

Otorhinolaryngological Manifestations of Pregnancy in a Nigerian Tertiary Health Center.

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Abstract

The objective of our study is to assess the frequency and distribution of ENT symptoms according to trimesters in pregnancy and the effect of these symptoms on the quality of life of pregnant women.

This was an observational prospective case control study performed in the department of Otorhinolaryngology, Family Medicine and Obstetrics and Gynaecology in a specialist health institution in Nigeria. A total of 220 women were recruited from the ENT, Family Medicine and Antenatal Clinic for the study, consisting of 110 subject and another 110 age matched controls following ethical approval. Assessment of ENT complaint and Examinations were carried out using a structured proforma for both subject and controls and compared the values and results presented in tables and figures

Age range for the subject was 17 - 43 years with a mean age of 28.4 ± 5.4 years and age range for the controls is 19 – 43 years with a mean age of 28.1 ± 5.3 years. Thirty seven of the subject were in the first trimester another 37 in the second trimester and 36 in the third trimester. The commonest aural manifestations were otalgia and ear fullness, the commonest nasal manifestations were snoring, epistaxis and facial hyperpigmentation while the commonest throat symptoms were Gastro-oesophageal reflux disease, sore-throat and dysphagia.

We conclude that snoring and epistaxis were the most common symptoms in the third trimester, followed by gastro-oesophageal reflux disease which was also found to be predominant in the first and second trimester. All the symptoms were found to increase with advancement in age of pregnancy except for hearing loss, hoarseness and facial weakness which are not statistically significant in our study.

Key words: Pregnancy; Trimester; Otorhinolaryngology; Manifestation; Snoring

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Introduction

Pregnancy is a state where a various changes are observed throughout the body of a woman including the ear, nose and throat (ENT). While some of these changes are said to be physiological, some can become pathological¹. These special changes may be made more stressful with the development of ENT related symptoms and the need for the otolaryngologists and the obstetrician to recognize the potential influences of ENT challenges on the quality of life in a pregnant state¹.

Some of these physiological changes are due to various protein and steroid structured hormones produced by feto-placental unit such as Human Chorionic Gonadotropin (hCG), Human Placental Lactogen (HPL), Human Somatomammotropin², Human chorionic Thyrotropin and Human Chorionic Corticotropin; steroidal ones are Progesterone and Oestrogen and increased activity of maternal pituitary, thyroid and adrenal glands². The hCG levels reaches its highest level between 10-12 weeks of pregnancy which is within the first trimester of pregnancy and remains high during pregnancy. Progesterone and oestrogen levels rise during first and second trimesters and remain constant during third trimester.

The physiological changes in pregnancy are strongly protective. Most of these changes are qualitative in the first trimester and only become mature later³. Vascular changes and physiological expansion of circulating blood volume along with hormonal changes may contribute to various otolaryngological manifestations. The role of hormones on physiological, immunological and inflammatory response is not completely understood².

During pregnancy there is increased prevalence of rhinorrhea or nasal discharge and rhinitis and these has been associated with nasal vascular congestion and progesterone induced vascular smooth muscle relaxation. Also previous studies have reported that sex hormones have effect on histamine (H_1) thus increase in these hormones lead to increase in H_1 receptor expression on nasal epithelium and its associated micro-endothelial cells with an effect on nasal symptoms via histamine receptors⁴. The severity of rhinitis has been shown to be parallel to oestrogen level during pregnancy. Nasal congestion in rhinitis has been found to increase in supine position and cause snore⁵ which on a long term may provoke sinusitis. Symptoms of pregnancy rhinitis are similar to allergic rhinitis (AR) such as daytime fatigue, thirst, decreased

concentration and headache all of which may affect the living quality of a pregnant woman⁵.

This increased vascular flow to the nasal mucosa due to hormonal changes has also been found to contribute to increased frequency of epistaxis in pregnancy and may occur in about 20% of pregnant women⁶. Other possible causes including granuloma gravidarum and nasal haemangioma are not uncommonly reported⁷.

