

Hemoglobin trends across gestational age in Emirati pregnant women: The Mutaba'ah Study

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Background:

Iron deficiency anemia (IDA), as a result of low hemoglobin (Hb) level, is a leading cause of many adverse pregnancy outcomes. IDA and its longitudinal course and pattern among pregnant women in the United Arab Emirates (UAE) are not well understood.

Aim:

This study aims to estimate and characterize the hemoglobin level and its changing pattern across gestational periods, as well as identify factors associated with these changes among Emirati pregnant women.

Materials and Methods:

The analysis was performed using data from the ongoing Maternal and Child Health cohort study – The Mutaba'ah Study. All eligible women recruited in the study were included in this analysis (N=1,120). KML machine learning algorithm was applied to identify distinct cluster trajectories of Hb measurements during pregnancy across two distinct periods of the 1st and the 3rd trimesters. Descriptive statistics were used to profile the study participants. Multinomial multivariable logistic regression was employed to identify risk factors for negative changes in Hb concentration. All analyses were performed using R software version 4.0.3

Results:

The three identified clusters – A, B and C – had median Hb concentrations (g/L) of 123 [IQR = 118-128], 118 [IQR = 114-123], and 104 [IQR=98 - 109] during the 1st trimester respectively (Figure 1). During the 3rd trimester, these values were 119 [IQR = 115 - 125], 100 [IQR = 93-105], and 108 [IQR = 102-113] respectively. Based on average Hb level changes, Clusters B and C saw a decrease and an increase in Hb level respectively, while Cluster A remained relatively stable within the normal range (≥ 110 g/L) during the 3rd trimester. A higher gravida (AOR=1.85, 95% CI=1.05-3.24, P<0.05) and being diabetic (AOR=3.39, 95% CI=1.19-9.62, P<0.05) were positively associated with a clinically significant decrease in Hb concentration; Being parous (AOR=0.50, 95% CI=0.28-0.88, P<0.05) and having a higher level of education (AOR=0.57, 95% CI=0.39-0.82, P<0.01) were negatively associated with a clinically significant decrease in Hb concentration (Table 1). Use of iron supplements before pregnancy (AOR=2.42, 95% CI=1.34-4.38, P<0.01), and a higher level of education (AOR=0.58, 95% CI=0.39-0.88, P<0.01) were positively and negatively associated with increasing Hb level respectively.

With regards to IDA, 25.1% and 51.1% of the women had IDA during the 1st and the 3rd trimesters respectively. Most (68%) of those who were anemic during the 1st trimester remained so during the 3rd trimester.

