

ASSOCIATION OF BLOOD GROUP 'A' WITH ISCHEMIC HEART DISEASE

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ABSTRACT

Background and Objectives: The Pakistani populace has one of the most noteworthy dangers of ischemic heart disease (IHD) on the planet. Epidemiological information with respect to relationship between ABO blood groups and danger of coronary illness has been conflicting. The objective of this study was to comprehend the recurrence of blood group A in IHD patients in our populace and to decide the relationship of blood group A with ischemic coronary illness in our setting and hopefully improve public knowledge about risk factors for IHD. This case control study was carried out at Army Cardiac Centre, Combined Military Hospital, Lahore, Pakistan from October-December 2014.

Methods: Total Sample of 408 patient medical records was included in the study. Information was entered and analysed by utilizing Statistical Package for Social Sciences (SPSS) version 20.0 programming for Windows.

Results: Prevalence of blood group 'A' was significantly higher among IHD group i.e. 25.5% as compared to controls i.e. 15.2%, (Odds Ratio (OR) = 1.91, 95% confidence interval (CI) 1.16 to 3.13, $p = 0.01$) recommending there is a profoundly noteworthy relationship of blood group "A" with IHD.

Conclusion: The Pakistani cohort researched in this study plainly demonstrates blood group phenotype A is connected with an increased risk for IHD. This, by all accounts seems free of traditional cardiovascular risk variables. Along these lines, it is suggested that blood group "A" ought to be incorporated into non-modifiable hazard elements of ischemic coronary illness in our populace.

Keywords: Blood Group A, Frequency, IHD.

INTRODUCTION

Cardiovascular disease is created by disarranges of the heart and blood vessels, and include ischemic/coronary illness (heart attacks), cerebrovascular malady (stroke), raised circulatory strain (hypertension), peripheral artery ailment, rheumatic coronary illness, inherent coronary illness and heart failure.¹

Cardiovascular maladies (CVDs) are the main source of death all around: a larger number of individuals bite the dust every year from CVDs than from some other cause.² An expected 17.3 million individuals kicked the bucket from CVDs in 2008, accounting for 30% of all worldwide deaths.² Of these mortalities, an expected 7.3 million were because of coronary illness and 6.2 million were expected to stroke.³ Over 80% of CVD mortality takes place in low and center pay countries.² CVDs are anticipated to stay one of the main sources of death.⁴

In Pakistan, 30 to 40 percent of all deaths are because of cardiovascular illnesses.⁵ The Pakistani populace has one of the most astounding dangers of ischemic coronary illness (IHD) on the planet. The IHD deaths in Pakistan have achieved 200,000 every year

that is 410/100,000 of the population.⁵ IHD is presently driving reason for death in Pakistan.⁵

In spite of the fact that exact reason for IHD is not known, a large number of elements like family history of coronary illness, diabetes, raised blood pressure, hoisted cholesterol, smoking, poor sustenance, particularly an excessive amount of fat in the eating routine and stoutness have an impact.⁶

As of late, a lot of research has been embraced to explore if blood group phenotype is connected with an expanded danger of ischemic coronary illness. Epidemiological information with respect to relationship between ABO blood group and danger of coronary illness has been conflicting.⁷ In our Pakistani population, a study at Armed Forces Institute of Cardiology, Rawalpindi, showed a strong association between blood group A and ischemic heart illness.⁸ In a recent study by Lutfullah et al⁹ at Mayo Hospital Lahore, Pakistan, no affiliation was found between ABO blood groupings and ischemic coronary illness.

Blood group A phenotype is common in Pakistan with 24% prevalence.¹⁰ Ischemic heart disease is the leading non communicable disease in Pakistan thereby

making investigation about possible risk factors in our setting an important public health issue.

In view of the above, this study was intended to comprehend the frequency of blood group A in IHD patients in our populace and decide the relationship of blood group A with ischemic coronary illness in our setting and hopefully improve public knowledge about risk factors for IHD.

METHODS

Study Design

The study design for this research was case control with secondary data analysis.

Study Site

This study was carried out at Army Cardiac Centre, Combined Military Hospital, Lahore, Pakistan from October-December 2014.

Sample Size Calculation

Total sample of 408 patient medical records was included in the study. Cases and controls were selected on a 1:1 ratio i.e. 204 cases and 204 controls. Sample size was calculated by using sample size calculator software developed by WHO.⁸

Sampling Technique

Records of blood groups of cases and controls from last year (2014) were retrieved from patients' medical history forms using convenience sampling technique. The cases were all patients with proven IHD on the basis of coronary angiographic evidence. Controls were all angiography negative persons from the same institute for the same period. Matching was performed between groups to avoid potential confounders.

Before conducting the study, ethical approval was taken from Ethical Review Committee of CMH Lahore Medical College.

Data Collection

Two separate pro forma (annexed as 'A' and 'B') were carefully designed for the cases and controls to record the required information. A study pro forma was filled for every case to gather data with respect to age, sex, blood group, hypertension history, diabetes, body mass index and smoking status. The pro forma for the controls included the same information.

