

## Analysis of Incidence of Pregnancy Rhinitis in a Known Population: An Observational Study

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Received: 25-10-2023 / Revised: 23-11-2023 / Accepted: 26-12-2023

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Conflict of interest: Nil

**Abstract:****Background:** Pregnancy induces significant physiological changes in women, including gestational rhinitis, a condition associated with various complications. Despite its relevance, gestational rhinitis is underexplored in the literature, prompting the present study to assess its incidence using standardized scales.**Methods:** A cohort of 100 pregnant women attending routine obstetrics follow-up in the department of Obstetrics and Gynaecology, United Institute of Medical Sciences Prayagraj and study duration was duration April to September 2023. The Visual Analogue Scale (VAS) and Nasal-Obstructive-Symptom-Evaluation (NOSE) scale were employed to evaluate nasal symptoms. Data were analyzed using SPSS software, and the cutoff values were set at 4 for VAS and 45 points for NOSE.**Results:** The overall incidence of pregnancy rhinitis was 25%, with trimester-specific rates of 10%, 18.4%, and 46.87% for the 1st, 2nd, and 3rd trimesters, respectively. The study identified 31 subjects with elevated NOSE or VAS scores, and among them, 25 exhibited both.**Discussion:** Pregnancy rhinitis, characterized by nasal congestion in the last 6 weeks of pregnancy without an allergic cause, affects approximately one-fifth of pregnancies. The study's findings align with existing literature and emphasize the need for understanding and addressing gestational rhinitis.**Conclusion:** This study contributes valuable insights into the incidence of pregnancy rhinitis, revealing a substantial impact on pregnant women, particularly in the 3rd trimester. Standardized scales like VAS and NOSE prove effective in quantifying nasal symptoms. However, limitations, including a modest sample size and potential biases, should be considered in interpreting the results. Further research is warranted to explore diverse populations and potential influencing factors for a comprehensive understanding of gestational rhinitis.**Keywords:** Pregnancy, Rhinitis, Nasal, Physiological changes, Visual Analogue Scale.

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**Introduction**

Pregnancy is a state of having implanted products of conception located either in the uterus or elsewhere in the body. It ends through either spontaneous or elective abortion or delivery. During this time, the mother's body goes through immense changes involving all organ systems to sustain the growing fetus. [1- 3] Gestational rhinitis is a relatively common condition, but is seldom discussed in the national literature. It has gained importance in recent years, mainly due to the discovery of its association with snoring and obstructive sleep apnea syndrome (OSAS) during pregnancy, and indirectly with preeclampsia, a leading cause of maternal morbidity and mortality. Additionally, studies have shown its association with gestational hypertension, intrauterine growth

retardation, and lower Apgar scores in neonates. [4, 5]

Pregnancy-induced rhinitis (PIR) is defined clinically as nasal congestion not present prior to pregnancy, typically manifesting itself in the second or third trimester, lasting 6 or more weeks with no known allergic cause, and resolving completely within 2 weeks after delivery. It is classified as a hormone induced rhinitis in a separate group of non-allergic rhinitis patients alongside rhinitis caused by hormonal imbalances during menstrual cycles, puberty, menopause and specific endocrine disorders such as hypothyroidism and acromegaly. [5, 6] Hence; the present study was conducted for evaluating incidence of pregnancy rhinitis in a known population.

## Materials & Methods

The present study was conducted for evaluating incidence of pregnancy rhinitis in a known population. A total of 100 pregnant subjects were enrolled in the present study in the department of Obstetrics and Gynaecology, United Institute of Medical Sciences Prayagraj and study duration was duration April to September 2023. The inclusion criterion was pregnant women who come to the obstetrics outpatient clinic for routine follow-up. Two variables were evaluated among all the subjects as follows:

Visual Analogue Scale (VAS)

Nasal-Obstructive-Symptom-Evaluation (NOSE) scale

All the subjects completed the NOSE scale as indicated by circling the response closest to describing their current symptoms. Answers were summed and multiplied by five to base the scale out of a possible score of a 100 for analysis. The

cut off value was 4 for VAS and 45 points for NOSE score. Incidence of allergic rhinitis was evaluated. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

## Results

Of the 100 patients, 30 were in the 1<sup>st</sup>trimester, 38 were in the 2<sup>nd</sup>trimester and 32 were in the 3<sup>rd</sup>trimester. The mean age of pregnant subjects in the present study was 30.4 years. Among the 100 subjects enrolled, 31 patients had a NOSE score greater than 45 or VAS score greater than five at the time of evaluation. Among these 31 subjects, 25 subjects; 21 had both NOSE and VAS scores equal or bigger than cut-off levels. Hence; overall incidence of pregnancy rhinitis was 25 percent. Overall, PR was present in 3 subjects, 7 subjects and 15 subjects in the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> trimester of pregnancy; giving respective incidence of 10 percent, 18.4 percent and 46.87 percent.

