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Association of Abo Blood Group with Gynaecoid Fat Distribution Among Male Residents of Obio Akpor Local Government Area of Rivers State

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ABSTRACT
Gynaecoid fat distribution refers to fat patterns that accumulate around the hips, buttocks and thighs. This fat distribution is less associated with cardiovascular diseases. The aim of the study is determined if there is an association between ABO blood group and gynaecoid fat distribution in males. A total of one hundred and forty males (70 males without gynacoid fats and 70 males with gynaecoid fat) between the ages of 18-65 years were selected for this study. The parameters measured were height, weight, waist circumference, hip circumference, waist-to-hip ratio (WHR), body mass index and blood group using stature meter, weighing scale, inelastic tape and questionnaire respectively. To access if a male has gynaecoid fat distribution both the morphoscopic evaluation of the pelvic and thigh region for the pear shape appearance and WHR was used. The result shows blood group O is the most dominant for both normal males and males with gynaecoid fat (42.8% and 34.28% respectively), follow by blood group A (22.8% and 25.7%). In conclusion, the association between ABO blood group and gynaecoid fat distribution was not significant therefore there is no association between ABO blood group and gynaecoid fat distribution. I recommend that further studies aimed at corroborating this finding should be carried out.

Keywords: ABO blood group, gynaecoid fat distribution, waist- to-hip ratio, body mass index.

INTRODUCTION
Landsteiner first described the ABO blood group in 1900 and it served the beginning of blood banking and transfusion medicine [1]. Even after 100 years, the single most important test performed in the blood banking services is determination of ABO blood groups to avoid transfusion reaction and death [2]. With the ABO blood group, individuals are divided into four major blood groups namely, A, B, AB, and O according to the presence of antigens and agglutinins. Group A blood has type A antigens, group B blood has type B antigens, group AB blood has both type A and B antigens and group O blood has neither A nor B antigens. Also plasma from blood group A contains Anti-B antibodies which acts against type B antigens, plasma from type B blood contains Anti-A antibodies which acts against type A antigens, type AB blood group has neither type of antibodies and type O blood group has both A and B antibodies [3]. It is a well-known fact that the ABO blood groups are not found in equal numbers.

However, almost always an individual has the same blood group for life, but rarely an individual blood group type changes through addition or suppression of an antigens in infection, malignancy or autoimmune diseases [4]. Apart from the importance of the ABO blood group in blood transfusion (blood compatibility before transfusion), pregnancy and child birth, blood types have been used in forensic science and paternity testing before the advent of DNA analysis which provides greater certitude and has come to replace the use of blood type [4], [5]. Gynaecoid fat distribution is the body fat that accumulates around the hips, buttocks and thighs. It contributes towards the female's body shape that girls begin to develop at puberty; this process is modulated by estrogen which is the female sex hormone that causes the female to store higher levels of fat than males. Sex hormones such as estradiol and testosterone play an important role in the regulation of fat distribution. Previous studies found out that high estradiol levels are responsible for low waist-hip ratio due to the role in the regulation of fat accumulation around the hips, buttocks, bosom and thighs [6], [7].

Generally, females have a fold of body fat more than males but the distribution of this fat is different, women deposit adipose tissues in the lower part of the body particularly in the buttocks and thighs[8]. Sex hormones especially estrogen and testosterone plays a major role in the distribution of body fat in humans, where at puberty estrogen regulates the female body shape (gynaecoid) while testosterone male body shape. In humans, the factors that control fat distribution are partially determined by sex hormones concentrations [9]. Men, on average, have less total body fat but more central/intra-abdominal adipose tissue, whereas women tends to have more total fat that favours glutealfemoral and subcutaneous depots [10]. The

importance of estrogens in subcutaneous fat accumulation is evident; in fact estrogen hormonal therapy in men also increases the amount of subcutaneous fat [11].

MATERIALS AND METHODS

This cross sectional study was conducted among male residents of Obio/AKpor Local Government Area of Rivers State between the ages of 18-65 years with gynaecoid fat distribution. And total of 140 volunteers participated in their study. The weight of the volunteers was measured in an upright position using a weight measuring scale manufactured by Hindustan Scale Company. Height was measured without shoes with a stature meter manufactured by Swastik systems and services. Waist and hip circumference was measured using an inelastic measuring tape, waist -to- hip ratio was calculated based on waist divided by hip circumference. And a structured questionnaire was used to get volunteers blood group. To access if a male has gynaecoid fat distribution both the morphoscopic evaluation of the pelvic and thigh region for the pear shape appearance and WHR was used.

Statistical Analysis: Data obtained were presented in both tables and graphs. The relationship between the different blood groups with gynaecoid fat distribution in males was determined using Chi-square [test. Their Body mass index (BMI) was calculated using weight (kg)/height (m^2). The waist to hip ratio was calculated

RESULTS

The results are shown in tables 1- 3 and figure 1 below.

