

TONGUE ROLLING AND HAND CLASPING AMONG VARIOUS ABO BLOOD GROUPS IN A UNIVERSITY COMMUNITY IN EASTERN NIGERIA

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Abstract

Morphogenetic traits are physical observable traits that can be inherited either in a single gene or multifactorial pattern. ABO blood group is a codominant inherited trait that has been associated with different anatomical and physiological variations. However, there are limited studies that have linked ABO blood groups with some morphogenetic traits.

This study was conducted to ascertain the distribution of morphogenetic traits like hand claspings and tongue rolling among ABO blood groups in a University community in Eastern Nigeria.

A total of 115 volunteers participated in the study. The blood groups of the participants were determined and the expression of the morphogenetic traits was gotten by physical observation. Greater proportion of the participants were males (55.65 %), students (61.74 %) and within ages 15–25 (58.26 %). There was a higher prevalence of blood group O (57.39 %), tongue non-rollers (53.04 %) and right hand claspings (74.78 %) among the participants. The participants with blood groups A and O recorded a higher distribution of tongue non-rollers while those with blood groups B and AB recorded an equal number of both tongue roller and non-rollers. The participants with blood groups A, B and O recorded a higher distribution of right hand claspings while those with blood group AB recorded a significant higher distribution of left hand claspings ($P<0.05$).

In conclusion, morphogenetic pattern of tongue rolling could not be associated with ABO blood group, whereas that of left hand claspings was associated with blood group AB suggesting that individuals with blood group AB is likely to exhibit left hand claspings; forming basis for determination of hand claspings using ABO blood group in future advancement of genetics and forensic science.

Keywords: Morphogenetic trait, ABO blood group, tongue rolling, hand claspings, association studies.

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1. Introduction

Inheritance is the transmission of some genetic qualities from a parent to their offspring while Mendelian inheritance deals with how these qualities are passed down from generation to generation [1]. This can either be in an autosomal or sex dominant or recessive pattern. It is now believed that some of such genetic qualities do not simply follow Mendelian rule but rather express interplay between genetic and environmental factors [2]. Morphogenetic traits are physical ob-

servable traits inherited from parent to offspring [3]. These traits inherited through single gene or multifactorial are expression of the individual's genotype. Morphogenetic traits in humans include height, weight, eye and hair colour, straight or widow's peak hair line, straight or curved thumb, ability or inability to roll the tongue, free or attached earlobe, right or left hand clasping, Morton's toe and so many more [4, 5].

Some individuals have the ability to roll the lateral edges of their tongue (tongue rollers) while some do not. Some also have the ability to fold their tongue into various shapes (tongue folders) while some cannot. Study has shown some tongue rollers and tongue non-rollers also being tongue folders [2]. A geneticist, Alfred Sturtevant discovered that about 70 % of Europeans are tongue rollers while 30 % are tongue non-rollers [6]. When asked to interlace their fingers, some individuals tend to put the fingers of their most dominant or preferred hand over the other.

The ABO blood groups of individuals vary within and among different populations; blood transfusion and banking began after the description of the different ABO groups in 1900 [7]. Studies have associated the ABO blood groups with prevalence of some diseases like malaria and cancer [8–10], personality [11], sport endurance performance [12], susceptibility to Covid-19 [13, 14] and so on. There are few reported studies on the association of morphogenetic traits among the various blood groups.

Therefore this study was conducted to evaluate the prevalence and association of morphogenetic traits like hand clasping and tongue rolling among ABO blood groups in a University community in Eastern Nigeria.

2. Materials and methods

2. 1. Study area and population

The cross-sectional study was carried out during a free medical outreach conducted for the staff and scholars of Gregory University Uturu, Abia state Nigeria. Gregory University is a private owned university named after Pope Gregory; established in 2012 and located at Amaokwe Achara, Uturu in Isuikwato Local Government Area of Abia State Nigeria. The institution was founded to provide tertiary education to individuals largely from South-eastern and other parts of Nigeria. Gregory University, Uturu (GUU) has about eight colleges and over thirty departments. The institution is made up of about 650 staffs both academic and non-academic staffs as well as about 2000 students.

Simple random sampling was conducted; a total of 115 individuals volunteered and participated in the study. This included both male and female staff and scholars of various ages and ethnicity.

