

Abstract

Deficiency of Glucose-6-phosphate dehydrogenase (G6PD) is the most frequently encountered genetic abnormality of red blood cell (RBC) metabolism, and is estimated to affect over 200 million people worldwide. Malaria is believed to have been the selection pressure that has favored the maintenance of this potentially deleterious trait. The abnormality gives rise to hemolysis under conditions of oxidative stress such as those caused by ingestion of certain drugs or foods, exposure to certain chemicals, infection or hypoxia. G6PD deficiency has been shown to be protective against severe malaria and may confound the interpretation of malaria intervention studies. The objective of this study was to investigate the prevalence of the common African forms of G6PD deficiency namely G6PD A and A- among a group of children targeted to receive a blood stage malaria vaccine. Blood samples were collected from individuals presenting for screening and G6PD genotypes were determined by a combination of the polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP). Of the 570 individuals, 338 (59.3 %) had the normal G6PD B genotype, 153 (26.8 %) had the G6PD A genotype and 79 (13.9 %) had a combination of 376 A®G mutation and 202 G®A mutation that defines the deleterious G6PD A- genotype. The gene frequencies for GdB, GdA and GdA- alleles were 0.69, 0.21 and 0.10 respectively. To determine whether the G6PD locus in the studied population was in HardyWeinberg equilibrium, the observed and expected genotypic frequencies in the females were calculated from the Hardy-Weinberg equation and chi-square test used to determine whether there was a significant difference between the observed and expected genotypic frequencies. A statistically significant difference was found between the observed and expected ($p = 0.05$) leading to the conclusion that the inheritance of G6PD deficiency is not in Hardy-Weinberg equilibrium. This implies continuous selection pressure on the GdA- allele. Data emanating from this study will be used in the interpretation of malaria vaccine efficacy when the study is eventually un-blinded.