Tracing the Hidden Imprint of Hemoglobin O-Arab: A Nationwide Epidemiologic Insight”

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ABSTRACT

Hemoglobin O-Arab (HbO-Arab) is a rare β-globin variant characterized by the substitution of glutamic acid with lysine at position 121. Although typically asymptomatic in heterozygous form, its co-inheritance with other variants such as HbS or β-thalassemia can lead to clinically significant disease. Comprehensive population-level data on HbO-Arab in Saudi Arabia are scarce. A retrospective, population-based analysis of the PMSGC database was conducted from January 2011 to December 2018. Demographic, hematologic, and geographic data were extracted from the SEHA platform. Hemoglobin variants were identified using both high-performance liquid chromatography and capillary electrophoresis. Prevalence was calculated per 100,000 screened individuals. Among 1,871,184 screened individuals, 126 cases of HbO-Arab were identified, yielding a prevalence of 6.73 per 100,000 (95% CI: 5.60–7.99). Females represented 50.2% of cases. The Eastern Province had the highest regional prevalence (13.9 per 100,000), accounting for 42.9% of all cases. Mean hemoglobin concentration among carriers was 13.8 ± 2.0 g/dL, mean RBC count was 5.5 ± 0.7 × 10^{12}/L, mean MCV was 78.5 ± 7.0 fL, and mean MCH was 25.7 ± 2.9 pg. HbO-Arab is an uncommon hemoglobin variant in Saudi Arabia with marked regional clustering, particularly in the Eastern Province. These findings support the importance of accurate laboratory identification within national screening programs.

Keywords: Hemoglobin O Arab, HbO Arab, Saudi Arabia, Hemoglobinopathies, SEHA

Bahrain Med Bull 2026; 48 (2): 3109-3112

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