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FREQUENCY OF ALBINISM AMONG CHILDREN ATTENDING PUBLIC SCHOOLS IN LAGOS, NIGERIA.

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ABSTRACT:

Students in public primary and secondary schools in different parts of Ojo Local Government area of Lagos State were examined for complete albinism. Most of the albinism had yellowish hair colour and 3 had brown hair colour only, two of the eye colour types were seen in albinos. None of the albinos has green and blue eye colour. Six albinos were found in the sample of 19,865 primary school children while 5 were found among 16,825 secondary schools sample. The difference between the two samples is not statistically significant. There was also no significant difference in the occurrence of the trait among male and female students. Thus, the frequency of the trait in the sample is 1 in 3319 or 30 in 100,000. The frequency is discussed in relation to the frequency observed earlier in the same state by other investigators and with frequency from other population.

INTRODUCTION

Albinism is a condition demonstrating abnormally decreased amount of the pigment melanin or resulting in an absence or major decrease, of this pigment (Hypopigmentation) in the skin, mucosa, hair and eye in man. Among the six genetically characterized types of albinism, the tyrosinase negative oculocutaneous albinism (OCA) is the only one least likely to attract difference of opinion regarding its identification. Affected individuals are easily identified by their lighter than normal skin, hair and eye colour. They are therefore especially noticed and identified without any disagreement among the black race. Albinism, although biochemically heterogeneous, is an inborn error of metabolism presumed to be caused by a metabolic block (loss of enzyme tyrosinase activity) in the pathway leading from tyrosinase to melanin (Bodmer & Cavalli-Sforza, 1976). The trait is characterised by photophobia and nystagmus (Abadi and Pascal, 1994), Cancer of the skin (Yakubu and Mabogunje, 1995), Vision defects (Perez-Carpinel *et al.*, 1992) and Non-decussating retinal-fugal fibre syndrome (Apkarin *et al.*, 1995). The trait which is inherited as an autosomal recessive condition is thought to be controlled by a single recessive gene (Froggat, 1960). However, reports indicate a condition in which more than one gene locus could be involved (Bodmer & Cavalli - Sforza, 1976).

Albinos appear in every population and also in most well studied species in mammals. The condition is frequent among the American-Indians particularly the Jemez-Indians in New Mexico, USA with an observed frequency of 1 in 140, Hopi-Indians of Arizona USA, 1 in 227, Zuni-Indians of New Mexico, USA, 1 in 247 (Woolf, 1965) and the Tuke cuna tribe of the Honduras (James and Clarke, 1974). A low value of 1 in 29,000 was reported in Italy (Barnicot, 1952) but the European average was taken as 1 in 15,000 (Froggat, 1960).

The prevalence for the Caucasian populations is about 1 in 20,000 in United State. However, among the Navajo populations in South-West United States, the frequency is greater than 1 in 3,750, a value which is relatively large when compared with that in the Caucasian population in the U.S (Woolf, 1965).

Although the frequencies reported in Africa are not as high as those from America-India tribes, they are however higher than the European figures. For instance, although no albino was detected among 50,000 people in the Kivu area of Zaire (Williams *et al.* 1993), a frequency of 1 in 3,759 was reported for Ciskei and Transkei regions of South Africa and 1,400 was reported for Johannesburg (Maganyi *et al.*, 1974). One in 2833 was reported among school children in Harare (Kagorre and Lund, 1995) 1 in 7,900 in Cameroon for a 15-yr. Follow up study (Aquaron, 1990).

In Nigeria, Barnicot (1952) reported an observed frequency of 1 in 2,858 and 1 in 4,862 in Lagos and Benin-City respectively. Williams *et al.*, 1993 reported a frequency of 1 in 1,629 or 61 in 100,000 among school children in different parts of Lagos. The Barnicots' study was done at a time when education was not free, so might not have been true representation of albinism frequency in Lagos.

However, the no significant difference recorded when compared with the report by Williams *et al.* (1993) indicate that the populations considered by the two studies did not actually consider the greater part of the population found in Local areas whose financial status could only allow them to attend public schools as opposed to private schools that are fee-paying.

