

Full Length Research Paper

Some aspects of genetics study in some population in Benin City

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A study of the ABO blood groupings and the anthropometric traits of the ethnic groups in Benin City were conducted. Results of the ABO blood groups showed a distribution of 57.02% for group O, 23.4% for group A, 17.57% for group B and 1.99% for group AB in the sampled population. Data from the anthropometric traits showed no significant difference between the traits of the three ethnic groups. However, the Northern and Southern ethnic groups tended to have more traits in common.

Key words: Blood groups, anthropometric, antigens, plasma.

INTRODUCTION

The ABO blood groups system in human is determined by multiple alleles. The red blood is made up of two components namely the red blood cells and the plasma. The red blood cells contain antigens while the plasma contains antibody. The antigens are proteins otherwise known as Isoglutinogenes (Mills, 1989).

Human red blood cells are known to have antigenic substance A and B on their membrane called antigens A and B. These antigens are genetically determined and they permit the classification of blood groups.

Lab-Steiner (1843 - 1868) showed that all human blood could be divided into four groups depending on the presence or absence of antigens A or B. In addition, antibody which corresponds to the absent antigen is present in the plasma (Goldsmith, 1974).

Individuals with antigen A in their red blood cell and antibody B in their plasma belong to blood group A. Individuals with antigen B in their red blood cells and antibody A in the plasma belong to blood group B. Those individuals without any antigen but have both antibody A and B belong to blood group O hence, the ABO blood group system. There is a fourth group which has both antigen A and B in the red blood cell but no antibody in their plasma and they belong to blood group AB.

Therefore, there are four classes of blood group in human beings. The blood group AB individuals are universal recipients while blood group O individuals are universal donor (Andersen, 1960).

Therefore, for one individual with antigen A in his red blood cell membrane, his plasma will have antibody B. In other words, antigen B which is absent in the membrane will have antibody A. This led Landsteiner to formulate a law which states that "If an antigen (agglutinin) is present in the red blood cell, the corresponding agglutinin/antibody must be present on the plasma".

It was therefore possible to work out the ABO blood group of the individual. This could be done either by adding:

- (1) Known antiserum to unknown red blood cell (cell testing).
- (2) Known red blood cell to unknown plasma (serum testing or serum typing).

At birth, the A and B antibody are not present but they appear within the first six months of life. They are determined and also possible, as a response to antigens that they come in contact with surrounding area that makes them to produce antigen (Seegers, 1980).

Anthropometric traits have been used for tracing phylogenetic relationships between major groupings of any given geographical area.

The purpose of this study is to utilize two genetic

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Table 1. Frequency of ABO blood group distribution in Benin City.

Phenotype	Number	Frequency
A	472	0.2342
B	354	0.1757
AB	40	0.0199
O	1149	0.5702
Total	2015	1.0000

Table 2. Anthropometric traits of some ethnic groups in Benin City (cm).

Ethnic group	Sex	Stature	Head circumference	Calf circumference	Face height	Nose height	Nose height	Head length	Head breath	Sitting height
Bendel North	F	156	55	32	20	5.5	6	33	29	81
	M	184	61	42	22	6.5	8	34	32	93
	M	194	59	37	24	6	7.5	33	31	94
	M	179	60	34	21	5	7.5	32	31	85
	M	180	59	40	20	6	7	31	30	91
	M	180	59	34	21	6	7	31	27	88
	F	184	58	37	20	6	7	34	31	91
	F	170	56	36	21	5	6.5	31	28	84
	M	183	57	37	23	5.6	7.5	35	31	92
	M	178	58	39	23	6	7	34	30	88
	M	180	59	37	23	6	7.5	35	32	89
	F	174	58	33	21	5	6	34	33	87
	F	159	58	30	22	5	6.5	32	28	80
	F	165	59	39	22	5	7	34	27	85
	F	157	55	35	20	5	6	31	29	82
	F	173	58	31	20	5	6	33	32	85
	F	168	56	32	22	6	7	32	30	83
	M	172	57	37	22	5	7	32	28	85
	F	179	57	33	22	5	7	33	29	89
	F	170	55	32	21	5	7	32	28	83
	M	178	58	36	23	6	7.5	34	30	85
	F	181	57	38	24	6	7	32	28	89
	F	185	58	35	22	6	7.5	33	28	88
	M	188	57	37	21	5	6	31	27	91
	F	175	57	33	21	6	7	32	28	86
	F	179	57	34	20	5	7	31	28	87
	F	180	58	35	22	5	7	32	29	88
	M	189	59	34	23	6	7.5	35	31	92
	F	171	56	33	21	5	7	31	29	84
	M	182	57	32	21	5	7	33	29	87
	M	188	58	38	20	6	7	32	28	90
	M	184	58	37	22	5	7	31	28	89
	F	169	57	32	20	5	7	32	29	83
	M	181	57	37	21	6	7	33	31	90
	M	185	57	36	20	5	7	32	29	89
	M	179	58	38	22	5	6	34	30	87
	F	167	58	37	23	6.5	7.5	33	29	85
	M	187	59	36	20	5	6	31	29	92
	M	184	58	39	22	6	7	32	30	93
	M	190	57	37	21	6	7	33	31	94
	F	165	56	40	20	5	6.5	31	28	85

Table 2. Contd.

