

# Association of ABO Blood Group with Clinicopathological Factors among Gastric Cancer Patients in Tertiary Care Hospital

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## Abstract

**Objective:** To determine the association of ABO blood groups with clinicopathological factors among gastric cancer patients.

**Study type, settings & duration:** This cross-sectional study conducted at the Department of Medical Oncology, Jinnah Postgraduate Medical Centre, Karachi from January 2019 to March 2020.

**Methodology:** All the patients with confirmed diagnosis of gastric cancer of age from 15-90 years and of either gender were included in the study on the basis of convenience sampling. Type of ABO blood group was identified from laboratory and from blood transfusion section of the hospital. The socio-demographic and clinicopathological data was also recorded on pre-designed proforma. SPSS version 23 was used to analyse data.

**Results:** The mean age of the study sample was  $48.31 \pm 12.36$  years (range: 19-85 years). Out of 144 gastric cancer patients, 51 patients had A type 35.4%, 45 had type B 31.3%, 40 had type O 27.8% and 8 had AB type of blood (5.6%). There was statistically significant association between ABO blood type grade and stage of tumour ( $p = 0.013$ ) and ( $p = 0.05$ ) respectively.

**Conclusion:** Blood group A is the most common blood group found in patients with gastric tumour. Pathologically well differentiated tumour grade is most common grade seen in blood group O, whereas tumour stage III is observed in blood group type B.

**Key words:** ABO blood type, tumour grade, tumour size, tumour stage, gastric cancer.

## Introduction

Globally, gastric cancer is ranked as 5<sup>th</sup> most commonly prevalent cancer and 3<sup>rd</sup> leading cause of fatality.<sup>1</sup> In Pakistan, males are commonly affected with gastric cancer. In Karachi, out of 100 thousand population 6 males and about 4 females are diagnosed with gastric cancer.<sup>2</sup> The risk factors of gastric cancer involves helicobacter pylori infection, drinking alcohol, smoking and salty food intake.<sup>3</sup> However, not any specific factor is involved

in aetiology of gastric carcinoma. Whereas, helicobacter pylori has shown strong significant association with gastric carcinoma, peptic ulcer and gastric mucosa associated lymphoid tissue (MALT) lymphoma.<sup>4</sup> The prognosis of gastric cancer is highly dependent upon the stage of gastric cancer. The diagnosis of gastric cancer at an initial stage can lead to more than 90% of survival rate. However, the diagnosis at late stage can reduce the survival chances to 50% and treatment becomes challenging and limited to palliative management only.<sup>5</sup> In Pakistan, helicobacter pylori infection is the primary cause of gastric cancer. The eradication of helicobacter pylori infection can reduce the risk of gastric cancer by a quarter of 1.<sup>6</sup>

Apart from external risk factors, the host factor also plays an important role in Gastric cancer risk. The relationship between ABO blood group and gastric cancer was discovered years ago and few studies have also confirmed the relation of ABO blood group is likely to be associated with causing gastric cancer. Hence, the better understanding of aetiology for gastric cancer can lead to better treatment. The genetic and environmental factors

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### Authors Contribution

PM & GH conceptualized the project. AS & BP did the data collection and statistical analysis. BP & RR performed the literature search. Drafting, revision & writing of manuscript were done by RR & SB.

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are also worth understanding in gastric cancer context. The relationship between ABO blood group and gastric cancer are still not confirmed as some researchers have reported different prognosis with different blood group type in a manner that ABO blood group has protective role in gastric cancer.<sup>7</sup> Whereas, other studies found that ABO blood group has no role in prognosis of gastric cancer.<sup>8,9</sup>

The ABO blood grouping is related to genetic factor. Earlier studies have shown that type A blood group was more likely associated with gastric cancer. Later on the studies discover type B blood group can also increases the risk of gastric cancer. However, type O blood group was associated with peptic ulcer leading to gastric cancer. There are many studies suggesting strong link between carcinoma and ABO blood group.<sup>10</sup>

Therefore, the aim of the present study was to determine the association of ABO type blood group among gastric cancer patients in our local population. The study will also give some pathological insight and association with ABO blood system.

## Methodology

It was a cross-sectional study conducted at the Department of Medical Oncology, Jinnah Postgraduate Medical Centre, Karachi Pakistan from January 2019 to March 2020. The sample size was estimated using Open EPI online sample size estimator, by taking statics of type B blood as 24.1% among patients with gastric cancer, margin of error as 5% and 95% confidence interval, estimate sample size came out as 144. All the patients with confirmed diagnosis of gastric cancer of age 15 to 90 years and of either gender were included in the study based on convenient sampling.

The verbal informed consent was taken from all the eligible patients before collecting the data. The information regarding the blood group was collected from medical record. The socio-demographic and clinicopathological data was recorded on predesigned Performa.

The ABO blood type of patients was identified from laboratory and blood transfusion section of hospital. The socio-demographic and clinicopathological data was recorded on pre-designed Performa.