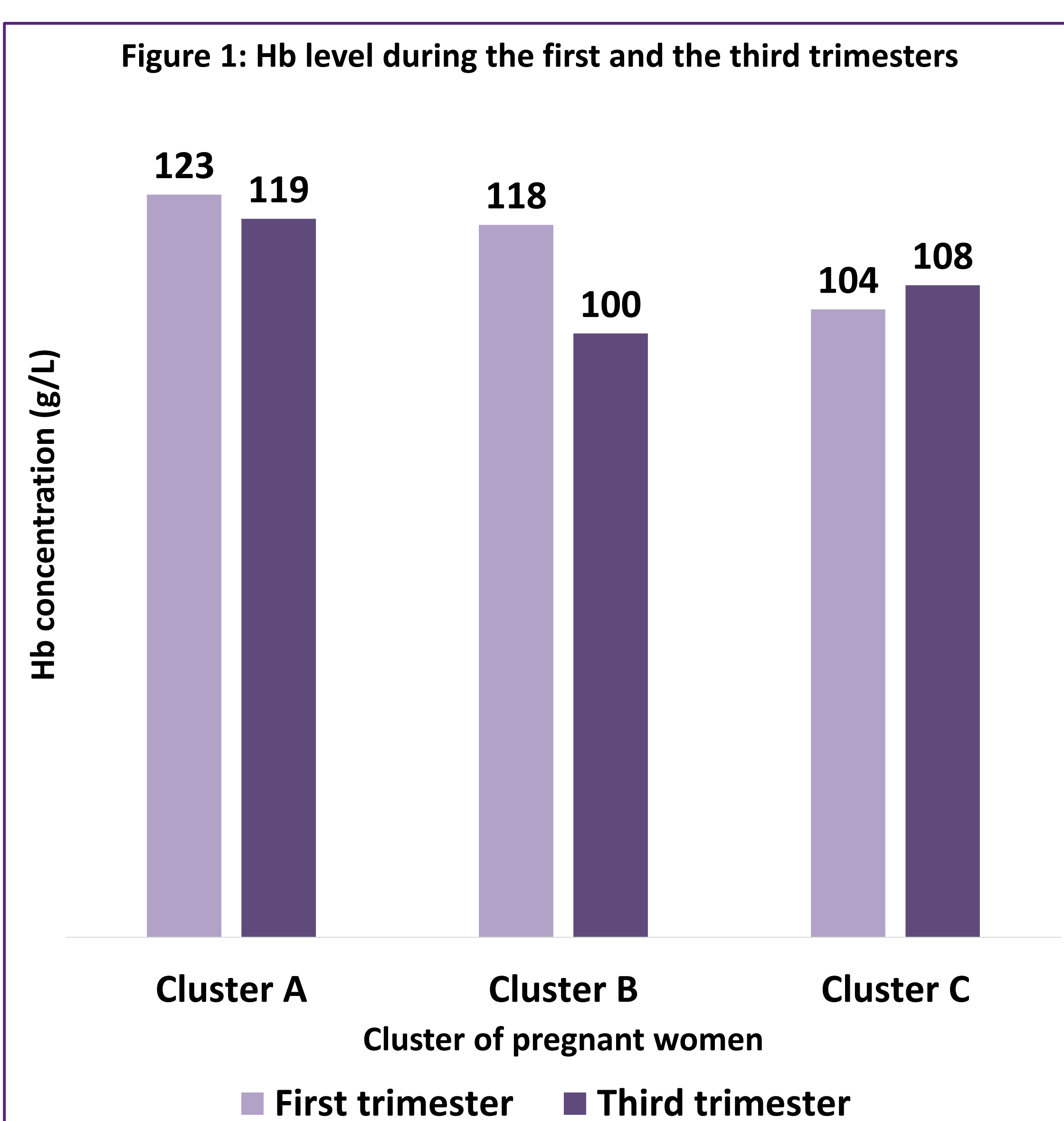


Table 1: Multivariable multinomial logistic regression for factors associated with being in B (Decreased) Cluster or C (Increased) Cluster with reference to the A (Normal/Stable) Cluster

Predictors	B versus A	C versus A
	AOR (95% CI)	AOR (95% CI)
Age	0.99 [0.96, 1.03]	1.01 [0.97, 1.05]
Body mass index	1.01 [0.98, 1.05]	0.97 [0.94, 1.01]
Gravida		
≤2	1	1
>2	1.85 [1.05, 3.24]*	1.64 [0.89, 3.03]
Parity		
0	1	1
≥1	0.50 [0.28, 0.88]*	0.97 [0.50, 1.86]
Diabetes		
No	1	1
Yes	3.39 [1.19, 9.62]*	1.81 [0.54, 6.07]
Iron before pregnancy		
No	1	1
Yes	1.33 [0.73, 2.44]	2.42 [1.34, 4.38]**
Education		
Secondary or lower	1	1
Higher than secondary	0.57 [0.39, 0.82]**	0.58 [0.39, 0.88]**

* p < 0.05, ** p < 0.01; AOR – adjusted odds ratio; CI – confidence interval

This model was constructed keeping age and iron use during pregnancy fixed at each step

Conclusions

- ❖ Majority of the women experienced IDA at some point during pregnancy.
- ❖ Treatment failure rates among the anemic pregnant women seemed high.
- ❖ Management of IDA among the women should be prioritized during the antenatal visits with particular attention to treatment adherence, women with higher gravida (>2), parous, diabetic and of lower education.

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