

Brief Communication

THE RELATIONSHIP BETWEEN ABO BLOOD GROUPS AND SUSCEPTIBILITY TO DIARRHEA IN INFANTS DURING THE FIRST YEAR OF LIFE

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Associations have been found between ABO blood groups and both infectious and non-infectious diseases of the gastrointestinal tract¹ and other organs.^{2,4} Persons with blood group O appear to have a higher incidence of duodenal ulcer while those with group A have a greater frequency of pernicious anemia, achlorhydria, and gastric carcinoma.^{1,5} ABO blood groups influence the risk of diarrhea due to *El Tor Vibrio O1* in endemic populations,⁶ although the biologic basis for this association remains unknown.⁷ In such populations group O individuals are at highest risk, group AB individuals are at lowest risk, and persons with group A or group B are at intermediate risk.⁶ Furthermore, persons with blood group O may experience more severe cholera than persons with other blood groups.^{7,8}

During a house-hold survey of diarrhea, we did ABO and Rh blood group determinations to look for differences in the occurrence of diarrhea in association with certain blood groups among 550 Pakistani infants who were randomly selected from five socio-economically different communities and were registered for systemic surveillance of diarrhea from day 0 up to 12 months of age. Of the total 550 infants studied, 359 infants experienced diarrhea (cases) and the remaining 191 infants (controls) were without diarrhea. In each case clinical features were evaluated and stool samples were investigated for bacterial,⁹ (rotavirus, by ELISA technique) agents of diarrhea, which are also reported by the authors.^{12,13} The χ^2 test¹⁴ was applied for statistical analysis of results.

Amongst the 550 infants, 196, 113, 94 and 147 infants belonged to blood groups A, B, AB and O, respectively

(Table I). Of the 359 infants with diarrhea, 137 (38.2%), 61 (17%), 53 (14.8%) and 108 (30%) infants belonged to blood groups A, B, AB and O, respectively. The results also show that infants who had diarrhea were nearly one and a half times as likely as controls to be of blood group O (30% vs. 20.4%; $p < 0.05$) and that the infants with blood group B (17% vs. 27.2%) and AB (14.8% vs. 21.5%) were at minimum risk for diarrhea. Blood group O was the most susceptible to diarrhea followed (in order of highest to lowest susceptibility to diarrhea) by groups A, AB and B (χ^2 for trend = 15.83; p value = 0.0012). Results of a study revealed increased susceptibility to *E. coli* and *Salmonella* in infants of group B and AB.¹⁵ An association of blood group O with increased severity of cholera symptoms has also been found consistently in several studies.^{7,8} However a strong association with ABO groups, analogous to that for cholera, does not exist for ETEC diarrhea¹⁶ among children < 3 years old. David et al.¹⁷ investigated severe life-threatening cholera associated with blood group O in Peru and reported that blood group O was strongly associated with severe cholera. Infected persons had more diarrheal stools per day than persons of other blood groups, were more likely to report vomiting and muscle cramps, and were almost eight times more likely to require hospital treatment. In the present study a significant difference in the overall distribution of ABO blood groups was also evident when the 359 cases and 191 controls were compared ($p < 0.05$). Similarly an elevation of risk of diarrhea was observed among blood group O subjects versus group B and group AB which were 1.36 and 1.30, respectively. Reports show that blood group O was not only associated

Table I: Relationship between ABO blood groups and susceptibility to diarrhea in infants.

Study group	No. of infants (N= 550)	No. (%) of infants susceptible to diarrhea by indicated blood group			
		A (N= 196)	B (N= 113)	AB (N= 94)	O (N= 147)
Infants with diarrhea	359	137 (38.2)	61 (17)	53 (14.8)	108 (30)
Infants without diarrhea	191	59 (30.9)	52 (27.2)	41 (21.5)	39 (20.4)

with occurrence of various diarrheal agents, but also with other diseases such as peptic ulceration, which in turn is associated with *H. pylori* infection.¹⁸ A relatively small number of reports are available on the possible mechanisms of the association. However, studies suggest that blood group B-specific mucinase production may be related to *Shigella flexneri* 2a strains¹⁹ which is known to be a major cause of diarrhea.

The present observations indicate that infants with blood group O are probably more susceptible to diarrheal attacks than those in other groups. Further researches on molecular and genetic aspects of these associations are needed to obtain more information, especially in other socio-economically diverse communities.

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