Recent studies on cytokines propose the role of interleukins on nasal physiological changes related to pregnancy^{8,9}. Inspired air through the nasal cavity carries nitric oxide (NO) from sinonasal area to lung with subsequent vasodilatation¹⁰. Mouth breathing leads to mouth dryness and decreases salivary secretion causing tooth decay and poor orodental hygiene with halitosis. Oestrogen secreted during pregnancy increases vascularization on nasal mucosa which may cause ear blockage through its extension of the accompanying oedema into the eustachian tube opening in the nasopharynx which may cause dysfunction and blockage. This decreases the air passage to the middle ear with negative pressures leading to aural fullness, pressure, tinnitus and hearing loss¹¹. Heartburn is another common symptom observed and present as gastroesophageal reflux disease (GERD) is seen in 2/3 of pregnant women. Decreased lower oesophageal sphincter via increased progesterone and oestrogen hormones during pregnancy is the main reason of GERD. It was observed that there was frequent ENT consultations request from the antenatal clinic to review otolaryngological complaint among pregnant women. This stimulated the need to know if those complaint were related to pregnancy state or not was the basis for the study.

The objective of our study is to assess the frequency and distribution of ENT symptoms according to trimesters in pregnancy and the effect of these symptoms on the living quality of pregnant women in North-central Nigeria.

Material and Methods

This study was prospective observational case control study carried out at the antenatal and postnatal clinics and Otorhinolaryngology (ENT) while the control were from well adult clinic of the Family Medicine department in a state established specialist tertiary health institution in north-central Nigeria through January 2016- December 2016. Ethical approval was sought from the ethical review committee of the hospital and informed consent from each of the patients or subjects and control were obtained. The study population consisted of 230 women that were recruited from both O&G, ENT & Family Medicine departments. The study population which consisted of 120 pregnant women out of which 10 pregnant women

failed the inclusion criteria (four pregnant women were excluded from study because of incomplete data and not coming for follow-up, 4 were excluded due to hypertensive complications and 2 due to diabetes complications. Inclusion criteria were pregnant women attending antenatal clinics and ENT clinics during the period of the study. All age-matched consented well adult non-pregnant women with no ENT complaints attending well adult outpatient clinic, consented non pregnant healthy mothers or caregiver who accompanied their wards to ENT clinic without ENT complaint were recruited as controls. Exclusion criteria include smoking, use of snuff, trauma cases involving the ear nose and throat, pregnant women with systemic disease like thyroid disease, HIV and AIDs, hypertension and diabetes were excluded from the study and those with past history of nasal surgeries, ear surgeries and throat surgeries. Thus 110 pregnant as subject and 110 non-pregnant women as control consented to be included in the study. The pregnant women were grouped based on their stage of pregnancy. Group 1: 1-14 weeks (First trimester), Group 2: 15-28 weeks (Second trimester), Group 3: 29-42 weeks (Third trimester). These subjects were followed up to six weeks postpartum during the immunization period and re-assessed to find out if there was resolution of symptoms after delivery.

All women included in the study both subject and control were made to complete a semi structured proforma assisted by the research assistant to obtain the biodata and clinical details related to the study which included Ear, Nose and Throat symptoms some of which included sensation of blockage of ears, sudden hearing loss, facial paralysis, stuffiness, olfactory sensitivity, gum bleed, change in taste, hoarseness, dysphagia, regurgitation, facial pigmentation e.t.c. ENT examination of both the subject and the control was carried out by the same physician in each trimester and in sixth week postpartum period. The examination included anterior rhinoscopy, rigid nasal endoscopy using 18cm 0° and 30° 2.7mm rigid telescope and also endoscopic otoscopy using size 2.7mm 0° hopkins rod telescope with a battery powered light source. Nose was examined for any changes in nasal mucosa and nasal patency. Oral cavity, larynx and pharynx examination were also done. All the procedures were done without anaesthesia because of risk of toxicity to the foetus. All patient with Otolaryngological complaints were evaluated and treated based on the various diagnosis

All symptomatology, examination findings and treatment were noted on structured proforma filled by the subject and control. The medical treatment were given to patients based on the ENT diagnosis while elective surgery was advised after delivery only.

Statistical analysis: The data was tabulated as number of participants with a particular complaint. Chi-square

test was used to determine the relationship between the ear, nose and throat symptoms in pregnancy and non-pregnancy state. Multivariate analysis was done to test the associations of the significant variables.

