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A Relationship Between Colitis and ABO Blood Group In Population Based Cohort Study In Kut

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Abstract
Objectives: To find out prevalence of ABO blood groups and to investigate them association with Colitis.
Materials and Methods: Researchers conducted a cross-sectional study in Kut City, Iraq from December 2022 to April 2023. The study enrolled 100 participants of both sexes, aged 18 to 70 years old. The participants' ABO blood groups were determined using the antisera method. Additionally, the researchers collected detailed histories from the study population, recording information such as age, sex, family history, and other relevant details on a standardized form.
Results: In our study population, blood type O was most common (65%). A history of colitis was reported. Colitis was common in individuals with Rh+ blood type (94.0%), but the proportions were similar in females and males (57%, 43%). This population-based cohort study found a significant association between colitis and diabetes and blood pressure. Blood type AB had the lowest risk of allergic rhinitis (8%). This study showed an association between blood type and colitis, but the p-value of 0.069 did not meet the standard threshold for statistical significance of $p < 0.05$.
Conclusion: In the study population, blood type O was the most common blood type among the participants. Furthermore, individuals with blood type O were observed to have a higher risk of developing colitis compared to those with other blood types, while blood type AB was the most protected. The p-value of 0.069 suggests there may be a potential association. Still, it does not reach the level of statistical significance that would allow the researchers to conclude there is a definite, reliable relationship between blood type and colitis based on this study alone. Further research would be needed to confirm any such association.
Keywords: *ABO blood-group system, Colitis, Blood group antigens, Seasonal.*

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I. Introduction

The classification of human blood into the ABO groups was first established in the early 20th century, and our knowledge of this system has significantly advanced since its initial discovery. Individuals can be categorized into one of four main blood types - A, B, O, and AB - based on the agglutination patterns observed in their red blood cells [1]. The underlying ABO blood group system is defined by the presence or absence of A and B antigens on the red blood cell surface, as well as the corresponding antibodies that develop in the serum when these specific antigens are not expressed. These ABO antigens are found not only on red blood cells, but also on the surface of various other tissues and secretions within the body. The natural anti-A and anti-B antibodies typically emerge in immunocompetent people around 6 months of age [2, 3].

Research has suggested that an individual's specific ABO blood type may influence their susceptibility to various diseases, though some of these correlations remain debated[4-6]. For example, studies have indicated a potential link between blood group A and increased rates of stomach cancer, while blood group O has been associated with a higher prevalence of stomach and duodenal ulcers [7-9]. The genetic basis for the ABO blood group system resides within the ABO locus, located on chromosome 9. This genomic region spans approximately 18 kilobases and contains 7 distinct exons. Exon 7 is the largest and considered the most critical coding sequence within this locus. Interestingly, an inclusion deletion in exon 6 is commonly observed in the O blood group alleles, which can result in a loss of enzymatic function[10-12].

Moving beyond the ABO system, the lower digestive tract, consisting of the large intestine, plays a vital role in the body's waste elimination processes. The large intestine, measuring over 1.5 meters in length, receives the digested food mixture from the small intestine through a one-way valve. On average, adults excrete around 2.5 gallons of fluid through the colon each day. Irritable bowel syndrome (IBS) is a common gastrointestinal disorder that can persist for years, with symptoms often developing gradually and potentially worsening due to factors like anxiety, stress, and nervous tension. These IBS symptoms can include belching of

undigested food without vomiting, pain in the lower right quadrant, potential weight loss, heartburn, nighttime coughing, and chronic diarrhea[13, 14].

There are various types of colon diseases, with irritable bowel syndrome (IBS) being considered the most common disorder of the digestive system. IBS can significantly impact a person's quality of life and daily activities. Individuals with IBS tend to be younger, with the condition being less prevalent after the age of 50. Interestingly, the incidence rate of IBS is about twice as high in women compared to men[15, 16].

Another notable colon disease is ulcerative colitis, which often affects young adults. This condition has the potential to start in the rectum and sigmoid colon during childhood, and may subsequently spread to the left colon and eventually involve the entire colon[17].