The present study is a survey of about equal number of students by the second study but only from public schools of Old Ojo Local Government Areas which is considered as a rural area in Lagos State.

MATERIALS AND METHODS

School children from Public Schools (Primary and Secondary) in Ojo Local Government area of Lagos State, Nigeria were examined for the traits. Careful, unbiased and general counting of individuals were done.

The sexes of all children as well as the eyes and hair colours of each albino were recorded. The families of the albinos were visited for further information on the kindred. Interviews and direct observations were made about the family members to ascertain some of the claims by the proposition (Scott-Emuakpor and Scott Emuakpor, 1990).

RESULTS

Eight each of primary and secondary schools were covered in the survey and the results are as follows: 19,685 primary school pupils and 16,821 secondary school children were examined. Six albinos were found in the primary schools and five in the secondary schools, making a total of 11 albinos among 36,509.

Table 1 shows the prevalence of albinos among the children in the 2 school levels used for the study. The table also represented the sexes of the albinos. The distribution of eye and hair colour among the albinos is shown in table 2. The hair colours were classified simply as brown or yellowish. Three had brown eyes and 8 had yellowish. The examination of eye colours revealed none of the albinos with green or blue but 2 had blue-green and 1 had light brown eyes.

Table 1 Prevalence of Albinism Among Children in Public Schools.

School Types	Number of Schools Tested	Total Pupils	Number of Albinos		Total Number of Albinos	Normal	Prevalence
Primary	8	19,685	3	3	6	19,679	1 IN 3181
Secondary	8	16,824	2	3	5	16,819	1 IN 3365

Table 2: Distribution of eye and hair colour among the albinos.

HAIR	EYE					TOTAL
		GREEN	BLUE-GREEN	BLUE	LIGHT-BROWN	
BROWN		-	2	-	1	3
YELLOWISH		2	2	2	2	8
TOTAL		2	4	2	3	11

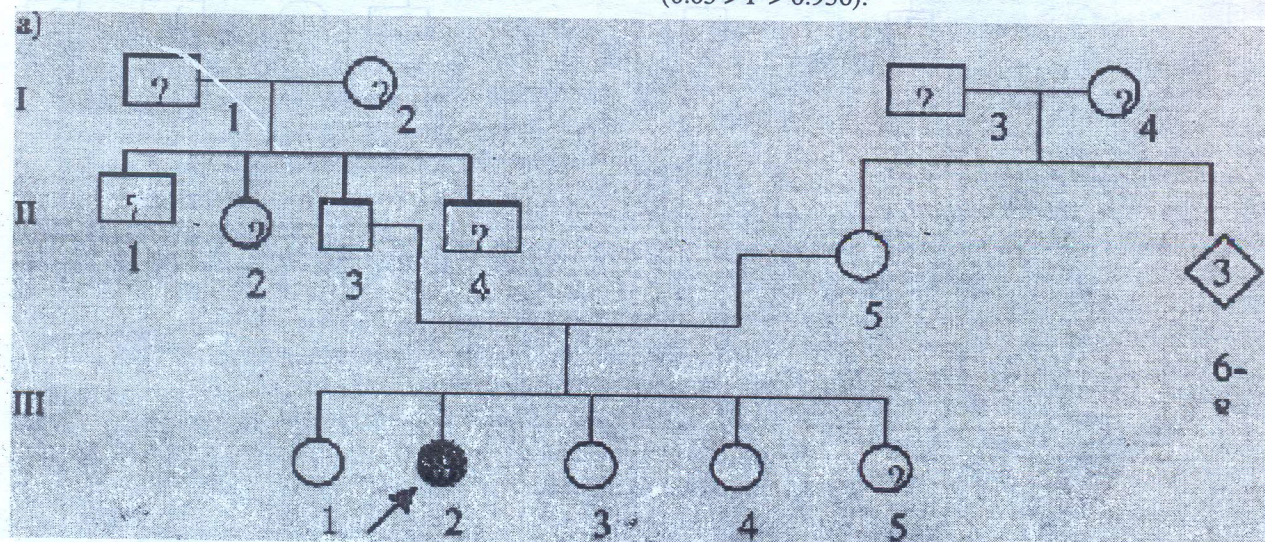
The 2 x 2 chi-square test of independence between 1^o and 2^o school samples show a no significant difference with a value of 0.00179 at 1 degree of freedom corresponding to $0.950 > P > 0.975$. A similar test considering the numbers of males and females gave a X^2 value of 0.09 corresponding to $0.05 > P > 0.950$.