Results

A total of 110 pregnant and 110 non-pregnant women were enrolled into the study thus serve as the study population. Age range for the subject was 17 - 43 years with a mean age of 28.4 ± 5.4 years and for the control age range was 19 – 43 years with a mean age of 28.1 ± 5.3 years. Thirty seven (37) of the subject were in the first trimester, Thirty seven (37) in the second trimester and thirty six (36) in the third trimester. The subjects were also followed up till six week postpartum period.

Using a pie chart representation the maximum number of complaints among the subjects were in third trimester with about 202 (45.8%) ENT complaints, followed by second trimester with 133 (30.2%) ENT complaints and the least were in first trimester with about 74 (16.8%) otolaryngologic complaints. However there was gross reduction of similar complaint among the control group with about 32 (7.2%) as seen in Figure I with a χ^2 of 198 and a P-Value < 0.0000001 which reveal a strong relationship.

Table 1 showed different ear, nose and throat complaint among the subject and control based on their trimester. Otolological symptoms such as reduced hearing, facial weakness from facial nerve palsy, ear discharge and sudden hearing loss were seen in 3rd trimester. However, tinnitus were found in all trimesters but worse among the subjects in the third trimester. Aural fullness due to eustachian tube dysfunctions was also seen in 3rd trimester though less frequent than other ear complaints. The difference between the severities of the symptom from one trimester to the other and when compared with the

Table 2 - Post-partum Assessment (n = 65)

OTOLOGICAL

Ear pain	5 (4.6)
Ear blockage	10 (9.1%)
Tinnitus	2 (1.8%)

NASAL MANIFESTATION

Nasal blockage /stuffiness	5 (4.6%)
Loss of odour perception	5 (4.6%)
Snoring	12 (10.9%)
Facial hyperpigmentation	10 (9.1%)
Epistaxis	2 (1.8%)

THROAT MANIFESTATION

Gum bleeding	2 (1.8%)
Altered taste	1 (0.9%)
Dysphagia	1 (0.9%)

Table 1 ORL Symptoms among Pregnant women in different stages of pregnancy and the Non-Pregnant women (Control) (n = 110)

ORL manifestations	Frequency Trimester of Pregnancy (%)			Control group	Chi Square	P-value
	1st	2nd	3rd			
Otological						
Ear pain	5 (4.5%)	13 (11.8%)	19 (17.3%)	4 (3.6%)	51.28	< 0.0000001
Ear blockage	8 (7.2%)	11 (10.0%)	12 (10.9%)	6 (5.5%)	22.19	0.00005951
Sudden hearing loss	-	-	2 (1.8%)	-	4.591	0.2043
Facial paralysis	-	-	2 (1.8%)	-	4.591	0.2043
Tinnitus	2 (1.8%)	4 (3.6%)	6 (5.5%)	2 (1.8%)	11.51	0.009254
Reduced hearing	-	4 (3.6%)	2 (1.8%)	-	10.78	0.01295
Nasal manifestation						
Nasal blockage /stuffiness/Discharge	5 (4.5%)	8 (7.3%)	15 (13.6%)	5 (4.5%)	30.84	0.000000917
Loss of odour perception	-	8 (7.3%)	8 (7.3%)	2 (1.8%)	26	0.000009538
Snoring	4 (3.6%)	13 (11.8%)	25 (22.7%)	9 (8.1%)	63.31	< 0.0000001
Facial hyperpigmentation	2 (1.8%)	3 (2.7%)	16 (14.5%)	-	61.01	< 0.0000001
Epistaxis	6 (5.5%)	12 (10.9%)	22 (20.0%)	2 (1.8%)	66.86	< 0.0000001
THROAT MANIFESTATION						
Gum bleeding	1 (0.9%)	5 (4.5%)	7 (6.4%)	2 (1.8%)	16.96	0.0007206
Gum Swelling	-	1 (0.9%)	2 (1.8%)	-	4.202	0.2405
Altered taste	19 (17.3%)	13 (11.8%)	5 (4.5%)	2 (1.8%)	55.82	< 0.0000001
Dysphagia	7 (6.4%)	12 (10.9%)	15 (13.6%)	2 (1.8%)	41	< 0.0000001
Hoarseness	2 (1.8%)	3 (2.7%)	5 (4.5%)	2 (1.8%)	8.292	0.04035
Regurgitation	10 (9.1%)	15 (13.6%)	22 (20.0%)	-	70.99	< 0.0000001
Sorethroat	3 (2.7%)	8 (7.3%)	17 (15.5%)	4 (3.6%)	44.18	< 0.0000001