Numerous studies have suggested a potential link between blood type and the risk of developing colon-related diseases. Specifically, some research has indicated that individuals with blood type O may be more prone to large bowel and colon problems, potentially due to the characteristics of stomach acid secretion in this blood type[18].

However, accurate statistical data on the incidence and prevalence of colon diseases in terms of gender and age is currently limited. Some sources estimate that approximately one-fifth of the population may be affected by these conditions, suggesting that around 20 out of every 100 people could be impacted[19, 20].

The current study aims to investigate the potential association between blood type and colon irritation in the Wasit province sample.

II. Materials And Methods

The current study focused on patients with colitis, who were included from the Wasit governorate. Over the period of December 2022 to November 2023, blood samples were collected from 100 patients aged between 18 to 65 years. All study participants provided informed consent.

The researchers first counted the number of male and female participants. They then collected data on the patients' age, blood type, Rh factor, presence of other disorders, location of the inflamed gland, and family medical history .

The cardinal symptoms considered in the study were diarrhea (often with blood or pus), rectal bleeding, abdominal pain and cramping, rectal pain, urgency to defecate, inability to defecate despite the urgency, weight loss, and fatigue .

ABO blood typing is determined using the traditional antiserum method on a glass slide. Blood is collected by pricking the finger with a sterile lancet after cleaning the puncture site with 70% ethanol. One drop of antiserum A and B is placed on a glass slide. One drop of blood from each subject is mixed with each antiserum using a separate glass rod. Blood typing is determined based on agglutination[6, 21].

Table 1: Prevalence of Blood groups among study population.

A blood group	B Blood group	AB Blood group	O Blood group
n=17%	n=10%	n=8%	n=65%
Males= 5	Males=2	Males= 5	Males=31
Females=12	Femelles=8	Females=3	Females=34
Rh^{+}=100%	Rh^{+}=100%	Rh^{+}=87.5%	Rh^{+}=92.3%
Rh^{-}= 0	Rh^{-}= 0	Rh^{-}= 12.5%	Rh^{-}=7.6%

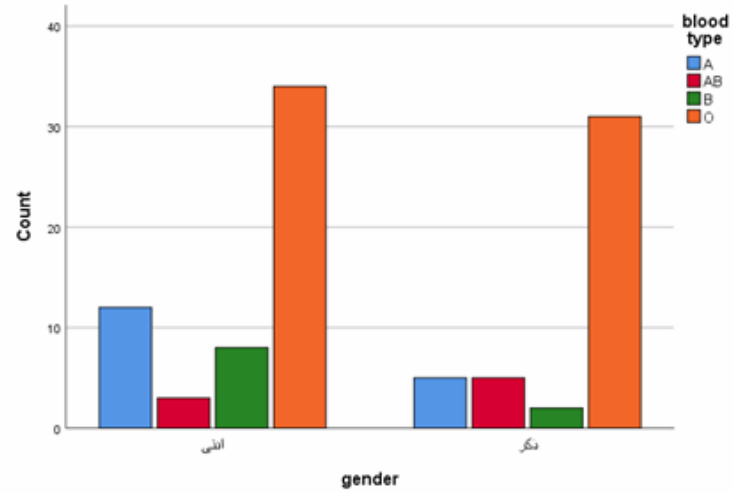

Fig 1: Gender based prevalence of blood groups

Statistical analysis

The data collected in this study was analyzed using SPSS statistical software. For quantitative variables, the mean and standard deviation were calculated. Qualitative data was presented as frequencies and percentages

To investigate the association between the blood groups and other variables, the researchers applied the t-test. The results showed a p-value of 0.069, indicating a potential association between blood groups and Colitis in the study population. It is important to note that a p-value of 0.069 does not meet the typical threshold for statistical significance, which is a p-value less than 0.05. While a p-value of 0.069 suggests a marginally significant association, it falls short of the conventional standard for declaring a statistically significant relationship. Further research with a larger sample size may be needed to confirm whether there is a reliable relationship between blood groups and allergies in this patient population.

