STUDY ON PREVALANCE OF GESTATIONAL ANEMIA IN PREGNANT WOMEN WITH AND WITHOUT PREGNANCY SPECIFIC ANXIETY IN HYDERABAD

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Abstract
Background: *Pregnancy requires an ample supply of nutrients to support fetal growth and development. This may result in a shortage of nutrients and an increase in worries during pregnancy. This excessive anxiety during pregnancy, commonly called as Pregnancy Specific Anxiety (PSA) usually interferes with the absorption of iron and causes gestational anemia.*

Material & Methods: *The current study recruited 187 participants visiting "The Department of Gynecology and obstetrics" at Liaquat University Hospital, Hyderabad and divided them into two groups i.e. Pregnant women with PSA (n = 93) and Pregnant women without PSA (n = 94). Each study subject was asked detailed demographic questionnaires and tested for CBC to estimate hemoglobin levels.*

Results: *Relationship of gestational anemia was evaluated between both study subjects. In PSA group 82% of the participants had lower levels of Hemoglobin while compared to the control group only 51% patients had anemia. Higher HAM-A scores in anemic subjects were computed against lower scores in their counterparts. This substantial difference and p-value <0.0001 is strongly suggestive of relationship of PSA with anemia.*

Conclusion: *The present study significantly showed the direct relationship of anemia and PAS. Treatment of gestational anemia may not only require nutritional supplementation but may also need psychiatrics intervention.*

INTRODUCTION

The period from conception to labor is pregnancy which endures significant metabolical changes in a women body. Increased energy demands, a higher metabolic rate, and an increased need for vitamins and minerals to support fetal development (Johnson et al., 2023). Kim & Lee, 2022 observed an upraise in the quantity of blood in pregnant women so they could meet their own and their fetus's demands (Kim & Lee, 2022). The requirement for iron during pregnancy rises by two to three times to support

increased blood volume and fetal growth (Nguyen et al., 2022). Martinez et al. (2024) established lower hemoglobin concentration as plasma volume expands more rapidly than hematocrit. Globally, the prevalence of gestational anemia is approximately 38% (Patel & Singh, 2023). World Health Organization specifies hemoglobin (Hb) < 11 g/dL as gestational anemia (WHO, 2023).

Pregnancy-specific anxiety (PSA) refers to a distinct form of anxiety characterized by worries and uncertainties explicitly related to pregnancy (Garcia et al., 2022). PSA and IDA can thought to be interconnected because PSA often leads to poor dietary habits and reduced iron intake, increasing the risk of IDA (Lee et al., 2023). Anxiety activates the hypothalamic-pituitary-adrenal (HPA) axis, raising cortisol levels, which impairs iron absorption and metabolism (Smith & Nguyen, 2024). Iron deficiency can directly disrupt neurotransmitter production which may leads to mood and anxiety. Iron deficiency can worsen anxiety symptoms, creating a cyclical relationship between PSA and IDA (Thompson et al., 2022). Pregnancy's increased iron demands, due to expanded blood volume and fetal growth, are further heightened by PSA-related stress (Wilson & Patel, 2023). Moreover, Chowdhury & Rahman, 2023 predicted fear and forgetfulness as a common symptom of PSA that usually results in ignorance in perinatal care and missing out iron supplementation. Symptoms like fatigue and cognitive impairment of anemia, can superimpose anxiety, adding to the psychological burden of pregnancy (Ahmed et al., 2024). This study is aimed to conclude the link of higher incidence of gestational anemia in PSA patients in Hyderabad, Sindh.

MATERIAL AND METHODS

Study Design & Setting: This "comparative cross-sectional study" was conducted at the Department of Zoology, University of Sindh in collaboration with the Diagnostic and Research Laboratory and the Department of Gynecology and obstetrics at Liaquat University Hospital, Hyderabad, Sindh, from **February 2024 to December 2024**. This study prime objective is to establish link between higher incidences of gestational anemia among PSA patients compared to healthy controls.

Participants:
187 participants' were recruited through "Non-probability Purposive" sampling technique. Pregnant women in their 3rd trimester with singleton pregnancy age 25-38 years were included while women with twin pregnancy, essential hypertension, women already on anti-hypertensive therapy, using anti-depression / anti-psychotic, and those who had endocrinological disorders were excluded.

Data Collection:
All participants who met the selection criteria provided informed consent without any financial implication and were educated regarding the study, its aim and objectives. Initially, a medical professional interviewed each participant for diagnosis of anxiety. We divided study subjects into two groups based on their scores on the Hamilton Anxiety Scale-A. The first group included Pregnant women with Pregnancy-Specific Anxiety (PSA) (n = 93), while the second group comprised of Pregnant women without PSA (n = 94).

Detailed questionnaires were followed regarding demographic characteristics like age, weight, BMI, residence, etc.

Complete Blood Count (CBC) tests were performed after collecting blood samples from each study subject using a fully automated analyzer to estimate hemoglobin levels.

Ethical Consideration:
Ethical approval was obtained from the Ethical Review Committee of University of Sindh, Jamshoro.

Statical Analysis:
Data were initially entered into **Microsoft Excel.** Numerical variables were presented as **mean ± standard deviation (SD).** Categorical variables were expressed as frequencies and percentages.

RESULTS AND DISCUSSION
The elucidatory statistics pointed out paramount insights into the study groups' age, hemoglobin concentration, anxiety levels, and BMI of the study subjects. The **mean age** was determined to be **27.83 ± 5.43 years**. The **mean hemoglobin level** was **9.97 ± 3.03 g/dL**, indicating a higher prevalence of

gestational anemia. Low hemoglobin levels in this study highlighted the inclining danger of postpartum hemorrhage (PPH) and preterm birth (Smith et al., 2023).

