facial nerve in the fallopian canal.[14] Vertigo was observed in 5 cases, of which one was diagnosed with Meniere's disease. Vertigo may be due to decline in serum osmolality in pregnancy, influenced by alterations of hormonal levels and fluid volume affecting the vestibular symptoms.[15]

16.7% of pregnant women presented with nasal symptoms. The most common rhinological manifestation seen was Allergic rhinitis in 22 cases (9.2%), mostly seen in 3rd trimester, presented with nasal blockage, excessive sneezing and running nose. It is due to the increased extravascular volume resulting in boggy nasal mucosa and therefore giving nasal congestion. The second most common complaint was epistaxis, seen in 13 cases (5.4%) This corresponds to the study done by Dugan et al which showed that epistaxis is more prevalent in pregnant women than non-pregnant women.[6] Pyogenic granuloma was seen in one case in second trimester. Altered perception of smell was present in 4 cases in first and second trimester, due to increased levels of Estradiol and swelling of olfactory mucosa.[16]

In oral cavity manifestations, stomatitis was the most common condition seen in 15 cases (6.2%), mostly in 2nd and 3rd trimester, contrary to the study conducted by Jain et al.[17] The increased susceptibility to infections in the oral cavity can occur due to the decrease in salivary pH, which along with change of dietary and oral hygiene habits, contributes to bacterial growth and increases the risk of oral lesions.[18]

There was only one case of pyogenic granuloma found in this study similar to the study done by Gomes et al.[19] Gingival pyogenic granuloma is a non-specific inflammatory lesion that can occur in pregnancy. It presents as a lobulated, usually pedunculated lesion, pinkish in colour, found more common in the anterior buccal aspect of maxilla. Pathogenesis of the lesion is linked to female sex hormones, which stimulate an increase of the local production of angiogenic factors, such as vascular endothelial growth factor.[20]

GERD was found in 20 cases mostly in second and third trimester which corresponds to the study of Malfertheiner et al.[21] The effect of the pregnancy hormones on the smooth muscles of the sphincters and the increased transit time of food through the gastrointestinal tract all combine to make these conditions common. These effects become heightened from the second trimester with the peak seen in the third trimester.

Phonoesthesia was reported in 4 cases while Ahmed et al and Zubaidi et al reported 3 such cases, which is attributed to "laryngopathia gravidarum"-caused by changes in the fluid content of lamina propria just beneath the laryngeal mucosa. Symptoms include hoarseness, deeper voice and decreased pitch.[22,23]Acute suppurative lymphadenitis was present in 5 cases. Sub-acute thyroiditis was seen in 5 cases. These cases were evaluated further by ultrasonography, ESR levels and Thyroid function tests, which showed hyperthyroidism in one case in first trimester and hypothyroidism in 4 cases in second and third trimester.

The main limitation of the present study was failure to follow up the pregnant women which was not possible with all the cases after parturition.

## CONCLUSION

The physiological changes that occur during pregnancy are mainly due to the changing levels of estrogens and progesterone hormones and affect every organ including ear nose throat. Otorhinolaryngology manifestations might not be life threatening but can impact significantly on the quality of life therefore it is important that otolaryngologist should recognize these conditions in order to manage and reassure the patient.

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