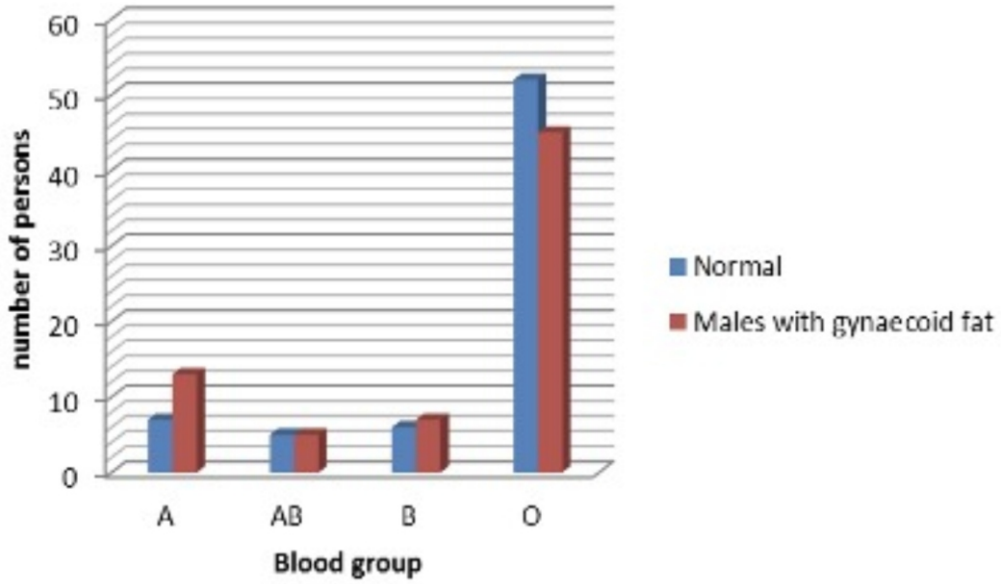

Figure 1: Sample size distribution for normal males and males with gynaecoid fats

Figure 1 shows a chart of the sample size distribution of normal males and males with gynaecoid fat distribution.70 participants of the total sample size were normal male and the remaining 70 were males with gynaecoid fat distribution. Blood group O was found to be dominant in both normal males and males with the gynaecoid fat.

Table 1: Descriptive statistics of measured parameters in males with gynaecoid fat distribution

Blood Group	Parameter	Sample size	Mean	SE	SD	Var	Min V	MaxV
A	WC (cm)	13	36.46	0.68	2.44	5.94	32.00	42.00
	HC (cm)		43.69	1.11	3.99	15.90	38.00	52.00
	WHR		0.83	0.01	0.04	0.00	0.77	0.87
	Wt (kg)		94.15	4.09	14.76	217.97	71.00	120.00
	Ht (m)		1.68	0.02	0.06	0.00	1.61	1.80
	BMI (kg/m2)		32.90	0.97	3.50	12.24	27.00	38.00
AB	WC (cm)	5	36.00	1.52	3.39	11.50	32.00	40.00
	HC (cm)		41.80	1.46	3.27	10.70	39.00	47.00
	WHR		0.86	0.02	0.05	0.00	0.80	0.93
	Wt (kg)		87.40	6.51	14.55	211.80	76.00	112.00
	Ht (m)		1.67	0.04	0.08	0.01	1.60	1.81
	BMI (kg/m2)		31.28	1.37	3.06	9.34	27.60	34.70
B	WC (cm)	7	35.29	1.29	3.40	11.57	30.00	40.00
	HC (cm)		42.00	1.40	3.70	13.67	38.00	48.00
	WHR		0.83	0.01	0.04	0.00	0.78	0.89
	Wt (kg)		93.00	4.96	13.13	172.33	82.00	120.00
	Ht (m)		1.67	0.03	0.07	0.01	1.61	1.82
	BMI (kg/m2)		33.07	0.80	2.11	4.45	30.90	36.36
O	WC (cm)	45	37.49	0.40	2.67	7.12	31.00	43.00
	HC (cm)		44.24	0.44	2.92	8.55	37.00	52.00
	WHR		0.84	0.01	0.04	0.00	0.74	0.91
	Wt (kg)		94.69	1.56	10.49	110.04	75.00	118.00
	Ht (m)		1.68	0.01	0.05	0.00	1.59	1.80
	BMI (kg/m2)		33.58	0.40	2.71	7.33	27.90	38.90