The **mean Hamilton Anxiety Score** was **20.16 ± 9.86**, indicating the presence of anxiety among pregnant participants. The **mean BMI** of the subjects was **28.87 ± 4.87 kg/m²**, sorting obesity as a significant risk factor in studied individuals for hypertensive disorders, gestational diabetes and complicated labor (Johnson & Lee, 2024).

Figure I expresses stratified of hemoglobin level by anxiety status, The PSA group had a mean Hb of 9.06 g/dL, while the Non-PSA group had a higher mean Hb of 10.88 g/dL. This suggests that women experiencing PSA are at a greater risk of anemia. In a study conducted by Beard et al. (2005), he also reported mean hemoglobin level of approximately 9.5 g/dL were significantly associated with increased risks of postpartum emotional disturbances, including anxiety and depression.
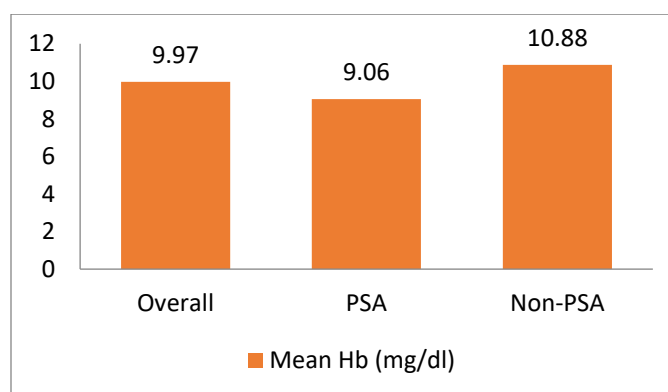

Figure I: Mean Hb level in Study groups

The findings of table I provide a significant association between Pregnancy-Specific Anxiety (PSA) and the prevalence of anemia in pregnant women. The data indicate that **82%** of pregnant women with PSA were anemic compared to **51%** of non-PSA pregnant women, with an overall anemia prevalence of **66%** in the study population. This substantial difference and p-value <0.0001 is strongly suggestive of relationship of PSA with anemia.

Study Variable	Pregnant Women with PAS (n=93)	Non-PAS Pregnant Women (n=94)	Total (n=187)	P-Value
Anemia	76 (82%)	48 (51%)	124 (66%)	<0.0001
No Anemia	17 (18%)	46 (49%)	63 (34%)	

Table I: Frequency of anemia in Study groups

Another research conducted by Zhao et al. (2020), reported association of psychological stress during pregnancy and higher prevalence of gestational anemia i.e. 60%, noting that lower risk of anemia in the absence of psychological stress. Their study supports the idea that anxiety-related physiological responses can hinder iron metabolism, thereby exacerbating anemia in pregnant women.

Li et al. (2022) found lower rate of clinging of women with high risk of gestational anemia to oral iron supplementation if they have PSA, further increasing the risk of anemia. Educational programs focusing on the importance of iron-rich diets and adherence to supplementation can mitigate the risk of anemia (Pasricha et al., 2018).

Table II shows the mean of Hamilton Anxiety Score across the distinct study groups. The table strongly highlights the association between anxiety levels and anemia status among pregnant women. Pregnant women with anemia who also experience Pregnancy-Specific Anxiety (PSA) had a markedly higher mean HAM-A score of **31.70 ± 5.9,** in contrast to **12.6 ±**

3.6 in the non-PSA group. **Cakir and Sancakdar (2019)** also find out significantly higher anxiety levels in hospitalized anemic patients when compared to non-anemic counterparts. While **Ghahari et al. (2020)** proposed that pregnant female with IDA scored higher on HAM-A scales, indicating that anemia not only affects physical health but also exacerbates anxiety during pregnancy (Ghahari, Mohammadi, & Rezaei, 2020).

Study Variable	Pregnant Women with PAS (n=93)	Non-PAS Pregnant Women (n=94)	Total (n=187)
	Mean+SD	Mean+SD	Mean+SD
Anemia *(n=124)*	31.70+5.9	12.6+3.6	24.31+6.4
No Anemia *(n=63)*	22.50+2.9	8.23+1.3	12.0+8.4
Overall *(n=187)*	29.97+7.6	10.46+2.4	20.16+9.8

Table II: Mean of Hamilton Anxiety Score in Study groups

Among non-anemic women, PSA participants had a mean anxiety score of 22.50 ± 2.9, while non-PSA participants had a much lower score of 8.23 ± 1.3. While these scores are lower than in the anemic group, they still reflect significant anxiety levels in PSA participants. Darling et al. (2021) highlight that even in the absence of anemia, anxiety during pregnancy can lead to poor nutritional choices and non-adherence to iron supplementation, potentially increasing the risk of anemia later in pregnancy.

The overall mean HAM-A scores are 29.97 ± 7.6 for PSA participants and 10.46 ± 2.4 for non-PSA participants, with an overall mean of 20.16 ± 9.8. The findings align with Karababa and Cinar (2018) as well as Öztürk, Ö., & Uğur, M. (2021), who observed higher anxiety scores in anemic patients using HAM-A scales, particularly female.

CONCLUSION
In conclusion, the present study significantly showed the inverse association of lower hemoglobin level and HAM-A scores. Routine screening for anemia and anxiety should be standard practice in perinatal care to decrease maternal and fetal complications. Integrative treatment targeting anxiety should also be given along with nutritional supplementation.

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CONFLICT OF INTEREST
The authors have affirmed no any conflict of interest.

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