

Incidence of NESTROFT-positives Among the Kolams of District Adilabad, Andhra Pradesh

K.N. Saraswathy¹, A.M. Elizabeth,² M.P. Sachdeva³, T.S. Rao⁴ and A.K. Kalla³

1 Department of Molecular Genetics, Albert Einstein College of Medicine of Yeshiva University, Jack and Pearl Resnik Campus, 1300 Morris Park Avenue, Bronx, New York 10461, USA

2 Department of Population Genetics and Human Development, National Institute of Health and Family Welfare, New Delhi 110 067, India

3 Department of Anthropology, University of Delhi, Delhi 110 007, India

4 Department of Biotechnology, Government of India, CGO Complex, New Delhi 110 003, India

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ABSTRACT Kolam is a primitive tribal population inhabiting Adilabad district of Andhra Pradesh and practising a high degree of consanguinity. Sickle cell anaemia is not the only haemoglobinopathy found among the Indian tribes. Other Hb variants like HbE, HbC, HbD and the structural defects in the synthesis of haemoglobin in the form of alpha- and beta -thalassaemias may also be present. For the extensive screening of the populations for abnormal haemoglobins, the most inexpensive and commonly used technique is the "naked eye single tube red cell osmotic fragility test" (NESTROFT). In the present study the incidence of Nestroft-positives in the Kolam tribe of Andhra Pradesh have been reported.

INTRODUCTION

Kolams are a primitive tribal population inhabiting mainly in the Adilabad district of Andhra Pradesh and practising a high degree of consanguinity. A few Kolams are distributed also in Maharashtra and Madhya Pradesh. The total population of Kolams in Andhra Pradesh according to 1991 census is 41,254 individuals of whom 92.4 % belong to the rural areas and the rest 7.6% belong to the urban areas.

Sickle cell anaemia and sickle cell trait are observed to occur in varying frequencies amongst the endogamous tribal groups through out India. Many other kinds of haemoglobinopathies and thalassaemias have been detected in various population groups (Bhasin et al., 1994). For the extensive screening of the populations for abnormal haemoglobins, the most inexpensive and commonly used technique is the "naked eye single tube red cell osmotic fragility test" (NESTROFT). For the presence of any type of haemoglobinopathy, whether it is structural, such as haemoglobin S, C, D, E, or there is a defect in

the rate of synthesis of haemoglobin, chains, such as thalassaemias, this test gives a positive result. The present genetic study has been conducted to know the -

1. Incidence of NESTROFT-positives among the Kolams
2. Generational variation among the Kolams with respect to the incidence of NESTROFT-positive cases, if any.
3. Effect of consanguinity on the distribution of NESTROFT-positives.

MATERIALS AND METHODS

Collection of Blood Samples

One day before going to the field the sterile sample collecting tubes were rinsed with EDTA (0.5% w/v). In the field, 2 to 3 drops of blood were collected from each individual by pricking the middle finger using a disposable sterilized lancet. The properly labelled blood samples were then placed in an icebox and transported to the field laboratory at Utnoor for analysis.

Samples for Screening

A random sample of 436 individuals of varying ages and either sex were collected to serve as the representative sample of the Kolam population.

Sample for Generational Variation

Later the blood samples were categorised in to the parental and the offspring generations. For this, 132 families were selected and 3 samples from each family were analysed, which included that of wife, husband and their first child; thus the total sample size of parental generation came

to be 264 (between 15 to 45 years) and that of the offspring generation was 132 (< 15 years).

Samples to Study the Effect of Consanguinity

For this, 154 blood samples of offsprings below the age of 15 years were selected. As the marriage type of parents of these children was definitely known, they were categorised in to two groups, i.e., consanguineous and non-consanguineous, with the sample sizes of 89 and 65, respectively. Nestroft could be performed only on 83 children of consanguineous marriages and 62 of non-consanguineous marriages.

Analysis of blood samples

Test for abnormal haemoglobins

For the detection of other haemoglobinopathies, including thalassaemias, nestroft test as given by Thomas et al. (1996) was used.

RESULTS AND DISCUSSION

The results respectively are set out in the tables numbering 1 to 4.

Table 1: Distribution of nestroft-positives among the Kolams

Total No.	Nestroft +	Nestroft-	Nestroft Doubtful
436	N 109	300	27
	% 25	68.81	6.19

Table 2: Distribution of sickle cell haemoglobin among the nestroft- positive Kolams

	Total Nestroft + Hb AS	Other haemoglobins
Number		
Absolute No.	436	109
%	-	25
		32
		29.36
		77
		70.64

Table 3: Distribution of Nestroft-positives between the Parental and Offspring Generations of the Kolams

Generation	No.	Nestroft-positives		Nestroft-negatives		Nestroft-Doubtful		χ^2	Df	P
		N	%	N	%	N	%			
Parental	264	57	21.59	191	72.35	16	6.06	6.714	2	.05>p>.02
Offspring	132	39	29.54	79	59.85	14	10.61	-	-	-

Table 4: Distribution of nestroft-positives among the children of consanguineous and non-consanguineous marriages of the Kolams

Mt	Number	Nestroft Status			χ^2	Df	p
		Positive	Negative	Doubtful			
C	83	17 (20.5%)	10 (12%)	56 (67.5%)	3.915	2	.2>p>.1
NC	62	21 (33.9%)	04 (6.5%)	37 (59.6%)	-	-	-

A total of 436 randomly collected Kolam blood samples were screened for abnormal haemoglobins and thalassaemia by the Nestroft test. It was found that one-fourth of the Kolams were Nestroft-positive and 68.81% were nestroft-negative, while the assessment was doubtful in 6.19% cases. This indicates that as far as the haemoglobinopathies (including thalassaemia) are concerned as much as 25 percent of the Kolams were abnormal (Table 1).

Nestroft, as mentioned earlier, is a screening test for abnormal haemoglobins like HbS, E, C, D and thalassaemia. Of the 109 nestroft-positives, only 29.36% were found to be sickle cell positive and the rest 70.64% could have belonged to any other above abnormal haemoglobin variants or a/b thalassaemia (Table 2).

A total of 264 samples were screened for Nestroft-positives in parental generation, which constituted 132 wives and 132 husbands. One child from each couple amounting to 132 samples constituted the offspring generation. Of the 264 samples of parental generation only 21.59% were Nestroft-positives, 72.35% were Nestroft-negative, and the assessment was doubtful in the rest [6.06%] of the cases (Table 3). A higher percentage of Nestroft-positives (29.5) was observed in the offspring generation when compared to that of the parental generation (21.59). The percentage of Nestroft- doubtful cases was also found to be higher in the offspring generation: 10.61, compared to that of the parental generation (6.06). The χ^2 value (6.714 for 2 degrees of freedom) revealed a statistically significant difference (at 5% probability) between the two generations.

83 children from consanguineous matings

and 62 from non-consanguineous matings were screened for the abnormal haemoglobins by the Nestroft test. The percentage of nestroft-positives in the children of non-consanguineous matings (33.87) was found to be rather higher than that among the consanguineous matings (20.48). As the Nestroft gives a positive result in the case of abnormal haemoglobins, which include lethal forms like that of sickle cell haemoglobin and thalassaemia in homozygous condition, their frequencies tend to decrease among the children of consanguineous matings which may be due to the long term practice of consanguinity among the Kolams. However, the chi

square value (3.915) at 2 degrees of freedom [at 5% probability] reveals a non-significant difference between the two groups (Table 4).

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