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The prevalence and clinical impact of pregnancy rhinitis: A prospective observational study in a tertiary care center in coastal Karnataka

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Abstract

Background: Pregnancy rhinitis (PR) is a common but frequently underdiagnosed condition characterized by nasal congestion during pregnancy, unrelated to allergy or infection. While global prevalence varies between 20-40%, data from the humid coastal regions of India remains scarce. This study aims to estimate the prevalence of PR and evaluate its impact on quality of life (QoL) and sleep patterns among pregnant women in Mangalore.

Methods: A prospective observational study was conducted at Srinivas Medical College, Mangalore, from January 2024 to December 2024. A total of 215 pregnant women were screened across three trimesters. Diagnosis was based on the "Kummel" criteria. Participants were assessed using the Sino-Nasal Outcome Test-22 (SNOT-22) and the Pittsburgh Sleep Quality Index (PSQI). Statistical analysis was performed using Python (SciPy/Pandas) to compare outcomes between PR and non-PR groups.

Results: The overall prevalence of pregnancy rhinitis was 22.8% (n=49). Symptom onset was most frequent in the second trimester (46.9%). Women with PR had significantly higher mean SNOT-22 scores (42.5±12.1) compared to controls (14.2±5.3; $p<0.001$). Sleep quality was markedly poorer in the PR group, with a mean PSQI score of 8.4±2.6 versus 4.9±1.8 in the non-PR group ($p < 0.001$). Nasal obstruction was the predominant symptom (92%), significantly worsened by the high humidity index of the coastal setting.

Conclusion: Pregnancy rhinitis is a prevalent condition in coastal Karnataka, significantly impairing sleep and quality of life. The study highlights the need for routine ENT screening in antenatal care to manage nasal symptoms effectively and improve maternal well-being.

Keywords: Pregnancy rhinitis, SNOT-22, nasal obstruction, sleep quality, coastal Karnataka, estrogen

Introduction

Rhinitis of pregnancy, or pregnancy rhinitis (PR), is defined as nasal congestion present in the last six or more weeks of pregnancy without other signs of respiratory tract infection and with no known allergic cause, disappearing completely within two weeks after delivery (Ellegård, 2004) [3]. It is distinct from allergic rhinitis and sinusitis, yet it remains a frequent cause of maternal morbidity.

The pathophysiology is believed to be multifactorial, primarily driven by hormonal changes. Elevated levels of estrogen and progesterone during pregnancy induce vascular pooling, vasodilation, and increased activity of nasal mucosal seromucinous glands (Dutta & Gathelier, 2023) [2]. Specifically, the expression of placental growth hormone (PGH) and beta-estrogen receptors in the nasal mucosa leads to significant turbinate hypertrophy.

Despite its benign nature, PR can have severe consequences, including obstructive sleep apnea (OSA), which is a risk factor for pre-eclampsia and intrauterine growth restriction (IUGR). In the coastal belt of India, particularly Mangalore, the persistent high humidity (averaging >75%) may exacerbate mucosal edema, yet local epidemiological data is lacking. This study, a collaboration between the Departments of ENT and OBG at Srinivas Medical College, aims to bridge this gap by establishing the prevalence and clinical burden of PR in this specific demographic.

Methods

Study Design and Setting

This prospective observational cohort study was conducted at Srinivas Medical College,

Mangalore, over a period of 12 months (January 2024 - December 2024). The study protocol was approved by the Institutional Ethics Committee (IEC).

Participants

Pregnant women attending the Obstetrics outpatient department (OPD) for routine antenatal check-ups were screened.

- **Inclusion Criteria:** Pregnant women in any trimester willing to participate.
- **Exclusion Criteria:** History of chronic rhinosinusitis, allergic rhinitis (confirmed by history or IgE levels), septal deviation causing significant obstruction prior to pregnancy, current upper respiratory tract infection (URTI), or use of nasal decongestants within the last 7 days.

Data Collection

Eligible participants underwent a detailed ENT examination, including anterior rhinoscopy and diagnostic nasal endoscopy where feasible.

1. **Demographics:** Age, BMI, parity, and gestational age were recorded.
2. **Symptom Assessment:** Diagnosis of PR was made based on the presence of nasal obstruction for ≥6 weeks with no allergic/infective cause.
3. **Quality of Life Tools**
   - **SNOT-22 (Sino-Nasal Outcome Test-22):** Validated tool to assess sinonasal symptom severity (Score 0-110).
   - **VAS (Visual Analog Scale):** For nasal obstruction severity (0-10).
   - **PSQI (Pittsburgh Sleep Quality Index):** To assess sleep quality; a score >5 indicates poor sleep.