Statistical Packages for Social Sciences (SPSS) version 23 was used to analyse data. Continuous variables were presented by mean and SD whereas categorical variables were presented as frequencies and percentages. Chi-square test was used to assess the association between

clinicopathological features and blood group type.  $p \leq 0.05$  was taken as statistically significant.

The Ethical approval was obtained from Institutional Review Committee of Jinnah Postgraduate Medical Centre, Karachi.

## Results

The mean age of the study sample was estimated as  $48.31 \pm 12.36$  years (range: 19-85 years).

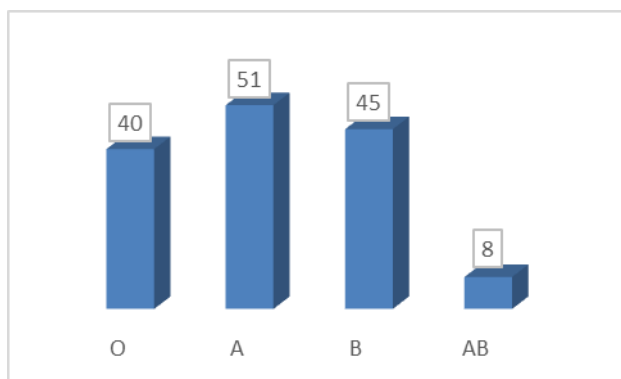
**Table 1: Socio-demographic and clinicopathological characteristics.**

| Variables             | n   | %    |                              | n   | %    |
|-----------------------|-----|------|------------------------------|-----|------|
| Gender                |     |      | Hypertension                 |     |      |
| Male                  | 82  | 56.9 | Yes                          | 7   | 4.9  |
| Female                | 62  | 43.1 | No                           | 137 | 95.1 |
| Residence             |     |      | Obese                        |     |      |
| Rural                 | 65  | 45.1 | Yes                          | 16  | 11.1 |
| Urban                 | 79  | 54.9 | No                           | 128 | 88.9 |
| Education             |     |      | Diabetes mellitus            |     |      |
| Illiterate            | 43  | 29.9 | Yes                          | 8   | 5.6  |
| Primary               | 28  | 19.4 | No                           | 136 | 94.4 |
| Metric                | 30  | 20.8 | Pernicious anemia            |     |      |
| Intermediate          | 30  | 20.8 | Yes                          | 1   | 0.7  |
| Graduate              | 13  | 9    | No                           | 143 | 99.3 |
| Ethnicity             |     |      | Family history               |     |      |
| Urdu                  | 38  | 26.4 | Yes                          | 4   | 2.8  |
| Sindhi                | 55  | 38.2 | No                           | 140 | 97.2 |
| Parkton               | 21  | 14.6 | Site of tumor                |     |      |
| Bloch                 | 10  | 6.9  | Antrum                       | 14  | 9.7  |
| Punjabi               | 16  | 11.1 | Pylorus                      | 26  | 18.1 |
| Other                 | 4   | 2.8  | Body                         | 50  | 34.7 |
| Religion              |     |      | Cardiac                      | 5   | 3.5  |
| Muslim                | 141 | 97.9 | Extensive                    | 28  | 19.4 |
| Hindu                 | 3   | 2.1  | Multiple sites               | 21  | 14.6 |
| Socio-economic status |     |      | Grade                        |     |      |
| Low                   | 61  | 42.4 | Well differentiated          | 58  | 40.3 |
| Middle                | 73  | 50.7 | Moderately differentiated    | 24  | 16.7 |
| High                  | 10  | 6.9  | Poorly differentiated        | 48  | 33.3 |
| Marital status        |     |      | Signet ring cell or mucinous | 14  | 9.7  |
| Unmarried             | 14  | 9.7  | Stage                        |     |      |
| Married               | 130 | 90.3 | II                           | 19  | 13.2 |
| Employment status     |     |      | III                          | 97  | 67.4 |
| Unemployed            | 61  | 42.4 | IV                           | 28  | 19.4 |
| Employed              | 83  | 57.6 | Tumor size                   |     |      |
| Smoking               |     |      | <2.5 cm                      | 62  | 43.1 |
| Yes                   | 30  | 20.8 | $\geq 2.5$ cm                | 82  | 56.9 |
| No                    | 114 | 79.2 |                              |     |      |
| Alcohol consumption   |     |      |                              |     |      |
| Yes                   | 10  | 6.9  |                              |     |      |
| No                    | 134 | 93.1 |                              |     |      |

Out of 144 patients, 56.9% were males, 54.9% belonged to urban area, 29.9% were illiterate, 38.2% were Sindhi, 97.9% were Muslims, 50.7% belonged from middle socio-class, 90.3%

were married and 57.6% were employed. About 20.8% patients were smokers and 6.9% were alcohol consumers. Out of 144, 4.9% patients had hypertension, 11.1% were obese, 5.6% had diabetes mellitus and 0.7% patient had pernicious anaemia. Most of the patients had no family history of gastric cancer 97.2%. Most of the patients had body site of tumor 34.7%. About 40.3% of the tumor were well differentiated, 67.4% had stage III of tumour and (56.9%) had tumor of size  $\geq 2.5$  cm (Table-1).