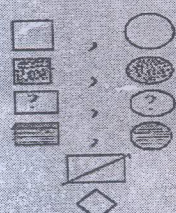
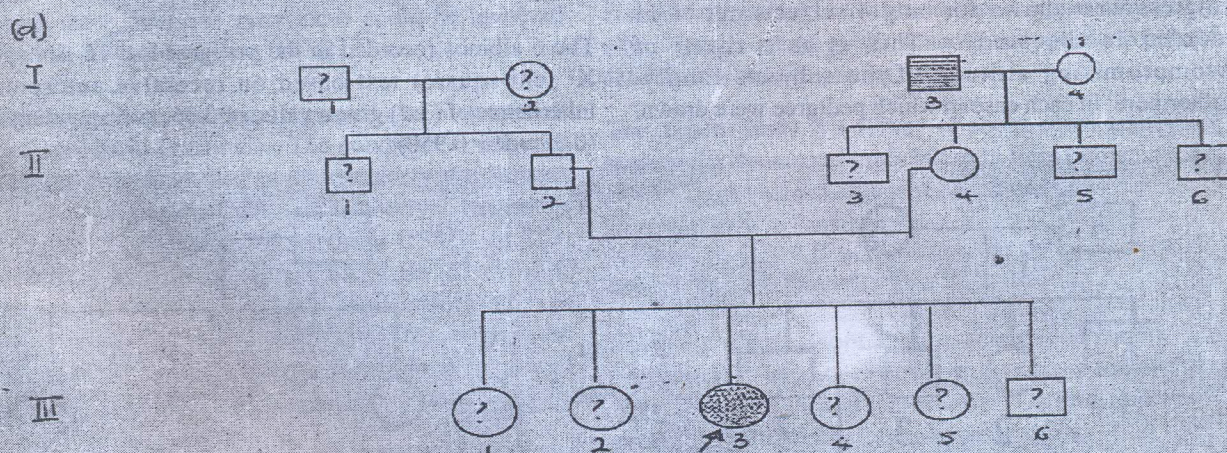
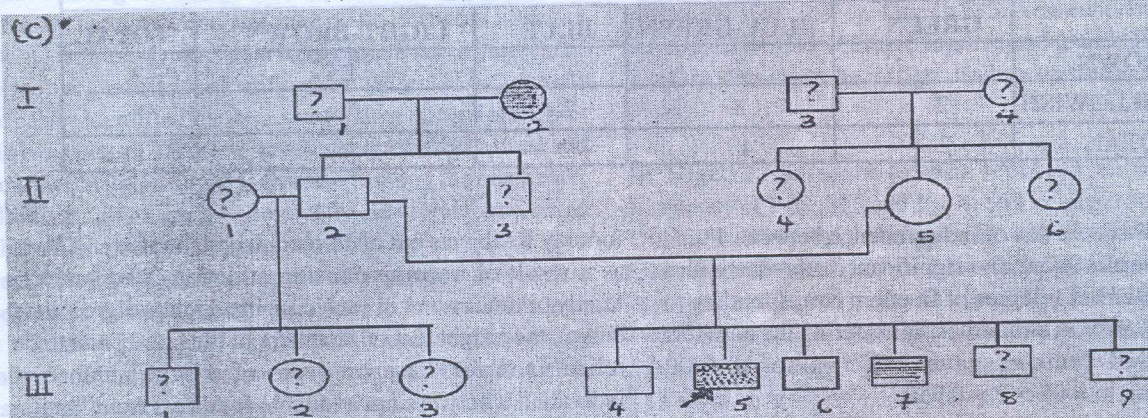
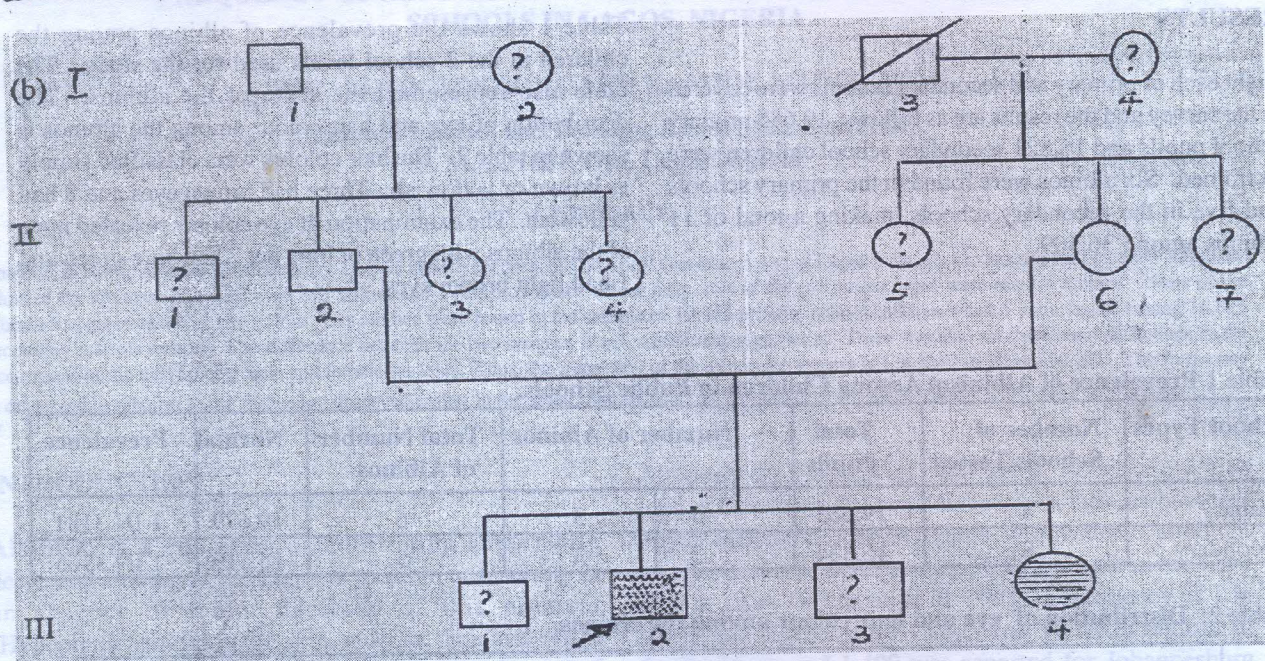
These no significant differences provided the justification to pool results from 1^o and 2^o schools. Thereby, revealing a prevalence of 1 in 3319 or 30 in 100000 for the survey done in this study.