Table 3 – Examination Findings among the Subjects and Controls

Examination findings	Frequency Trimester of Pregnancy (%)				Control
	1 st	2 nd	3 rd	Total	
Endoscopic Otoloscopy					
Clear External Auditory Canal (EAC)	29(26.4)	30(27.3)	22(20.0)	81(73.6)	97 (88.2%)
Wax	7 (6.4)	4(3.6)	7(6.4)	18(16.4)	9 (8.2%)
Fungal Debris	1(0.9)	2(1.8)	4(3.6)	7(6.4)	4 (3.6%)
Purulent Discharge	-	1(0.9)	3(2.7)	4(3.6)	-
Nasal Endoscopy					
Normal Nose with Engorged turbinates	37(33.6)	35(31.8)	32(29.1)	104(94.6)	110(100)
Nasal polyp	-	2(1.8)	4(3.6)	6(5.5)	-
Throat Examination					
Normal Throat Assessment	36(32.7)	32(29.1)	33(30.0)	102(92.7)	108(98.2)
Enlarged Tonsils	1(0.9)	4(3.6)	3(2.7)	8(7.3)	2(1.8)

control showed indicated a strong statistically significant.

A significantly higher number of patients complained of nasal obstruction and snoring as the pregnancy advances with values worse in the second and third trimester with a p-value of <0.00001, (Table 1). More cases of epistaxis were observed among those in 3rd trimester (20%) followed by 2nd trimester and then least number of patients with epistaxis were seen in 1st trimester (p<0.05). The commonest symptomatic throat manifestation in the first trimester among the subjects was altered taste in 17.3% which when compared to control (1.8%) and regurgitation in 9.1% among the subject and none among the control then followed by an ear blockage in 7.2% among the subject and 5.5% among the control were statistically significant with P-value of <0.00001 (Table 1). Among all the symptoms of presentation sudden hearing loss, reduced hearing, facial weakness, hoarseness and gum swelling with varying ² value and P-value >0.05 thus not statistically significant with no relationship between pregnancy and this otolaryngology symptoms

The otolaryngology symptoms among the subject was compare to post-partum period six weeks after delivery to find out if the symptoms persist. However only 65 (59%) of the subject presented during the post-partum follow up 6weeks post-delivery for the assessment of either improvement or worsening of the ENT symptoms and result are shown in Table 2 below with nasal manifestation still being the most common symptoms observed specifically snoring in 10.9%, followed by facial hyperpigmentation and ear blockage in 9.1% respectively, then nasal blockage and reduced odour perception in (4.6%) respectively. However there was significant drop in the symptoms postpartum with a ² of 63.31 and P value of <0.00001.

Examination of the subjects during each of the trimester and the control indicated that the commonest otological findings in the external auditory canal (EAC) were wax impaction in 16.4%, fungal debris in 6.4% and purulent ear discharge in 3.6% respectively compared to wax impaction of 8.2% and fungal debris

of 3.6% among the control with no case of ear discharge found. However few of the subject had nasal polyps which was an incidental finding among this patients (Table 3). All the patients with Otolaryngologic complaints were treated with decongestants and about 92.7% of the subject said that postural changes like sleeping on the sides is better.

Discussion

In pregnancy state various physiological changes are observed in the body of pregnant woman, ear, nose and throat changes are not excluded and this brings about some changes in the living quality in a pregnancy state. However few women go through this pregnancy and childbirth state without encountering real or potential challenges thus their quality of life is unaffected². These changes may present as complaints concerning the ear, nose throat, head and neck which are not naturally considered in the assessment of quality of life of a pregnant woman. The need for obstetrician to acquaint themselves with these symptoms when their patient present with it for optimal reassurance, better management, or care of the pregnant woman in a safe manner to further improve their quality of life. Some of these symptoms are mild and may present for a short period of time and sometimes are self-limiting. The mean age of the participant of study group was 28.4years which fall within the age when fertility rate in women is at its peak and tend to decline after age 30yrs¹² while the mean age found in our study is higher than the mean age found by Ahmed in 2012¹³ but similar to finding from Akocca et al².