	F	170	59	36	22	6.5	7.5	32	39	87
	M	187	58	39	21	5	7	31	30	93
	M	184	58	38	23	5	6	32	30	89
	F	172	57	32	21	6	7	31	28	83
	M	188	57	41	22	6	7	30	29	84
	F	160	58	37	22	6	7	33	29	84
Bendel North	M	187	59	34	20	5	6.5	32	28	91
	M	183	58	36	20	5	6	31	27	89
	F	159	57	33	21	6	7.5	34	28	88
	F	164	56	32	22	5	6	32	30	89
	F	167	59	36	22	6	7	33	30	87
	M	179	58	35	21	6	7	34	30	86
	F	163	55	36	22	5	6	33	28	87
	M	178	57	32	21	5	7	31	29	88
	M	186	59	34	20	6.5	8	34	27	91
	F	170	58	39	20	6	7	32	28	84
	M	181	57	35	23	5	6	33	31	87
	F	166	57	31	22	5	6.5	32	29	84
	M	180	59	36	21	5	6	31	28	93
Bendel South	M	174	57	33	21	6	6.5	31	27	87
	F	169	56	35	22	5	6.5	33	30	85
	F	171	59	40	21	5	7.5	36	30	88
	M	170	55	31	22	6	7	31	29	87
	M	188	58	38	21	6	7.5	32	31	88
	M	185	57	36	20	5	7	34	29	88
	F	181	57	40	22	6	7	35	31	89
	F	165	56	35	20	5	6.5	31	29	84
	M	180	55	34	20	5	7	31	28	87
	M	195	59	31	23	5	7	35	33	85
	M	175	59	40	24	6	7	35	32	94
	M	186	57	33	22	5	7	34	29	88
	M	170	58	33	22	5	7	33	27	85
	F	175	55	35	21	6	8	35	30	90
	M	176	59	38	21	5	7	34	27	87
	M	185	57	36	21	5	6	30	29	88
	F	177	59	34	20	5	6	33	29	81
	F	176	57	35	20	5	7	34	31	85
	M	181	57	37	21	6	7	33	30	83
	F	174	56	38	21	6	7.5	35	28	87
	F	179	58	38	21	5	6.5	32	20	87
	F	177	59	39	22	6	7	31	37	84
	M	184	59	36	26	6	7	33	29	86
	M	186	58	35	23	5	6.5	32	28	89
	F	174	56	38	21	5	6	33	29	87
	F	176	56	37	20	5	6	34	30	86
	M	180	57	34	22	6	7	31	28	38
	M	179	58	33	22	5	6.5	32	28	85
	F	171	59	36	21	6	7	31	28	87
	M	182	56	35	22	6	7	31	27	87
	M	186	58	37	22	6	7	31	27	87

Table 2. Contd.

	M	183	57	36	21	5	6.5	31	37	85
	F	174	56	32	20	6	7	32	27	83
	M	178	57	34	20	5	7	30	27	84
	F	172	57	34	21	5	7	33	27	81
	M	180	58	35	20	5	7	31	29	88
	M	184	56	39	21	6	8	32	29	93
	M	188	57	32	20	6	7.5	34	28	90
	F	176	57	33	20	5	6.5	33	31	85
Bendel South	F	171	55	33	21	6	7.5	32	33	83
	F	181	58	37	21	5	6	32	32	87
	M	184	57	34	21	5	6	31	28	88
	F	177	57	36	22	6	8	34	27	86
	M	186	58	31	22	6	7.5	31	29	89
	M	189	58	39	21	6	7	32	30	90
	M	181	57	32	20	5	7	33	27	89
	M	188	57	40	20	6	7	34	30	92
	F	170	58	38	21	5	7	32	31	84
	M	179	57	34	23	5	6.5	32	28	87
	F	169	57	37	20	6	7	33	31	81
	M	182	59	37	21	6	8	31	30	88
	F	170	56	34	20	5	7	33	27	83
	M	177	59	33	21	6	7.5	32	27	85
	M	184	57	37	21	6	7	31	29	89
	F	168	59	39	20	5	6	33	30	82
	F	173	56	34	22	6	7	32	31	84
	M	185	57	36	22	5	6	33	30	90
	M	189	58	37	21	6	7	32	28	91
	F	192	58	32	20	6	7	31	30	83
	M	192	59	29	20	5	6.5	32	29	93
	F	173	58	31	21	6	7.5	36	27	88
	M	182	57	30	21	6	7.5	34	31	89
	M	186	57	38	20	5	7	33	31	89
	M	187	57	35	22	5	7	35	30	90
	M	183	59	37	23	6	7.5	32	28	87
	F	170	58	38	21	6	7.5	36	27	82
	M	179	68	33	20	6	8	34	27	86
	M	181	58	32	21	5	7	32	31	87
	F	174	58	37	21	6	7	31	30	82
Bendel East	M	184	57	38	21	5	7	32	30	87
	M	186	58	33	22	6	7	30	28	88
	M	181	56	37	23	6	7	31	29	86
	M	184	57	37	21	6	7	33	29	88
	M	189	58	36	24	5	6.5	32	28	90
	F	174	56	33	23	6	6.5	31	30	83
	M	182	57	32	22	5	7	30	28	86
	F	175	56	35	21	5	7	32	29	81
	F	171	57	37	21	5	6.5	30	28	80
	M	180	57	39	22	6	7	31	29	85
	M	181	58	38	22	5	7	31	28	87
	F	170	57	38	21	5	7	33	29	82
	F	169	57	37	21	5	6.5	30	28	81