Pedigree were drawn for only 4 subjects out of 11 recorded in the study. This is as a result of uncompromising attitude of the subjects family. Furthermore, in each case in which pedigree were drawn,

for only 4 subjects out of 11 recorded in the study. This is as a result of uncompromising attitude of the subjects family. Furthermore, in each case in which pedigree were drawn, the judgement of members of the family had to be relied upon for the phenotypes of a large number of individual who were not available for direct examination (fig. 1). In all cases, the albinos were products of marriages between unaffected parents. Although in Figs. 1a and 1b, the grand parents of the albinos were also unaffected. But Fig. 1c and 1d had one of the grandparents affected with albinism.

The 6 albinos recorded in the pedigree had 16 siblings. X^2 (chi-square) test based on recessive autosomal inheritance of (3:1) give a value of 0.06 corresponding to $(0.05 > P > 0.950)$.





- Unaffected individual seen by the investigator
- Albino seen by the investigator
- Reported to be unaffected
- Reported to be albino
- Reported to be dead
- Sex unspecified.

DISCUSSION

It is an uncontested fact that albinos are easily identified in a predominantly black population, therefore, we had no reason to doubt seriously the information supplied on those not directly examined by the investigators the X^2 -test to ascertain the mode of inheritance of the trait confirms the consistency with a recessive autosomal condition by being not significantly different from expected ratio of 3:1 ($0.05 > P > 0.950$).

This study did not reveal any significant difference between male and female albinos. This is as would be expected for an autosomal trait which is not sex influenced or limited. This corresponds to similar results revealed by Williams *et al.*, (1993). But contradicts the report by Froggart (1990) and Barnicot (1952). Although the difference were not statistically significant.

From the data presented in table II, it is not possible to identify any association between hair and eye colours, although yellowish hair and blue-green eyes were predominant. Barnicot (1952) and Williams *et al.*, (1993) studies did not reveal any association among the eye colours.

The similar results at both primary and secondary levels which led to pooling the results indicate no preferential elimination of albinos in getting admitted to secondary schools from public primary schools. Considering the economic down turn in the country, one would have expected that parents will not strive towards educating albinos higher than the primary school level. This fact which was earlier observed by Williams *et al.*, in 1993 considered private schools along with public schools and as such included the elites of the society who would afford private schools. With the suspected introduction of fees into schools again, a new data will be required in the nearest future to ascertain these claims.

The observed frequency of albinos is 11 in 36, 509 corresponding to 1 in 3319 or 30 in 100,000 appears lower than 1 in 1622 or 61:100,000 that Williams *et al.*, 1993 for Lagos or 1 in 2858 or 35 in 100,000 obtained by Barnicot (1952) for Lagos. However, a X^2 test using a 2 x 2 contingency table between the more recent study and this gave a X^2 (1d.f) of 3.69, $0.05 > P > 0.95$. Thus the difference between the 2 samples is not statistically significant. The apparent decrease detected in our study might be ascribed to the consideration of only public schools which underscores the fact that some of the illiterate parents of albinos who are expected to send wards to public schools might prevent their subjects from attending schools due to the attitudes towards albinos and the suspected low capabilities of the albinos.

However, there's no significant differences in our sample and that of Barnicot 1952 and Williams *et al.* 1993 might be taken as an indication of little or no discrimination against albino children. Moreover, the results of this study corresponds closer to Barnicot (1952) frequency of 35 in 100,000 than Williams *et al.* (1993) of 61 in 100,000.

The observed frequency in this study is higher than those found in the Ciskei and Transkei in South African and in Kiku area of Zaire (Magagi *et al.*, 1974). The number of albinos detected in our samples is significantly different ($X^2 = 4.84$) from the highest European frequency obtained in Norway which is approximately equal to 10 in 100,000 (Barnicot, 1952). The number of albinos from Williams *et al.*, (1993) sample is also significantly different from the Norwegian sample (X^2 I.D.F = 67, 2939, $P < 0.005$). Thus the frequency of albinism in Lagos considering this study and Williams *et al.*, (1993) is 30-61 in 100,000 in between 3 and 6 times as high as in Norway.

Although the frequency recorded by our study was close to those from Harare (35: 100,000). It is however different from the frequency recorded for albinism in Cameroon by Aquaron (1990) from a 15-yr. follow-up study. The study reveals 1 in 7,900 or 13 in 100,000 using an estimate of 1,500,000 Bamileke. This data is the highest recorded so far in Africa. The high frequency have been attributed to a greater frequency of inbreeding tendency among the people of Bamileke.

The higher frequencies recorded for Lagos by the studies so far (Barnicot, 1952 to the present study) tends to show a preference for albinos in Lagos. But there is no evidence for this, if any thing, there are obvious efforts to discourage marriages with families with albinos or to albinos. Therefore the high frequency could be explained as a result of easy identification of affected individuals in a dark-skinned population like Lagos.

Finally, it should be pointed out that the frequency observed in this study is valid probably for Lagos and possibly West Southern Nigeria. It is unlikely that the frequency will vary in different parts of Nigeria. It is also noteworthy that only public schools were considered for this study. It is not unlikely that variation might exist for private school frequencies in the light of economic differences of families of school children that attend the schools.

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