Increased frequency of nasal congestion, nasal obstruction and snoring from the first to third trimester can be attributed to cholinergic effect of progressive increase in placental growth hormone and oestrogen as enumerated in previous study by Ellegard and Karlsson^{2,14,15} thus affecting their quality of sleep¹⁶. Some researchers have reported nasal congestion to be an outcome of neurotransmitters like substance P whose secretion changes via oestrogen and progesterone².

Figure 1 Pie Chart of Frequency of Otolaryngological Complaints among the Subject based on Trimesters of Pregnancy and 6weeks Post delivery

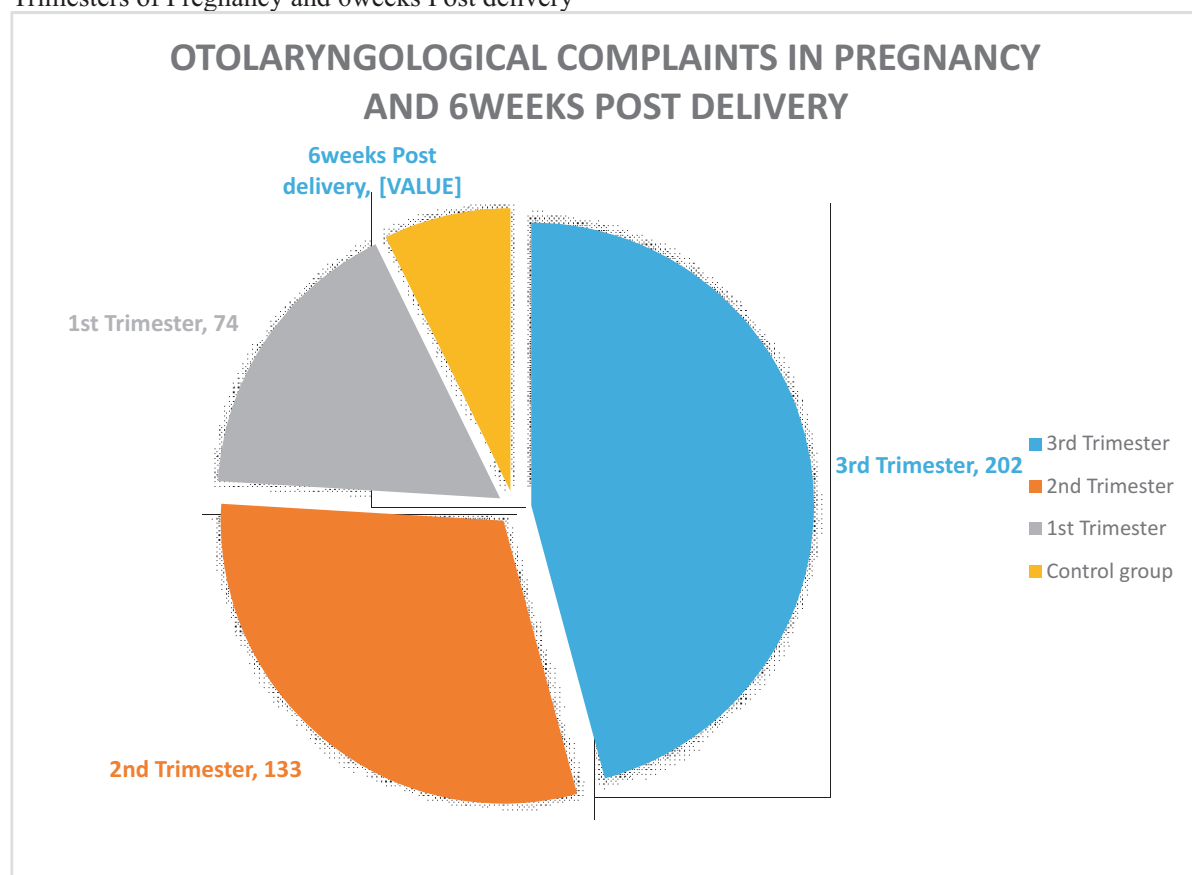
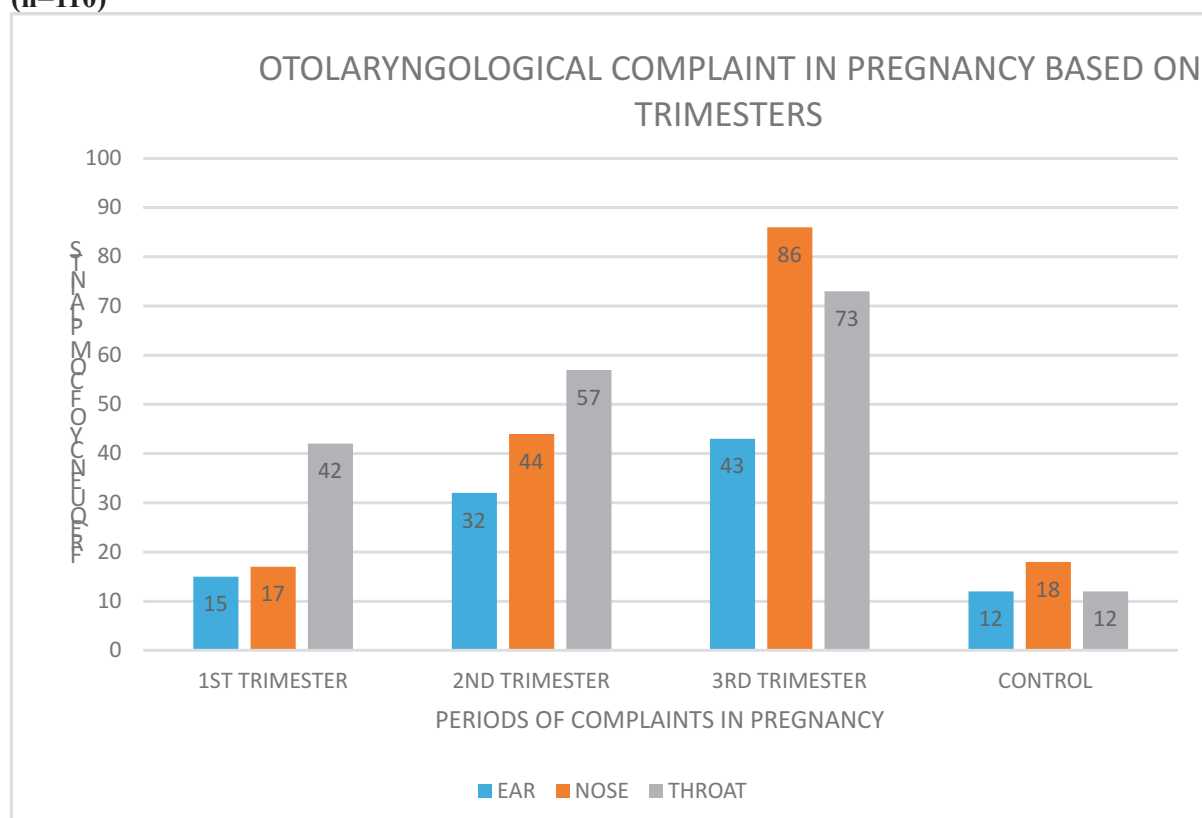