Inclusion/Exclusion Criteria

Irrespective of age and sex, all patients fulfilling the criteria for proven IHD at Army Cardiac Centre, CMH, Lahore, from 1st January 2014 to 31st December 2014 were included for cases. For controls, the persons free from evidence of IHD from the same institute during same period were included. Patients having valvular heart disease, congenital malformation, hypertrophic cardiomyopathy, severe renal failure and malignancy were excluded.

Statistical Analysis

Information was admitted and broken down by utilizing Statistical Package for Social Sciences (SPSS) version 20.0 programming for Windows. Strength of association between blood group 'A' and IHD was examined by estimating Odd ratio (OR). Significance of association between blood group 'A' and IHD was examined by using Chi-square test of significance. P value < 0.05 was taken as measurably noteworthy.

RESULTS

In the aggregate specimen of 408, 83 (20.3%) were of blood group 'A', 154 (37.7%) of blood group 'B', 114 (28%) of blood group 'O' and 57 (14.0%) of blood group 'AB'.

It was revealed from the data that there were total 204 bypass surgery cases during the period in Army Cardiac Centre. The IHD bunch comprises of 175 (85.8%) males and 29 (14.2%) females. The control group consists of 146 (71.8%) males and 58 (28.4%) females (P = 0.001) (Table 1).

Main risk variables observed in this study were obesity, hypertension, diabetes and smoking.

Out of these 204 cases, 52 (25.5%) were of 'A' blood group, 73 (35.8%) were of 'B' blood group, 54 (26.5%) of 'O' blood group and 25 (12.3%) of 'AB' blood group.

While in the controls, the distribution according to blood group revealed that out of 204 controls, 31 (15.2%) were 'A' blood group, 81 (39.7%) were of 'B' blood group, 60 (29.4%) of 'O' blood group and 32 (15.7%) of 'AB' blood group. Overall association of A B O blood group with IHD was found statistically borderline significant (P = 0.08).

Commonness of blood group "A" was altogether high among IHD aggregate i.e. 25.5% as compared to controls i.e. 15.2%, Odds Ratio (OR) = 1.91, 95% confidence interval (CI) 1.16 to 3.13, p = 0.01 (table 2). It means the odds of having blood group 'A' in IHD group is about two times more than control group or if a person has IHD then the chances that this person has blood group 'A' are about two times more than the person who does have IHD. Moreover, high rate of blood group "A" in IHD bunch demonstrates that there is significant association of blood group "A" with IHD.

Although prevalence of hypertension, diabetes, and smoking was more in cases as compared to controls but this distinction was not measurably critical (P > 0.05). Be that as it may, high prevalence of obesity in cases (20.1%) as compared to controls (12.3%) was significantly associated with IHD (P = 0.001) (table 3, Fig 1).

There was highly significant association of age with IHD (P = 0.001).

DISCUSSION

Though the exact cause is not known, a multitude of

risk variables are accountable for the development of ischemic coronary illness. Control of these hazard variables has been appeared to lessen the seriousness and difficulties of disease.¹¹

The ABO blood group framework is the most critical framework for blood group similarity. Notwithstanding, ABO blood gathering may have extra results on different components that may likewise add to the danger of thrombosis¹²⁻¹³ and merit extra examination especially to clarify the IHD chance.

In various areas of the world, there is particular ABO blood bunch conveyance. Indeed, even inside a similar nation (as Pakistan), slight varieties has been observed.¹⁴⁻¹⁵ In the areas of Sindh and Baluchistan blood bunch O is more basic in population.¹⁶ Blood aggregate B is the most well-known gathering in Pakistan in all reviews done in Pakistan.¹⁷ In this study in the entire sample (cases and controls) blood group B was additionally most predominant (37.7%). While In USA, England, Africa, Australia and Saudi Arabia, larger part of the general population have a place with blood aggregate A and O.¹⁸

A few studies have uncovered that ABO blood aggregates especially non-O blood (A, B and AB) gatherings are connected with expanded danger of IHD.¹⁹ A noteworthy affiliation was found in Australian populace between blood groups and family history of IHD and were connected with expanded mortality in patients.²⁰ Anvari indicated CABG patients in Iranian populace have high predominance of blood gathering A.²¹ In British local heart consider, individuals with IHD were analyzed demonstrating that blood group A is connected with IHD in moderately aged British men.²² Khan et al⁸ showed in number relationship of blood gathering A with IHD with Odds ratio of 3.34 and p-esteem < 0.001. However, there are reports that there is no correlation between blood groups and ischemic heart disease.²³⁻²⁴

The after effects of this study demonstrated a marginal critical relationship of ABO blood groups with IHD (p = 0.08), however, there was a very huge relationship amongst IHD and blood group A (OR = 1.91, 95% CI =

Table 1: Gender distribution of case and controls.

Gender	Cases (n = 204)	Controls (n = 204)	Odds Ratio	95% CI*	P-Value
Males	175 (85.8%)	146 (71.6%)	2.4	1.50 – 3.94	0.001
Females	29 (14.2%)	58 (28.4%)			

*CI = Confidence Interval

Table 2: Relationship of blood group A with IHD.