2. 2. Ethics

Study was approved by the Department of Human Anatomy, Gregory University Uturu, Abia state Nigeria. Study was performed in accordance to the Helsinki declaration. Before the commencement of the study, the participants were briefed about the relevance and procedures of the study and then verbal consent was obtained from the participants. The participants were duly informed that their data will kept anonymous.

2. 3. Socio-demographic data

The sex, age, marital status, state of origin and occupation was obtained verbally from the participants and recorded.

2. 4. Determination of ABO blood group

The principle of haemagglutination reaction was the basis for the ABO blood grouping test. Blood from the participants was collected by piercing the tip of the previously sterilized middle finger with a sterile lancet and three drops of blood was placed on a clean tile. A drop each of Anti A sera, Anti B sera and anti-D was added to each drop of blood respectively. Each drop of blood with the antiserum was then mixed and presence of agglutination in the form of red granules within 30 seconds was observed and recorded.

2. 5. Determination of the morphogenetic trait

For tongue rolling, the subject was asked to turn up the lateral edges of their tongue according to a visual representation shown to them. The data was recorded as follows:

- subjects who could roll their tongue – ‘Yes’;
- subjects who could not roll their tongue – ‘No’.

For hand clasping, the subject was asked to subconsciously interlock/interlace their fingers of the two palmar surfaces. The position of one thumb over the other was then observed:

- right thumb on top – ‘Right’;
- left thumb on top – ‘Left’.

2. 6. Statistical analysis

Data was analysed using IBM Statistical Package for Social Sciences (SPSS) version 25. Frequency and percentage distribution were computed for socio-demographic data, prevalence of ABO blood group and the morphogenetic traits in the population. Chi-squared test were used to test for associations between ABO blood group and sex, ABO blood group and tongue rolling and ABO blood group hand clasping. $P < 0.05$ was considered significant.

3. Results and discussion

Table 1 shows the frequency distribution of the socio-demographic data of the participants. Greater proportions (61.74 %) of the participants were students. The study recorded a higher number of males (55.65 %) and a higher number of participants between 15–25 years of age (58.26 %). Participants from the South-Eastern part of Nigeria constituted the highest (80 %) population of the study.

Table 1
Socio-Demographic Data of Participants

Variable	Sex	Frequency (%)
	Sex	
Male		64 (55.65)
Female		51 (44.35)
	Age range	
15–25		67 (58.26)
26–35		15 (13.04)
36–45		16 (13.91)
46–55		10 (8.70)
>55		7 (6.09)
	Marital status	
Single		82 (71.30)
Married		33 (28.70)
	State of origin	
Southeast		92 (80.00)
Southwest		4 (3.48)
Southsouth		17 (14.78)
Northeast		0 (0.00)
Northwest		0 (0.00)
Northcentral		2 (1.74)
	Occupation	
Student		71 (61.74)
Staff		44 (38.26)

Although there are about 400 blood grouping antigens discovered, the ABO and Rh group remains the most significant [6]. On analysis of the blood groups of the participants in (**Table 2**), the frequency of the O group was the highest (57.39 %) while AB group recorded the least frequen-

cy (6.96 %) in a O>A>B>AB pattern. This is in accordance with the results gotten from Nigerian population [3, 7, 15] and other populations [16, 17]. On the other hand, some studies recorded O>B>A>AB prevalence pattern in Nigeria [18, 19] and other population [5, 20]. The AB⁻ blood group is the rarest of the blood groups and this is seen in this study as it was not recorded among the participants.

The ability to roll the lateral edges of the tongue is said to be a dominant gene [2]. Result from (Table 2) shows higher prevalence of inability to roll the tongue (53.04 %). This result is in tandem with the results of [19] who reported a 51.6 % of tongue non-rollers. The reports of [21, 22] recorded higher number of tongue rollers. This is expected as genetic variability and diversity cannot be over-emphasized.

When asked to clasp the hands, the position of the thumb is known to be controlled by genetics. Right hand clasping was more prevalent (74.78 %) among the participants. This trend was also reported by some studies [5, 19].

Table 2

Frequency Distribution of ABO blood groups, Tongue rolling, and Hand clasping among participants

Variable	Frequency (%)
ABO blood groups	
A+	26 (22.61)
A-	1 (0.87)
B+	13 (11.30)
B-	1 (0.87)
AB+	8 (6.96)
AB-	0 (0.00)
O+	63 (54.78)
O-	3 (2.61)
Tongue rolling	
Yes	54 (46.96)
No	61 (53.04)
Hand clasping	
Right	86 (74.78)
Left	29 (25.22)

The prevalence studies of blood groups are being highly sought out in modern medicine because of its multipurpose usefulness [19]. For the prevalence of sex among the various blood groups, blood groups O, A and AB were more prevalent among the males while blood group B was more prevalent among the females (61.5 %) (Table 3). Although a study [19] reported prevalence of blood group AB among females, the result of this study agrees with the work of [23] who reported higher no of females with B blood group.