Out of 144 gastric cancer patients, 51 patients had A type (35.4%), 45 had type B (31.3%), 40 had type O (27.8%) and 8 had AB type of blood (5.6%) (Figure).



**Figure: Frequency distribution of blood type.**

**Table 2: Comparison of clinicopathological features and type of ABO blood.**

| Variables                    | O  | A  | B  | AB | p-value |
|------------------------------|----|----|----|----|---------|
| Site of tumor                |    |    |    |    |         |
| Antrum                       | 3  | 5  | 4  | 2  |         |
| Pylorus                      | 4  | 9  | 11 | 2  |         |
| Body                         | 11 | 19 | 17 | 3  |         |
| Cardiac                      | 3  | 2  | 0  | 0  |         |
| Extensive                    | 8  | 10 | 10 | 0  |         |
| Multiple sites               | 11 | 6  | 3  | 1  | 0.265   |
| Grade                        |    |    |    |    |         |
| Well differentiated          | 20 | 17 | 18 | 3  |         |
| Moderately differentiated    | 2  | 7  | 11 | 4  |         |
| Poorly differentiated        | 14 | 19 | 15 | 0  |         |
| Signet ring cell or mucinous | 4  | 8  | 1  | 1  | 0.013   |
| Tumor size                   |    |    |    |    |         |
| <2.5                         | 17 | 22 | 19 | 4  |         |
| $\geq 2.5$                   | 23 | 29 | 26 | 4  | 0.980   |
| Stage                        |    |    |    |    |         |
| II                           | 7  | 8  | 1  | 3  |         |
| III                          | 27 | 33 | 34 | 3  |         |
| IV                           | 6  | 10 | 10 | 2  | 0.050   |

Out of 58 patients with well differentiated tumour, 20 had blood type O, 18 had blood type B, 17 had blood type A and 3 had blood type AB. The relationship between grade of tumour and type of

blood was statistically significant ( $p = 0.013$ ). Out of 97 patients with stage III of tumour, majority had blood type B, followed by type A, type O and type AB. The relationship between stage of tumour and type of blood was statistically significant ( $p = 0.05$ ) (Table-2).

## Discussion

According to the present study results, almost thirty five percent patients having gastric cancer had blood group type A, followed by thirty one percent having blood type B. However, Yu H et al. studied the association between blood group types and gastric cancer patients, study concluded that blood type A was associated with higher risk of gastric cancer whereas the study also found that blood group type AB had lower risk of gastric carcinoma. A study in China showed higher survival rates with blood type AB among cancer patients.<sup>11</sup> Similar results has been shown by studies conducted by Aird I et al., Keet AD et al. and Hovinga ICK et al. who claimed that blood group type A is associated with increased risk of gastric cancer<sup>12-14</sup> whereas blood group type O has higher risk of developing gastro duodenal ulcers.<sup>15,16</sup> The study also elaborated non-significant relation between different clinical and pathological parameters with blood types.<sup>17</sup> The present study showed that majority of patients having stage III of tumour had blood type B which cannot be relatable to a study reported that blood type O is prognostic factor for gastric carcinoma.<sup>17</sup>

There is lack of data available in Pakistani population in this context. Gastric cancer has been associated with highest mortality for the past decade specifically in developing countries.<sup>18</sup> In one study, Ansari SA et al. concluded that helicobacter pylori infection is positively correlated with blood group types.<sup>19</sup> Brecher et al. and Waseem et al. reported genetic connection among different blood group types with different diseases that helps to take prophylactic measures beforehand.<sup>20,21</sup>

Ding P et al. reviewed five studies and conducted a meta-analysis of blood group types and gastric cancer. The review showed that out of 8024 gastric cancer patients, type A blood group had 1.1 times more chance to have gastric cancer, followed by blood type B than blood type AB.<sup>22</sup> The results are like present study findings. Moreover, the present study showed that the relationship between stage of tumour and type of blood is statistically significant ( $p = 0.05$ ), which is in disagreement with Chinese study which no significant association ( $p$ -value 0.849). The study also concluded that blood type A is associated with worst prognosis.<sup>23</sup>

Nevertheless, the present study showed higher cases of blood type A in poorly differentiated cancer.

Poorly differentiated gastric carcinoma had mostly type A whereas well differentiated cancer patients had mostly blood type O. Stage 3 had mostly type B blood group. Hence, blood group can be important factor serving a prognosis in gastric cancer. It is advised to have detailed knowledge and association between both leading to increase patient survival. The significance of ABO blood group distribution might be associated with biological behaviour of gastric carcinoma patients.

Current study concluded that blood group A is the most common blood group seen in gastric cancer patients in the study population. Pathologically well differentiated tumour grade is most common grade seen in blood group O, whereas tumour stage III is observed in blood group type B.

**Conflict of interest:** None declared.

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