

Glucose-6-phosphate dehydrogenase deficiency and its effects on glycosylated haemoglobin: data from an Emirati cohort

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Background

Glucose-6-phosphate dehydrogenase (G6PD) deficiency, the most common human enzyme defect, is an inherited X-linked recessive defect; affecting males more severely. The prevalence of G6PD deficiency in Abu Dhabi, UAE is reported to be around 11.6 % in male UAE nationals [1]. Diabetes is also a common condition globally, and in the UAE. Haemolytic anaemia is one of the major clinical manifestation of G6PD deficiency[2] and can affect glycosylated haemoglobin (HbA1c) which is used for monitoring and diagnosis of diabetes.

Aim

In this retrospective study, we have compared HbA1C and haemoglobin(Hb) levels among male, individuals with type 2 diabetes and G6PD (Study group, SG) and G6PD normal (Control group, CG) subjects.

Methods

The study was conducted on male patients attending Imperial College London Diabetes Centre (ICLDC), Abu Dhabi, UAE. Information on patients tested for G6PD-deficient was retrieved from the ICLDC electronic database. Data for the SG and age-matched CG included: (1) age, (2) age at T2D diagnosis, (3) haemoglobin (Hb) levels and (4) HbA1C levels. Statistical analyses were performed using SPSS version 24. Data are presented as median (IQR) with statistical significance at p-value of 0.05.

Results

794 G6PD-deficient males were identified; 171 (21.5%) also had T2D and composed the SG while 177 age-matched males with normal G6PD expression level composed the CG (**Table 1**). The majority of subjects were Emirati (88.0% for both SG and CG). There was no significant difference with the age of T2D diagnosis between the two groups ($p=0.961$). Haemoglobin and HbA1C were significantly lower in SG than in the CG (127 Vs 140 g/L, $p<0.001$ and 6.5 Vs 7%, $P<0.001$ respectively).

Table 1. Patient characteristics of the study (SG) and control groups (CG)

Parameter	Group	N	Median	IQR	p-Value
Age (years)	SG	171	56.7	49.0-66.5	0.879
	CG	177	57.0	51.7-64.7	
Age at T2D Diagnosis (years)	SG	171	44.0	36.0-53.0	0.961
	CG	177	44.3	35.0-51.6	
HbA1c (%)	SG	171	6.5	5.7-7.3	<0.001
	CG	177	7.0	6.3-8.0	
Haemoglobin (g/L)	SG	171	127.0	116.0-135.0	<0.001
	CG	177	140.0	130.0--150.0	

Table 1. Comparison of anthropological and clinical parameters between the study (SG) and control groups (CG). Median values were compared using Mann Whitney U-test. *T2D=Type 2 diabetes; SG=Study Group (G6PD-Deficient+T2D); CG=Control Group (G6PD-Normal+T2D); IQR=Interquartile Range*

Discussion

G6PD deficiency leads to a lowering of HbA1c; in the Arab population studied was around 0.5%. This effect needs to be considered in populations with a high prevalence of G6PD deficiency.