Figure 2 Bar Chart Showing the Otolaryngological Complaints based on Trimesters (n=110)



As seen in our study above complaint of nasal congestion increases with each of the trimester and reach its peak of 16.4% in third trimester compared to 4.5% among the control group this was also found to have dropped to about 4.6% in the post-partum period among the group that presented 6 weeks post-delivery. The value of nasal congestion/discharge found from our study is lower than value found by Akocca et al² but higher than the value found by Ahmed¹³. Most of our subject with nasal complaints such as nasal congestion and discharge were managed symptomatically with both local and systemic decongestant to reduce the snoring, improve the quality of sleep and subsequently the quality of life in pregnancy and further study need to be undertaken to compare if the body mass index above certain level in pregnancy with the nasal congestion

Nasal bleed as a complaint was found to be commoner among those in the 3rd trimester in about 20% which is similar to findings Dungan et al⁶ while about 1.8% was found among the control. Previous study have revealed increased vascular supply to the nasal mucosa due to hormonal changes leading to epistaxis, but other reports have also been published regarding gravida granulomas, nasal hemangiomas leading to severe epistaxis in pregnancy¹⁷ however most of our patient had spontaneous bleed following nasal congestion and some unknown cause. However there may be need to assess the clotting profile in this stage of pregnancy as well.

