ORIGINAL ARTICLE

PUBLIC AWARENESS OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE (G6PD) DEFICIENCY, CAUSES, AND PREVALENCE FACTORS

Muath Salman Almuhaini, Akram Ibrahem Alwassel, Osama Mansour Alateeq, Mohammed Khalid Alruzayhi*

College of Medicine, Al-Imam Mohammad Ibn Saud Islamic University, Kingdom of Saudi Arabia
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ABSTRACT
Glucose 6-phosphate dehydrogenase (G6PD) deficiency is an x-linked disorder that consequently causes the hemolysis of red blood cells (RBCs) when exposed to certain triggering factors like medications, food or disease. The current study aims to determine the awareness and knowledge level of the Saudi community in Riyadh city. A random sample of 86 participants was asked to fill a pre-designed questionnaire examining the awareness and knowledge level about G6PD deficiency. Results of the study indicated that the Saudi community had a poor knowledge level about G6PD deficiency, especially in the pattern of inheritance, symptoms, and factors triggering this disorder. The study also recommends that there is an urgent need to carry out campaigns to increase awareness level in the Saudi community regarding G6PD deficiency.

Keywords: Awareness, glucose 6-phosphate dehydrogenase, knowledge.

1. INTRODUCTION

Glucose 6-phosphate dehydrogenase (G6PD) is an enzyme which helps red blood cells (RBCs) to function normally. G6PD deficiency is a hereditary condition in which the individual has low levels of the G6PD enzyme, which causes the RBCs to get destroyed quickly when exposed to a certain trigger such as medications, food or disease[1]. The G6PD deficiency has been considered as the commonest enzymatic inherited disorder of RBCs, which affects more than 500 million people worldwide[2]. The disease has been reported in people from nearly all geographical locations; however, it occurs most frequently in areas where *Plasmodium falciparum* malaria had been endemic[3]. This deficiency was discovered for the first time when hemolytic anemia occurred in some persons who consumed anti-malarial drug named primaquine. The G6PD gene is located on the long arm of the X-chromosome (Xq28) while most deficient people do not show any symptoms until or following exposure to oxidative drugs, some infections, and ingestion of fava (broad) beans[1,2].

The mutation in the G6PD gene may lead to the production of a G6PD enzyme that has diminished functionality and/or stability. The following activity demonstrates different levels of enzyme activity and consequently a wide range of biochemical and clinical presentations that principally include neonatal jaundice and acute hemolytic anemia triggered by an exogenous agent in most cases[4]. More than 176 mutations and 500 different variants have been described to date for the G6PD gene; however, most are single base changes, leading to amino acid substitution[5]. The current study aims to assess the public awareness level of G6PD deficiency causes and prevalence among the Saudi community.

2. METHODS

A cross-sectional descriptive study was carried out on Saudi population comprised of both males and females attending three governmental

*Corresponding Author Email: mr.wassel@hotmail.com

hospitals in Riyadh city, including Al-Yamama, Riyadh Armed Forces, and King Salman bin Abdulaziz Hospital. The study sample was composed of 86 participants who were selected randomly from the study population. A pre-designed questionnaire composed of two parts; the demographic data part and the questionnaire items part were presented to all the study participants. The data analysis was performed by calculating the frequencies, percentages, means, and standard deviations of the participants' response.

3. RESULTS

The results of the study (Table 1) indicates that the participants ranging between 30 to 40 years of age were the highest represented category (45.3%), followed by participants older than 40 years (29.1%). Distribution of the study participants based on their gender revealed that 59.3% of the participants were males while 40.7% were females. The results according to the educational level indicated that participants holding an undergraduate degree (Diploma or Bachelor) represented 50% of the total study sample, followed by those having a postgraduate degree (Master or Ph.D.) who constituted 33.7% of the total sample count.

The findings of this study according to the questionnaire filled by the participants (Table 2) also showed that the first item stating that G6PD is a hemolytic disease was the highest estimated item (1.81±0.71) followed by the fifth item that fava beans can trigger an attack of G6PD (1.71±0.53). The third rank was given to the tenth item stating that G6PD deficient individuals do not appear to acquire any illness more frequently than other people (1.57±0.48). On the other hand, the lowest three items were the sixth item stating that pallor is one of the symptoms of G6PD (1.21±1.01), followed by the ninth item that a side effect of G6PD deficiency is that it confers protection against malaria (1.13±0.57) while the least ranked item was the eighth one stating that splenectomy could be beneficial for some G6PD deficiency patients (1.01±0.39). The total knowledge and awareness scale score was 1.412±0.567, which points towards a poor knowledge level and low awareness among the study participants regarding G6PD deficiency.

Table 1. Study sample distribution according to their demographic data

Characteristics		Frequency (N)	Percentage (%)
Age (years)	Less than 20	5	5.8
	20–<30	17	19.8
	30–40	39	45.3
	More than 40	25	29.1
Gender	Male	51	59.3
	Female	35	40.7
Education	Illiterate	4	4.7
	Secondary stage	10	11.6
	Undergraduate	43	50.0
	Postgraduate	29	33.7

Table 2. Scores for knowledge and awareness of participants regarding G6PD deficiency

S. No.	Item	Mean	Standard Deviation
1.	G6PD is a hemolytic disease	1.81	0.71
2.	Both parents have to be carriers for G6PD to have an affected child	1.32	0.49
3.	G6PD is a blood disease	1.44	0.62
4.	Inheritance of G6PD is related to gender	1.39	0.63
5.	Fava beans can trigger an attack of G6PD	1.71	0.53
6.	Pallor is one of the symptoms of G6PD deficiency	1.21	1.01
7.	Certain drugs could be a factor causing RBCs break down in G6PD deficiency	1.53	0.77
8.	Splenectomy could be beneficial for some G6PD deficiency patients	1.01	0.39
9.	A side effect of G6PD deficiency is that it confers protection against malaria	1.13	0.57
10.	G6PD-deficient individuals do not appear to acquire any illness more frequently than other people	1.57	0.48
	Total Score	**1.412**	**0.567**

4. DISCUSSION

G6PD deficiency is an X-linked disorder and is considered as the most common enzymatic disease of RBCs in humans affecting millions of people worldwide[2]. Exposure to specific medications or fava beans in people with this disorder may exhibit non-immune hemolytic anemia[1,2]. The present study has been designed to evaluate the awareness level of this disorder in the Saudi population.

The findings of the study indicated that the respondents had poor awareness and knowledge of G6PD deficiency (Table 2). Moreover, participants did not show any knowledge about pallor as one of the symptoms of G6PD deficiency and that a side effect of this deficiency is that it confers protection against malaria. The results of the current study have been found inconsistent with the study conducted by other workers that showed Bahraini people to have a good knowledge level about G6PD deficiency[6]. Also, the results of the present study were inconsistent with the findings of another study according to which there is a fairly good level of awareness of G6PD deficiency in Iraqi society despite the widespread confusion regarding certain aspects[7].

5. CONCLUSION

This study concludes that there is a poor knowledge level among the Saudi community regarding G6PD deficiency and about the pattern of inheritance, symptoms, and factors triggering the disorder. Based on the previously presented findings, the study recommends that intensive awareness campaigns should be carried out targeting different categories of the Saudi community regarding G6PD deficiency disorder. Furthermore, policymakers should be encouraged to support the healthcare services providers and motivate them to hold workshops, courses, and educational seminars that could significantly increase the community awareness level about G6PD deficiency.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICAL APPROVAL8

The research was performed after the approval from the Institutional Research and Ethics Committee.

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