III. Results

The distribution of ABO blood groups among the study participants is presented in Table 1. The data shows that blood group O was the most prevalent type in the study population, regarding the Rh factor, the results in Table 1 indicate that Rh-positive individuals were the dominant group across both genders. Further analysis of the gender-specific blood group distribution, as shown in Figure 1, confirms that blood group O was the most common in both males and females. However, the ratio of blood group A and AB was equally distributed in males. while in females, the blood group AB was less commonly distributed. Conversely, the ratio of blood group B was higher in females than in males.

The study sample included participants across a range of age groups, and research suggests that colitis is most frequently diagnosed in individuals aged 25 to 35 years. Existing evidence indicates that colitis may have a genetic component, and having a family history of the condition is a significant risk factor, with the risk increasing if both parents have colitis.

The statistical analysis conducted in this population-based cohort study revealed a potentially significant association between colitis and blood group, with a p-value of 0.069. While this p-value is slightly above the conventional significance threshold of 0.05, it still suggests a noteworthy relationship that may warrant further investigation. It is important to note that a p-value of 0.069 is considered marginally significant, as it does not quite meet the standard criterion for statistical significance ($p < 0.05$). However, the findings indicate a potentially meaningful association that should be explored further with a larger sample size to more conclusively determine the relationship between colitis and blood group in this patient population.

IV. Discussion

Regarding the association between the ABO blood group and colitis, the statistical analysis yielded a p-value of 0.069, which indicates a lack of correlation between these two variables. These findings are consistent with an earlier study by Smith et al. in 1961, which examined 317 colitis patients. Their results showed the distribution proportions of blood groups O, A, B, and AB were 46.37%, 39.12%, 10.41%, and 4.1%, respectively, and they also concluded that the ABO blood group was not associated with colitis[22].

The current study's results, combined with the findings from the previous research, suggest that the ABO blood group is not a significant risk factor for the development of colitis. These findings contribute to the growing body of evidence on the lack of a meaningful relationship between ABO blood groups and the incidence of colitis.

Recently, some new studies on the relationship between ABO blood group and colitis have been discussed in the literature. Hsiang-Chun Lai et al. reported the distribution ratios of blood type O, A, B, and AB were 33.3%, 31.8%, 29.5%, and 5.4%, respectively, among colitis patients, Although the patients had a higher proportion of type A blood compared to the general population, there was no statistically significant association in ABO blood type distribution between the colitis patients and the control group ($p = 0.1906$). These findings are in agreement with the results of the current study, which also found no significant correlation between ABO blood group and colitis[18]. The expression of blood group antigens has been shown to affect a host's susceptibility to various infectious agents, including microorganisms, parasites, and viruses There appears to be a symbiotic relationship between an individual's blood group antigen expression and the composition of their gastrointestinal microbiome, which in turn can influence the occurrence and progression of conditions like colitis [23, 24] [25, 26]. While the epidemiological evidence does not conclusively link ABO blood groups to colitis risk, further basic science research is still needed to determine the underlying pathophysiological mechanisms that may connect these factors. Elucidating the biological mechanisms, if any, could provide valuable insights into developing and managing inflammatory bowel diseases.

V. Conclusion

The current study found a potential association between ABO blood group and the incidence of colitis, though the results did not reach statistical significance. Colitis patients showed a trend of having fewer individuals with blood types A and B, and more with blood type O, compared to the general population control group. Among colitis patients, those diagnosed at a younger age tended to have more blood types A and B, while those diagnosed at an older age had a higher prevalence of blood type O. While these findings suggest a potential relationship between ABO blood group and susceptibility to colitis, the differences observed were not statistically significant. Further research with larger sample sizes is needed to elucidate the potential pathophysiological mechanisms underlying the relationship between ABO blood group expression and the development or progression of colitis, as establishing a clearer understanding of this association could have important implications for risk assessment, disease monitoring, and the development of targeted preventive or therapeutic strategies.

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