Snoring was observed in our study to get worse with increasing trimester to as high as among 22.7%. Snoring was not evaluated by Ahmed¹³ and Akocca et al² in their study, the snoring was found to be persistent even in post-partum period in 10.9% compared to 8.1% among the control group which is also high although previous study from our centre on the knowledge and attitude toward snoring showed poor knowledge and attitude towards it is still adaptation¹⁸. Some other studies have found snoring to be more among hypertensive pregnant women¹⁹ however evaluation of blood pressure was not part of our objectives. Sleeping on either sides was found to reduce snoring in our patients following interaction with the subjects. Other studies have found progressive hypoxia in pregnancy from snoring and apnoea to cause poor foetal growth, foetal arrhythmias, day-time somnolence and personality disorders²⁰.

Progressive increase in age of pregnancy is associated with increase in placental growth hormone, oestrogen and increased cholinergic effect as enumerated in previous study by Ellegard and Karlsson^{2,14,15} which indirectly affect the eustachian tube opening worse during the 3rd trimester with symptoms of intermittent autophony, and tinnitus with roaring sensation with effect on the quality of hearing and eventual quality of life of the subject. Tinnitus from previous study have been observed to get worse with

decongestants and upright position²⁰ however most of our subjects placed on decongestant were found to have improved symptoms and quality of life with reduced tinnitus frequency. Symptoms improve in supine position and increased humidity²⁰. Reduced hearing was also observed to increase with the trimesters with about 10% presenting with reduced hearing loss which is likely to be conductive in nature and in worst scenarios could lead to rupture of the tympanic membrane with ear discharge further worsening the hearing loss as observed in 3.6% of the subject who had endoscopic otoscopy however it was not statistically significant as the P-value was > 0.05. Only 1.8% of the subject were observed to develop sudden sensorineural hearing loss in third trimester, this is rare but may be associated with toxemia (Eclampsia)^{20,21} as previous literature have found oestrogen to increases hypercoagulability and vascular occlusion of the inner ear microcirculation²⁰. It may also be an early sign of pre-eclampsia (eclampsia) or pregnancy toxemia if observed earlier than the 3rd trimester. This may be an early warning of eclampsia which is an obstetric emergency and thus early treatment is advised. Nasal polyp found among the subjects on nasal examination may be an incidental findings however the value was not statistically significant with P value > 0.05.

Another otological symptom found in our study was one sided facial weakness which was volunteered in only 2 subjects in 3rd trimester of their pregnancy and was found to be facial nerve palsy on examination. Previous report found it to occur in 3rd trimester or postpartum period and the possible cause was thought to be due to perineural oedema and mechanical compression, viral (Herpes Simplex Virus, HSV) inflammatory reactivation with subsequent demyelination²¹.

Skin colour has an important effect on social and physiological life of human². In our study the facial pigmentation was found to increase with each trimester, however it was not found among the controls which indicated that it comes along with the pregnancy state and the value was statistically significant with P value < 0.05.

Previous studies have shown that gastroesophageal reflux in 50–75% of gravid women. Our study found a progressive increase from 9% to 13% in 1st and 2nd trimester to 20% in the 3rd trimester as the highest which is keeping with the trend in other studies^{2,20,22}. These symptoms became worse in the third trimester due to increased abdominal pressure, decreased gastric emptying and decreased lower oesophageal pressure. This symptoms may predispose to other symptoms of hoarseness where our study found 4.5% compared to the control of 1.8%²² however it was not statistically significant.

Conclusion

In conclusion the otolaryngologic complaints are major complaint among the pregnant women with a mean age of 28.4years, majority of the otolaryngologic were observed in the third trimester, while some may be an early warning of an obstetric emergency such as sudden hearing loss and tinnitus from anaedoctal evidence. All the symptoms were found to increase with increasing age of pregnancy in value except for dygeusia (Altered Taste) in our study and were statistically significant except for sudden hearing loss, reduced hearing, facial nerve weakness and hoarseness. Postural changes was observed to improve snoring and the quality of sleep of pregnant woman, use of decongestant have also been found to reduce the nasal congestion, nasal discharge and tinnitus.

Limitations

The limitation of the study included the inability to assess the pre-pregnant ear, nose and throat status and quality of life of the participants as well as objective assessment of hearing status, and future study will put into consideration the premorbid state compared to the pregnancy state.

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