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	F	171	58	36	23	6	7	31	30	82
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	M	187	59	33	21	5	7.5	31	28	89
	F	170	56	38	21	6	7	30	29	82
	M	181	57	39	21	6	7.5	33	29	85
	M	184	57	37	22	5	7	32	29	89
Bendel East	F	172	57	35	21	6	7	31	28	83
	M	170	56	37	22	6	7.5	33	30	80
	M	182	58	39	22	5	7	32	28	85
	M	185	58	33	21	5	7	31	28	87
	M	183	59	31	21	6	8	33	29	86
	F	180	57	33	20	5	6.5	32	30	84
	F	181	57	33	21	6	7.5	30	28	84
	M	183	56	36	22	5	6	30	27	87
	F	176	57	32	23	5	6	31	28	82
	M	186	58	35	22	6	7	32	30	89
	M	183	58	34	22	6	8	31	29	87
	M	182	59	36	21	6	7.5	32	31	85
	M	182	58	33	23	6	7.5	34	30	88
	M	188	58	39	21	6	7	32	30	90
	M	171	55	35	21	5	7	31	29	87
	F	169	58	46	23	6	7	34	33	88
	F	173	56	34	21	5	6.5	33	28	87
	M	189	58	37	24	5	6	32	27	89
	F	170	59	33	23	5	6	32	28	87
	M	184	60	40	24	6	7	34	29	91
	M	175	58	36	22	6	7	30	28	84
	F	170	58	39	21	6	7	34	32	87
	F	172	57	34	23	5	6.5	33	31	85
	F	171	57	36	22	6	8	34	30	83

parameters such as ABO groups and anthropometric traits in tracing the evolutionary relationships of the major groupings in Benin City.

MATERIALS AND METHODS

ABO blood group samples were observed from two locations in Benin City. These involved two thousand and fifteen individuals, screened over a period of years with data stored in the hospitals. Anthropometric traits of one hundred and ninety-eight individuals were observed.

Methods

ABO blood groups

The different blood groups were determined on the basis of agglutination tests. The red blood cells of a given blood group are agglutinated by the appropriate antiserum. For instance, the red blood cells of blood group A are agglutinated by anti-A serum while

those blood group B are agglutinated by anti-B serum. The red blood cells of blood group AB are agglutinated by anti-A and anti-B serum while those of blood group O are agglutinated by neither serum.

Anthropometric traits

The anthropometric traits evaluated included head, face and nose dimension, calf circumference, sitting height and stature. All measurement were recorded in centimeters.

RESULTS

The results obtained in this study are summarized in Table 1 and 2. From the results in Table 1, the blood groups distribution ranged from 57.02% for group O, 23.42% for group A, 17.57% for group B to 1.99% for group AB.

The anthropometric data for three ethnic groups are

summarized in Table 2. For Bendel North, stature, head circumference and sitting height of males ranged from 172 - 190 cm, 57 - 61 cm and 85 - 94 cm, respectively while those of females varied from 156 - 185 cm, 55 - 59 cm and 81 - 91 cm, respectively.

For Bendel South, the above traits for males were between 170 - 195 cm, 55 - 59 cm and 83 - 94 cm, respectively while those for females ranged from 165 - 192 cm, 55 - 59 cm and 81 - 91 cm, respectively. Similarly for Bendel East, these traits for males were between 170 - 189 cm, 55 - 60 cm and 80 - 91 cm, respectively; then for females, 169 - 186 cm, 56 - 59 cm and 80 - 89 cm, respectively.

There were significant variation between the face, nose and head dimensions of the different ethnic group.

DISCUSSION

The results of the ABO blood distribution observed in this study compares favourably with those reported in other population. For instance (Tullis, 1984), reported a distribution of 48, 26, 23 and 4% for blood group A, O, B and AB, respectively in the African population he studied. In European a distribution of the blood groups was 45,

40, 10 and 5% for group O, A, B and AB respectively. In this study a high percentage of blood group O (57.02% was obtained as compared with 23.42, 17.57 and 1.99% for group A, B and AB respectively.

The results from the anthropometric traits showed some evolutionary relationship between the three ethnic groups. There are indications that the North and South have more traits in common although these are not statistically satisfactory.

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