Relationship of ABO Blood Groups with Body Mass Index

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Abstract

Background: Obesity predisposing factors have been raised as a major concern of researchers due to the consequences of obesity on health such as diabetes, hypertension, and depression, ABO blood groups linked to many diseases, so may affect directly or indirectly on the incidence of obesity.

Objectives: The study aims to find out the association of ABO blood groups with body mass index.

Method: A cross-sectional study was conducted with a non-probability purposive sample of 2604 young adulthood age (18-25 years) that does not have previous surgery or chronic diseases through an electronic questionnaire in Iraq. A statistical package for social science (SPSS) program, version 24 was used for descriptive and inferential statistics.

Results: Blood group O was a common frequency in people with increased body mass index, so high statistically significant association recorded ($p \leq 0.001$). In addition, most of the subject (86.6%) have positive rhesus (Rh +).

Conclusions: People with blood group O and positive RH were most vulnerable to increase their body mass index.

Keywords: *Relationship, ABO blood groups, Body Mass Index.*

Introduction

It is really important to identify the obesity predisposing factors; Obesity has major consequences on the physical and psychosocial aspects. Hypertension[2], diabetes mellitus[3], cardiovascular diseases[4], depression, and anxiety[5] may develop as a result of obesity; this study tries to find out if the ABO blood groups are a factor to develop obesity. Many studies demonstrate that the blood groups correlate to several diseases such as osteoporosis, thyroid disorder, and hyper-cholesterolemia.[6,7] These studies help to identify the diseases vulnerability and take preventive measures to decrease the incidence and that what are going to do in this study. If we recognize the blood group that has the highest vulnerability to develop obesity so we can take more attention to help prevent people with this blood group to develop obesity.

Objectives of the Study: The study aims to find out the association between blood groups with body mass index.

Materials and Method

Design of the Study: A cross-sectional study was conducted with a non-probability purposive sample of 2604 young adulthood age (18-25 years) that does not have previous surgery or chronic diseases through an electronic questionnaire in Iraq.

Study Instrument: BMI was calculated by division body weight in Kilogram on the height in Metric Square

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($BMI = \frac{Bodyweight\ (Kg)}{Height\ (m2)}$,), and WHO classification of BMI was adopted as shown in (Table 1).

Table 1: Classification of BMI

BMI	Classification
< 18.5	Underweight
18.5–24.9	Normal weight
25.0–29.9	Overweight
30.0–34.9	Class I obesity
35.0–39.9	Class II obesity
≥ 40.0	Class III obesity

Results

Study results demonstrate that the blood group O records the highest percentage (40.8%) of the study sample followed by (34.8%), (22.6%), (12.8%) of A, B, and AB blood groups respectively (Figure 1). While the majority (86.6%) of Rhesus was positive with (13.4%) negative (Figure 2).

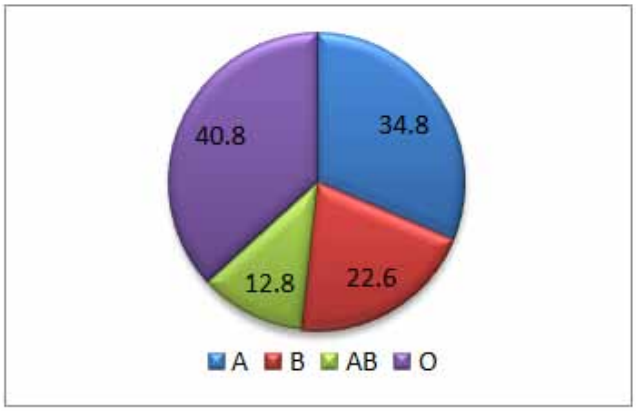

Figure 1: Distribution of ABO blood groups

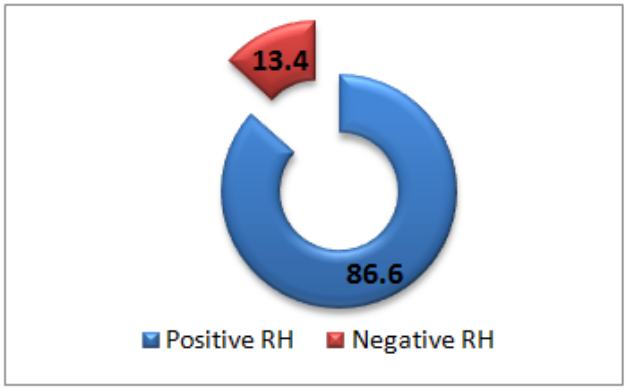

Figure 2: Distribution of Rhesus blood groups

Concerning the classification of BMI, most of the subject (54%) was obesity 3 followed by Obesity 2 that record (20%) and the lowest percentage (4%) was recorded in an underweight group. In addition, the males were (54.7%) and female (45.3%). (Figure 4)

