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Glucose-6-Phosphate Dehydrogenase Deficiency Among the Jats of Churu, Rajasthan

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ABSTRACT Data are presented on the incidence of G-6-PD deficiency among the Jats of Churu, an endogamous population of Rajasthan. The sample consisted of 158 individuals out of which 97 were males and 61 were females, in the age group of 9 to 19 years. Both methaemoglobin reduction test and cyanamide methaemoglobin elution test were employed. The percentage of deficient males was 8.2, whereas in females only 3.2 per cent were deficient and 14.7 per cent were heterozygotes.

INTRODUCTION

In the present study an attempt has been made to analyse the prevalence of G-6-PD deficiency among the Jats of Churu.

Churu is one of the 32 districts of Rajasthan state in North-West India. It is situated 939 feet above the sea level in the eastern part of the state between latitudes 27° 25' to 28° 42' and 74° 40' to 75° 41' longitude. Its borders touch Sriganganagar in the North, Hissar in the North-East, Jhunjhunu in East and South-East, Nagaur in South and Bikaner in the West. The main caste groups in the district are Brahmins, Rajputs, Jats Kumhars, Meenas, Naiks, Dhanakas and Mali. The gradation in terms of social status and hierarchy of castes is-Brahmins, Jats, Kumhars, Khatis, Malis, Chamars, Meenas, Dhanakas and Naiks. The Jats of Churu are an endogamous group and marry in the same caste group though among different sub-castes/gotra (75 in the sample under study). Out if 158 samples, the preponderant number of marriages were observed between Saharans and Dahiya (6) followed by Punia and Dhaka (5) which in turn were followed by Mahela and Nain (4).

MATERIAL AND METHODS

The samples collected for the present study were taken mainly from school though some of the samples were collected from households also. The universe of the study was Jats of Churu. Every care was taken not to collect blood samples of related persons. Total number of samples collected fell in the range of 9 to 19 years. The blood samples, obtained by finger prick method using disposable sterile lancets, were collected in clean stoppered tubes containing saline solution. Information pertaining to malarial attacks, if any, was also collected taking the help of local doctor where available. Screening for G-6-PD and cynamide methaemoglobin reduction test (Brewer, et al., 1962) and cynamide methaemoglobin elution technique (Gall et al.,.1965). The latter technique was used to distinguish between heterozygote and homozygote females.

RESULTS AND DISCUSSION

Table 1 depicts the G-6-PD deficiency status among the Jats of Churu. Out of 97 males tested 8.2 per cent were found to be deficient. In 61 females, 3.2 per cent were homozygotes whereas 14.7 per cent were heterozygoes, *i.e.*, they were partially deficient. The combined gene frequency, calculated by the gene counting method (Falconer, 1975), was observed to be $Gd+ = 0.9041$ and $Gd- = 0.0959$. The χ^2 testing difference between the sexes was 0.361 which is quite insignificant. We took the estimate of gene frequency from both sexes combined. Only the females are relevant to the test of random mating. The χ^2 testing agreement between observed and expected numbers in females was 0.0192. As the expected number in one of the categories with 2 degrees of freedom was less than 1, it was combined with the next higher category. The $\chi^2 = 0.0192$ ($.90>P>.80$) was too low to be judged significant. The data are therefore compatible with the Hardy-Weinberg equilibrium.

The distribution of G-6-PD deficiency

Table 1: Distribution of Glucose-6-phosphate dehydrogenase deficiency among Jats of Churu, Rajasthan

Sex/No tested		*G-6-PD status*			*χ^2 values*	*Allele frequency*
		Normal	*Partial deficient*	*Deficient*	*d.f.1*	
Male (97)	Observed	89 (91.75)	0 (0.0)	8 (8.25)	0.201	
	Expected	87.70	0(0.0)	9.30		*Gd+* = 0.9041
Female (61)	Observed	50 (81.97)	9 (14.75)	2 (3.28)	0.019	*Gd-* = 0.0959
	Expected	49.86	10.58	0.56		

Figures in parantheses are percentages

presents a heterogeneous picture all over India. It varies from 0.3 per cent among the Dhangar of Maharashtra (Undevia et al., 1985) to 33.5 per cent among the Naik Gonds of Maharashtra (Rao et al., 1987). However, many of the population groups of India show the complete absence of this deficiency (Bhasin et al., 1994). Major work done on the various population groups of Rajasthan has been accomplished by Choubisa et al. (1985, 1987) and Jain et al. (1981, 1984). The trait shows a differential distribution among the tribal and non-tribal populations as the highest frequency of 21.1 and 22 per cent were found among the Bhils and Saharia tribes, respectively, while the lowest frequency of 4.3 per cent was found among the Khatik males of Udaipur. The Jats of Churu show a frequency of 5.8 per cent which falls well within the range of 4.3 to 12 per cent as seen in non-tribal populations. (see Bhasin et al., 1994). In the neighbouring state of Haryana, the Jats in one study showed a *Gd-* frequency of 2 per cent only (Bhalla et al., 1974). Churu and adjoining villages were reported to be moderately infested with malaria. It was found that in village Buntia alone, 25 persons out of the 500 tested have had malaria according to the Health Centre reports. Of the individuals interviewed, those who had suffered from malaria have had the attacks once or twice lasting from one day to one month. Chloroquinine was the usual drug for treatment. Both *Plasmodium falciparum* and *Plasmodium vivax* were reportedly present in Churu, besides a mixed strain.

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