Among the participants with blood group O ($n=66$), result showed more prevalence of right hand clasping ($n=53$). This was seen in the works of [5, 19] who reported prevalence of right hand clasping among people with blood group O. Also, a greater proportion (75 %) of left hand clasping was seen among the participants with blood group AB.

The present study showed that participants with blood group O ($n=66$) and A ($n=27$) have a greater proportion of people with the inability to roll their tongue ($n=34$; $n=16$) (Table 3). This agrees with the works of [19].

Result from the statistical association between ABO blood groups and tongue rolling and hand clasping (Table 4) shows a significant association ($P<0.05$) between ABO blood groups and hand clasping. This was reflected among the AB⁺ blood group as it shows that people with the AB⁺ blood group are more likely to exhibit left hand clasping than other blood types. This does not agree the works of [19] who reported that there was no association between blood group and hand clasping.

Table 3

Prevalence of Sex, Tongue rolling and Hand clasping among the various ABO blood groups of the participants

ABO	Freq	Sex		Tongue rolling		Hand clasping	
		Male	Female	Yes	No	Right	Left
A+	26	14(53.8)	12(46.2)	11(42.3)	15(57.7)	18(69.2)	8(30.8)
A-	1	0(0.00)	1(100.0)	0(0.00)	1(100.0)	1(100.0)	0(0.00)
B+	13	5(38.5)	8(61.5)	7(53.8)	6(46.2)	11(84.6)	2(15.4)
B-	1	1(100.0)	0(0.00)	0(0.00)	1(100.0)	1(100.0)	0(0.00)
AB+	8	6(75.0)	2(25.0)	4(50.0)	4(50.0)	2(25.0)	6(75.0)
AB-	0	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
O+	63	35(55.6)	28(44.4)	30(52.4)	33(47.6)	51(81.0)	12(19.0)
O-	3	3(100.0)	0(0.00)	2(33.3)	1(66.7)	2(66.7)	1(33.3)

Note: values are expressed as n (%); where n=frequency and %=percentage; FREQ=frequency.

The result from (Table 4) showed a non-significant association ($P>0.05$) between ABO blood groups and tongue rolling which suggests that exhibition of tongue rolling ability of individuals may not be traced to the ABO blood group type they possess. This was also reported by [19].

Irrespective of the prevalence of sex among the various blood groups (Table 3), results from (Table 4) showed a non-significant association between sex and ABO blood group which suggest that the inheritance of ABO blood group was not dependent on the sex of the individual in the study area.

Table 4

Statistical association between ABO blood groups and Sex, Tongue rolling and Hand clasping among the participants

-	Sex	Tongue Rolling	Hand Clasping
ABO Blood Group	7.247(0.299)	2.753(0.839)	13.656(0.034)*

Note: values are expressed as X^2 (P value), *significance $X^2>11.06$, $P<0.05$.

The scope of the study was limited to determining tongue rolling and hand clasping among ABO blood groups of individuals in a University community in Eastern Nigeria; Considering the observed association between blood group AB and hand clasping which suggests that ABO blood group could be a prospective vital tool in anatomical sciences and genetics in determination of morphogenetic traits, it is recommended as follows:

1. More studies should be performed on higher populations.
2. More studies should be performed in different races and ethnicity.
3. More studies should be performed to associate ABO blood groups and other morphogenetic traits not mentioned in this study.

4. Conclusions

In conclusion, morphogenetic pattern of tongue rolling could not be associated with ABO blood group, whereas that of left hand clasping was associated with blood group AB suggesting that individuals with blood group AB is likely to exhibit left hand clasping; forming basis for determination of hand clasping using ABO blood group in future advancement of genetics, anatomical and forensic sciences.

Conflict of interest

The authors declare that there is no conflict of interest in relation to this paper, as well as the published research results, including the financial aspects of conducting the research, obtaining and using its results, as well as any non-financial personal relationships.

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Data availability

Data will be made available on reasonable request.

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