

ABSTRACT

Background:

Type 2 diabetes mellitus (T2DM) is a major global health problem with a rapidly increasing prevalence, particularly in developing countries. Genetic factors are known to contribute to the susceptibility to T2DM, and blood group antigens have been suggested as potential genetic markers associated with various metabolic diseases. However, evidence regarding the association between ABO and Rhesus (Rh) blood groups and T2DM remains inconsistent and varies across populations. Limited data are available from Yemen, especially from urban settings such as Hodeidah City.

Objective:

This study aimed to assess the association between ABO and Rhesus (Rh) blood groups and Type 2 Diabetes Mellitus among adults in Hodeidah City, Yemen.

Methods:

A cross-sectional analytical study was conducted among 250 participants, including 200 patients diagnosed with T2DM and 50 non-diabetic individuals as a control group. Participants were recruited from Al-Thawra General Hospital and the Central Laboratory in Hodeidah City using a convenience sampling technique. Venous blood samples were collected under aseptic conditions. ABO and Rh blood grouping were determined using the standard

serological plate method, while HbA1c and random blood sugar levels were measured using automated and semi-automated biochemistry analyzers. Data were analyzed using statistical software, and associations were assessed using chi-square tests and odds ratios (OR), with a p-value < 0.05 considered statistically significant.

Results:

Blood group A was the most prevalent among patients with T2DM (47.5%), followed by blood group O (46.0%), while blood groups B (4.5%) and AB (2.0%) were less frequent. A statistically significant association was observed between ABO blood groups and T2DM, with blood group A showing a higher prevalence of diabetes compared to other blood groups. Rh-positive individuals constituted 97.0% of diabetic patients and demonstrated a significantly higher odds of T2DM compared to Rh-negative individuals (OR = 4.4). Additionally, male gender, lower educational level, smoking history, and physical inactivity were significantly associated with T2DM.

Conclusion:

The findings of this study suggest a significant association between ABO blood groups—particularly blood group A—and Type 2 Diabetes Mellitus in Hodeidah City. Rh positivity was also associated with higher odds of T2DM, although this finding should be interpreted with caution due to the low

prevalence of Rh-negative individuals. These results highlight the potential role of blood group antigens as genetic markers for T2DM susceptibility in the local population. Further large-scale and multicenter studies are recommended to confirm these associations and explore underlying mechanisms.

Keywords:

Type 2 Diabetes Mellitus; ABO Blood Group; Rhesus Factor; HbA1c; Yemen; Hodeidah City.