Table 2: Descriptive statistics of measured parameters normal males

Blood Group	Parameter	Sample size	Mean	SE	SD	Var	Min V	MaxV
A	WC (cm)	7	36.57	2.14	5.65	31.95	29.00	43.00
	HC (cm)		38.43	2.06	5.44	29.62	31.00	44.00
	WHR		0.95	0.01	0.02	0.00	0.91	0.97
	Wt (kg)		84.00	4.57	12.10	146.33	65.00	100.00
	Ht (m)		1.69	0.02	0.06	0.00	1.60	1.79
	BMI (kg/m2)		29.40	1.09	2.90	8.39	23.30	31.20
AB	WC (cm)	5	35.80	2.84	6.34	40.20	28.00	44.00
	HC (cm)		39.20	2.78	6.22	38.70	32.00	47.00
	WHR		0.91	0.01	0.02	0.00	0.87	0.93
	Wt (kg)		93.40	8.15	18.23	332.30	63.00	112.00
	Ht (m)		1.67	0.03	0.07	0.01	1.59	1.75
	BMI (kg/m2)		33.22	2.30	5.13	26.36	25.00	37.80
B	WC (cm)	6	38.00	2.00	4.90	24.00	30.00	42.00
	HC (cm)		40.67	2.03	4.97	24.67	33.00	45.00
	WHR		0.93	0.01	0.02	0.00	0.90	0.95
	Wt (kg)		85.17	7.82	19.17	367.37	52.00	105.00
	Ht (m)		1.69	0.03	0.06	0.00	1.62	1.78
	BMI (kg/m2)		29.58	2.21	5.42	29.39	19.80	35.90
O	WC (cm)	52	35.10	0.73	5.29	27.97	28.00	48.00
	HC (cm)		37.94	0.70	5.05	25.55	30.00	50.00
	WHR		0.92	0.00	0.03	0.00	0.85	0.98
	Wt (kg)		81.63	2.41	17.35	301.06	55.00	120.00
	Ht (m)		1.66	0.01	0.08	0.01	1.50	1.82
	BMI (kg/m2)		29.80	0.84	5.99	35.90	20.10	44.40

KEY; BMI= body mass index, WHR= waist to hip ratio, WC= waist circumference, HC= hip circumference, wt= weight, ht= height, SE= standard error, SD= standard deviation, VAR= variance.

Table3: Test for association of gynaecoid fat distribution with ABO blood groups in males

Blood groups	normal	Gynaecoid fat distribution	Calculated Chi Square score	Critical Chi square score at 0.05 level	Inference
A	18	16	2.38	7.81	Not significant (p>0.05) There is no association between gynaecoid fat distribution and ABO blood group
AB	11	10			
B	17	14			
O	24	30			

DISCUSSION

The study has investigated the association of ABO blood group with gynaecoid fat distribution in males. It was observed from the test analysis done that the most dominant blood group was blood group O for both normal males and males with gynaecoid fat (42.8% and 34.28% respectively), follow by blood group A (22.8% and 25.7%) and blood group AB was found to be the least. The mean values of waist to hip ratio of blood group A, AB, B, O were 0.83, 0.86, 0.83, and 0.84, respectively. Blood group AB has the highest waist to hip ratio value (0.86) and blood group A and B has the lowest waist to hip ratio value from the analysis (0.83). The mean value of the body mass index of blood group A, AB, B and O were 32.9,31.2, 33.07 and 33.58 kg/m^2 respectively, blood group O was found to have the highest BMI (33.58 kg/m^2) while blood group AB has the lowest (31.2kg/m^2). From the statistics of the normal males, the mean values of the waist to hip ratio for blood group A, AB, B and O were 0.95, 0.91, 0.93 and 0.92 respectively and the mean values for the body mass index of blood group A, AB, B and O were 29.40, 33.22, 29.58and 29.80kg/m^2.

[12] conducted a study to find out association of ABO blood group with body mass index in United Kingdom with a population size of 14000 participants. Their result showed that blood type “B” is susceptible to obesity. [13] also carried out a study to find out association of ABO blood group with body mass index. From their study it was observed that the mean of weight and BMI were significantly higher in blood group "A" compared with other blood groups and came to a conclusion that there is no association between ABO blood group with body mass index. As stated earlier that blood group O is the most dominant blood group in both normal males and males with gynaecoid fat, however, worldwide distribution pattern has shown blood type O to be the most prevailing blood group because it is hypothesized to offer maximum protection to people who live in areas endemic to infectious diseases. Hence, the incidence of this blood group is very high in tropical regions where infectious diseases are common[14].

Therefore there is no association between blood group and gynaecoid fat distribution in males.

CONCLUSION

The association between ABO blood group and gynaecoid fat distribution was not significant therefore there is no association between ABO blood group and gynaecoid fat distribution. I recommend that further studies aimed at corroborating this finding should be carried out.

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