	Cases (n = 204)	Controls (n = 204)	Odds ratio	95% CI	p-value
Blood Group A	52 (35.5%)	31 (15.2%)	1.91	1.16 – 3.13	0.01
Other Blood Groups	152 (74.5%)	173(84.8%)			

*CI = Confidence Interval

Table 3: Frequency of risk factors in cases and controls.

Risk factors	Cases (n = 204)	Controls (n = 204)	P – value
Hypertension	39.2%(80)	32.8%(67)	0.18
Diabetes	26% (53)	21.6%(44)	0.30
Smoking	14.2% (29)	12.7%(26)	0.67
Obesity	20.1% (41)	12.3%(25)	0.001

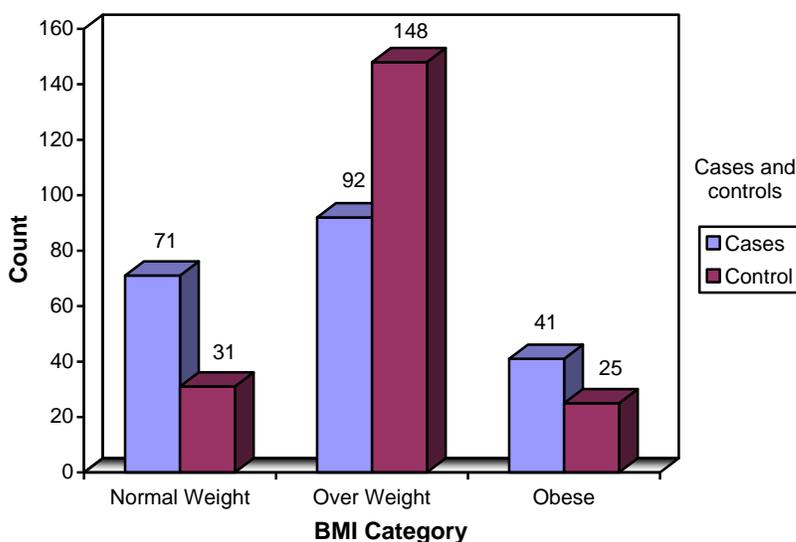


Fig. 1: Frequency of Body Mass Index (BMI) in Cases and Controls.

1.16-3.13; p = 0.01). There are several studies whose findings reflect those of this study.^{8,22,25-27}

This study plainly shows a high predominance of hazard elements, for example, hypertension, diabetes, smoking and obesity in IHD aggregate when contrasted with control bunch, however aside from obesity this affiliation was not measurably huge ($p > 0.05$). However, prevalence of obesity was much greater in cases (20.1%) as compared to controls (12.3%) and this association was statistically very highly significant ($p = 0.001$) what's more, it can be anticipated that being overweight may assume a vital part in the advancement of IHD in our local populace. Obese individuals are at more serious hazard to endure cardiovascular ailments (CVDs).²⁸

In this study, statistically highly significant association was observed when comparing cases and the control group according to age and gender i.e. males had a 2.4 fold greater risk of developing IHD as compared to females (OR = 2.4; 95% CI = 1.50-3.94; $p = 0.001$). This difference has been postulated to be due cardio-protective effects of females hormones. Similarly, the relationship between age and IHD was found highly significant ($p = 0.001$). There was a high prevalence of IHD (78%) in individuals aged 51 (yrs.) and above as compared to controls (60.3%). However, 22% of IHD were aged 50 years and below, which shows that IHD disease occurs in our population at a comparatively younger age as compared to Western countries.²⁹

The consequences of this examination uncovered a noteworthy relationship of blood group A with IHD which demonstrates that in this Pakistani populace the pervasiveness of IHD in blood aggregate A is constantly higher than in all other ABO blood bunches. It is striking that; notwithstanding the way that the most pervasive blood bunch among Pakistanis is phenotype B³⁰ the occurrence of IHD is most noteworthy in people with blood assemble phenotype A. This recommends an expanded hazard is connected with phenotype A when contrasted with B and considerably more along these lines, when contrasted and blood aggregate phenotype O.

Hazard components like hypertension, age, sex, obesity, smoking and diabetes observed to be more common in IHD. In this way these may be major contributory components for building up the danger of IHD in our nearby populace.

Limitations of Study

As with all research, there are limitations in the methodology. In this study, there is lack of information on additional risk factors such as hypercholesterolemia, stress and family history of IHD, single Centre and small study size. Furthermore, data was based on hospital records. Therefore, one cannot generalize these findings until these risk factors are addressed in further research.

It is **concluded** the Pakistani cohort researched

in this study plainly indicates blood group phenotype A is connected with a builds chance for IHD. This is by all accounts free of ordinary cardiovascular hazard components. Being an independent risk factor, it is recommended that blood group A should be included in non-modifiable risk factors of IHD and persons with blood group A must be educated regarding their increased risk of developing IHD.

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Authors' Contribution

MZA: Write-up. IAK: Data collection and data entry. NZ: Data analysis. MAC: Critical review.

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