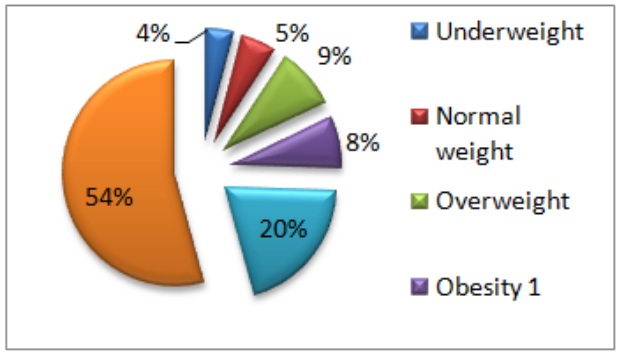

Figure 3: BMI Classification

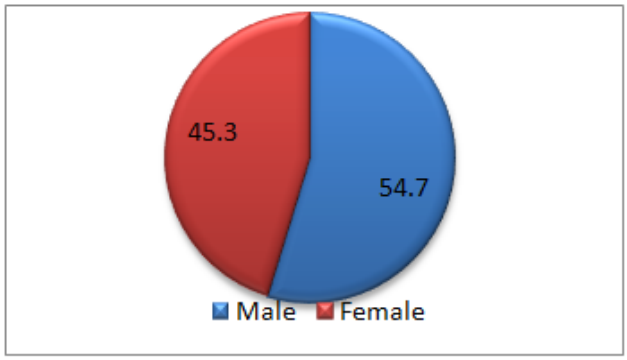

Figure 4: Distribution of Gender

Table 2: Association of ABO blood groups with BMI

	BMI classification						Total	df	Chi Square
Blood group	**Underweight**	**Normal**	**Overweight**	**Obesity 1**	**Obesity 2**	**Obesity 3**			
A	23	31	43	29	144	351	621	15	0.000
B	18	40	54	38	97	341	588		
AB	24	19	39	23	56	172	333		
O	40	46	93	104	228	551	1062		
Total	**105**	**136**	**229**	**194**	**525**	**1415**	**2604**		

Table 3: Differences of Rhesus toward BMI

	RH	N	Mean	Std. Deviation	Std. Error Mean
BMI	Positive	2256	63.4511	241.72271	5.08918
	Negative	348	45.0455	10.13388	.54323

Independent Samples Test										
	Levene's Test for Equality of Variances	F	Sig.	t-test for Equality of Means						
				t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confid.	
									Lower	Upper
BMI	Equal variances	5.35	.021	1.42	2602	.156	18.40563	12.96156	-7.010	43.82
	Not Equal variances			3.59	23.73	.000	18.40563	5.11809	8.36	28.44

Std: standard, sig: significant, t: independent t test, df: degree of freedom, N: number of subject

The BMI record high statistically significant association with ABO blood group (Table 2) added to that, the Rhesus was being found a statistical difference with BMI (Table 3).

Discussion

The study aims to find out the impact of ABO blood groups on the incidence of obesity so we can provide preventive measures to that group with the highest vulnerability to obesity such as a healthy lifestyle and dietary habits.

The study result showed that the majority (40.8%) of our sample was the blood group O, followed by A, B, and AB. In addition, the positive rhesus records the highest distribution (86.6%) in comparison to negative rhesus. These results come along with many studies about the distribution of ABO blood groups in Iraq.[7-10]

The blood group O takes the highest frequency of increase body weight, the main cause of that result need to be more studied. However many articles demonstrate that the blood group O preferred the high protein diet with lean meat and fish[11] added to that the type O blood group tend to Yoga and limited exercise in comparison to other blood groups that may prefer lifting weights and heavy exercise, eventually blood hormones level (such as catecholamines and cortisol) will be changed according to that exercise.[12]

The individuals with positive Rh record significant difference and obvious increase in their body weight when compared with peoples that have negative rhesus. Much more studies needed to explain that's fact and that may affected by race or specific geographical area.[13, 14]

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Conflict of Interest: There are no conflict of interest concerning this research and the manuscript has not been submitted to another journal or publishing venue.

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Informed Consent: Before filling the questionnaire, all participants were asked if they agree or disagree to participate in the research.

Conclusions: There are differences concerning physical and economic status between Americans and Iraqis, Americans record better physical activity and economic status. The psychological domain demonstrates that both communities had negative emotions, anxiety and depression as a result of COVID 19, curfew and social distancing.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Bayan university-College of Nursing-Adult Nursing Department and all experiments were carried out in accordance with approved guidelines.

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