Epidemiology of Hemoglobin D in the Saudi Population

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ABSTRACT

Rationale: Hemoglobin acts as a main molecular vehicle for oxygen transport. Genetic mutations in the hemoglobin gene can lead to structural and functional anomalies. Hemoglobinopathies are the most common monogenic inherited disorders. In the Middle East, hemoglobinopathies are most prevalent in the Kingdom of Saudi Arabia (KSA); however, no previous study reported the frequency of hemoglobin D (Hb D) in the Saudi population.

Methods: The data was extracted from the 1,872,495 entries in the Saudi eHealth Analytics (Seha) Platform of the Saudi Ministry of Health from subjects who enrolled for pre-marital screening. Complete blood count, hemoglobin electrophoresis, a sickling test, peripheral blood smears, reticulocytes, and serological testing for HIV, Hep B, and C was performed. Confirmation of hemoglobin bands in electrophoresis was performed through High-Performance Liquid Chromatography or capillary electrophoresis, or both. MATLAB was used to run the basic statistical analysis.

Results: The cohort (n= 1,872,495) comprised 49.8% males and 50.2% females with a mean age of 28.4±8.0 years (95% CI: 13–44). The rare hemoglobin variants were detected in 1825 individuals. The Prevalence of Hb D was n=754, with the highest prevalence in Mecca (n=290, 260), followed by Riyadh (n= 126, 121). Hb D occurrence per 10,000 of the study population is the highest in the Tabuk region (6.43 / 10,000). The mean RBS count, the mean MCV, and the mean MCH were in the optimal range.

Conclusion: No previous regional study has determined the prevalence of the rare Hb D variant. Our study reports the geographical prevalence of Hb D in KSA's 13 regions. These differences can guide future policymaking and practices.

Keywords: Hemoglobinopathies, Saudi Arabia, Hemoglobin D, Marital, Prescreening

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