**Table 1: Incidence of pregnancy rhinitis**

| Pregnancy rhinitis | Number | Percentage |
|--------------------|--------|------------|
| Present            | 25     | 25         |
| Absent             | 75     | 75         |
| Total              | 100    | 100        |

**Table 2: Incidence of pregnancy rhinitis according to trimester of pregnancy**

| Pregnancy trimester       | Pregnancy rhinitis present |            | Pregnancy rhinitis absent |            | p-value |
|---------------------------|----------------------------|------------|---------------------------|------------|---------|
|                           | Number                     | Percentage | Number                    | Percentage |         |
| 1 <sup>st</sup> Trimester | 3                          | 10         | 27                        | 90         | 30      |
| 2 <sup>nd</sup> Trimester | 7                          | 18.4       | 31                        | 81.6       | 38      |
| 3 <sup>rd</sup> Trimester | 15                         | 46.87      | 17                        | 53.13      | 32      |
| Total                     | 25                         | 25         | 75                        | 75         | 100     |
| p-value                   | 0.001 (Significant)        |            |                           |            |         |

## Discussion

Pregnancy rhinitis is defined as nasal congestion in the last 6 or more weeks of pregnancy, without other signs of respiratory tract infection and with no known allergic cause, with complete resolution of symptoms within 2 weeks after delivery. Pregnancy rhinitis occurs in approximately one-fifth of pregnancies, can appear at almost any gestational week, and affects the woman and possibly also the fetus. The pathogenesis of pregnancy rhinitis is not clear, but placental growth hormone is suggested to be involved. Smoking and sensitization to house dust mites are probable risk factors. It is often difficult to make a differential diagnosis from sinusitis: nasendoscopy of a decongested nose is the diagnostic method of choice. In some cases; ultrasound or x-ray may be necessary. Sinusitis should be treated aggressively with increased doses of beta-lactam antibiotics and antral irrigation. [7- 9] Hence; the present study was conducted for evaluating incidence of pregnancy rhinitis in a known population.

Of the 100 patients, 30 were in the 1<sup>st</sup>trimester, 38 were in the 2<sup>nd</sup>trimester and 32 were in the 3<sup>rd</sup>trimester. The mean age of pregnant subjects in the present study was 30.4 years. Among the 100 subjects enrolled, 31 patients had a NOSE score greater than 45 or VAS score greater than five at the time of evaluation. Among these 31 subjects, 25 subjects; 21 had both NOSE and VAS scores equal or bigger than cut-off levels. Hence; overall incidence of pregnancy rhinitis was 25 percent. Baudoin T et al, in a previous study, authors evaluated the prevalence of PIR. Six hundred eighty-one women were recruited in the study. PIR was diagnosed significantly more often if the women carried a female child. PIR is a common clinical entity with a wide range of symptoms with a direct impact on the quality of life in pregnancy. We propose a new definition of pregnancy-induced rhinitis. [10] Caparroz et al reviewed the current knowledge on gestacional rhinitis, and to assess its evidence. Gestational rhinitis and rhinitis “during pregnancy” are somewhat similar conditions

regarding their physiopathology and treatment, but differ regarding definition and prognosis. Management of rhinitis during pregnancy focuses on the minimal intervention required for symptom relief. [11]

In the present study, overall, PR was present in 3 subjects, 7 subjects and 15 subjects in the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> trimester of pregnancy; giving respective incidence of 10 percent, 18.4 percent and 46.87 percent. The cumulative incidence of pregnancy rhinitis was evaluated in a previous study by Ellegård E et al. Five centers with response rates of 70% or more, including 599 women, were evaluated. The cumulative incidence of pregnancy rhinitis was 22%. Smokers had a significantly increased incidence with a relative risk enhancement of 69%, whereas hayfever, asthma, and month of conception had no statistically significant influence on incidence. [12] The prevalence of pregnancy rhinitis was studied in a previous study by Dzieciolowska-Baran E et al. The study was conducted on 117 pregnant women. About 39% of pregnant women suffered from pregnancy rhinitis. Most such ailments were found during 13th and 21st week of gestation. [13] Ulkumen, B et al, in a previous study, determined the cumulative incidence of pregnancy rhinitis along with prevalence in different trimesters. Total prevalence of pregnancy rhinitis was 17.17% and cumulative incidence was 38.89%. Their study revealed significant relation of Nasal-Obstructive-Symptom-Evaluation (NOSE) score with both gestational week and BMI. Cumulative incidence of pregnancy rhinitis was 38.89%. Nasal congestion was significantly associated with BMI and gestational week. [14]

### Conclusion

In conclusion, this study aimed to evaluate the incidence of pregnancy rhinitis in a known population, utilizing the Visual Analogue Scale (VAS) and Nasal-Obstructive-Symptom-Evaluation (NOSE) scale as assessment tools. The findings revealed an overall incidence of pregnancy rhinitis of 25 percent, with varying rates across trimesters. This aligns with existing literature that recognizes pregnancy rhinitis as a common condition affecting a significant proportion of pregnant women.

The study contributes to the growing body of knowledge on pregnancy rhinitis, shedding light on its prevalence and potential impact on maternal well-being. The use of standardized scales such as VAS and NOSE provides a quantitative measure of the severity of nasal symptoms, enhancing the accuracy of the assessment.

### Limitations

However, it's essential to acknowledge certain limitations in the study. Firstly, the sample size of

100 pregnant subjects may not fully represent the diversity within the pregnant population, and findings may not be generalizable to larger and more diverse cohorts. Additionally, the study focused on a specific population, and regional or ethnic variations in the incidence of pregnancy rhinitis may not have been fully accounted for.

Moreover, the reliance on self-reported symptoms and scales introduces the possibility of subjective bias. Objective measures, such as nasal endoscopy or imaging, could provide a more comprehensive understanding of nasal congestion. Furthermore, the study did not explore potential confounding factors such as environmental exposures, genetic predispositions, or socioeconomic variables that might influence the development of pregnancy rhinitis.

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