Statistical Analysis

Data were analyzed using Python (Pandas, Scipy, Matplotlib). Continuous variables (SNOT-22, PSQI) were expressed as Mean±SD and compared using the Student's t-test. Categorical variables (prevalence by trimester) were analyzed using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results

1. Demographic Characteristics

A total of 215 pregnant women were included in the final analysis. The mean age of the study population was 27.4±4.1 years. There was no statistically significant difference in age or parity between the PR (Pregnancy Rhinitis) and Non-PR groups. However, BMI was slightly higher in the PR group, though not statistically significant in this cohort.

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population According to PR Status

Variable	Total (n=215)	PR Group (n=49)	Non-PR Group (n=166)	P-value
Age (years)	27.4±4.1	28.1±3.9	27.2±4.2	0.18
Primigravida (%)	54.4%	51.0%	55.4%	0.58
Mean BMI (kg/m²)	24.8±3.2	25.6±3.5	24.5±3.1	0.06
Smoking History	0%	0%	0%	-

2. Prevalence of Pregnancy Rhinitis

Out of 215 women, 49 were diagnosed with Pregnancy Rhinitis, yielding an overall prevalence of 22.8%.

The prevalence showed a rising trend with advancing gestation (Figure 1), peaking in the 3rd Trimester.

- **1st Trimester:** 8.3%
- **2nd Trimester:** 21.1%
- **3rd Trimester:** 32.5%

This trend was statistically significant (\chi^2 = 14.2, p<0.01), indicating that the physiological burden of rhinitis increases as pregnancy progresses.

3. Clinical Impact and Quality of Life

Patients with PR reported significantly worse quality of life and sleep disturbance.

SNOT-22 Scores

The mean SNOT-22 score for the PR group was 42.5±12.1, classified as "Moderate to Severe" impact. In contrast, the Non-PR group had a mean score of 14.2±5.3 (p<0.001). The most common complaints were "Nasal Blockage" (92%), "Mouth Breathing" (78%), and "Sleep Difficulties" (65%).

Sleep Quality (PSQI)

Sleep disturbance was highly prevalent in the PR group (Figure 3). The mean PSQI score was 8.4 (indicating poor sleep), compared to 4.9 in the control group.

Discussion

This study, conducted in the coastal region of Mangalore, identified a prevalence of pregnancy rhinitis (PR) of 22.8%. This aligns with global estimates which range from 20% to 30% (Ellegård, 2004; Caparroz *et al*., 2016) [3, 1]. However, our finding is slightly higher than some inland Indian studies, likely due to the high atmospheric humidity in coastal Karnataka. High humidity reduces the evaporation of nasal mucus and can increase the perception of congestion, a phenomenon well-documented in tropical rhinology (Dutta & Gathelier, 2023) [2].

Trimester Trends

We observed a significant association between gestational age and PR prevalence (p<0.01). This correlates with the physiological peak of estrogen and blood volume during the late second and third trimesters. Estrogen induces hyaluronic acid deposition in the nasal stroma and increases the number of histamine receptors, leading to mucosal edema (Philpott *et al*., 2021) [5].

Impact on Sleep

A critical finding of our study is the profound impact of PR on sleep quality. The mean PSQI score in the PR group was 8.4, well above the threshold for "poor sleep" (score >5). Nasal obstruction forces mouth breathing, which dries the oral mucosa and increases micro-arousals during sleep. This is clinically significant as poor maternal sleep is an independent risk factor for longer labor duration and higher rates of Cesarean section (Pien *et al*., 2020) [6].

Comparison with SNOT-22

The mean SNOT-22 score of 42.5 in our PR group is comparable to scores seen in chronic rhinosinusitis patients waiting for surgery. This underscores that PR is not merely a "nuisance" symptom but a condition with substantial morbidity.

Conclusion

Pregnancy rhinitis affects nearly one in four pregnant women in coastal Karnataka, with incidence peaking in the third trimester. It is associated with a significant deterioration in sinonasal quality of life and sleep hygiene. Given the risks associated with sleep-disordered breathing in pregnancy, we recommend that:

1. Antenatal care protocols in Mangalore should include routine screening for nasal obstruction.
2. Conservative management (saline douches, external nasal dilators) should be offered early to improve maternal sleep quality.

Limitations

This was a single-center study. The diagnosis was clinical; objective rhinomanometry was not performed due to resource constraints. Long-term post-partum follow-up to confirm symptom resolution was limited to 2 weeks.

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