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abstract

Prevalence of Transfusion-Transmitted Infections and its Correlation with Various Blood Types Among Blood Donors in the United Arab Emirates

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abstract

Prevalence of Transfusion-Transmitted Infections and its Correlation with Various Blood Types Among Blood Donors in the United Arab Emirates

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Introduction: Blood groups with variable distributions worldwide and Transfusion-Transmitted Infections (TTIs) pose significant concerns in transfusion practices. Due to notable inconsistent literature findings and UAE health records' gap, this study was conducted. Objectives were to determine(1) ABO, Rh, and Kell distribution among blood donors, (2) TTIs prevalence,(3)blood groups and TTIs correlation in Abu-Dhabi, Al-Ain, and Al-Dhafra; UAE, marking the nation's first research attempt of its kind.

Methodology: This 5-year-retrospective analysis examined data from Abu-Dhabi Blood-Banks Services [from January 2018 - January 2023]. Dual Ethical approvals were obtained by DOH and HCT. Data collection sheet was used including; 1) Demographic: Age (DOB), Nationality, Gender, Location, and Occupation. 2) Blood Groups i) ABO types (A,B,AB,O), ii) Rh-phenotypes (D,C,c,E,e), and iii) Kell system (K antigen). 3) Screening and confirmatory TTIs findings of HBV, HCV, HIV, HTLV, and Syphilis.

For statistical analysis, SPSS-v29 was used where Mean/Standard Deviation were calculated for continuous variables, while frequency/percentages for categorical variables. Pearson's correlation coefficient and Chi-square tests were performed to examine blood types and TTIs associations. p-value<0.05 was considered statistically significant.

Results: Post excluding missing/duplicated data, out of 290,900donors of whole or apheresis blood, only (162,946)participants were included. Males outnumbered females (n=147,847,90.7%); average age (37.73years),range [18-81years].

1. **Blood Groups Distributions**: Majority of participants were(O positive)(n=63,574; 39.0%),while(AB negative)was the lowest phenotypes(n=749; 0.5%). A study among 500 UAE nationals in Al Ain city showed that the O blood group was the most prevalent followed by A, and B[1]. A study among 500 donors from different nationalities in Sharjah, O was the most common, followed by B, and A[2]. The most common Rh-phenotype was (C+c-E-e+) (n=43,289;26.6%), while the rarest was (C+c+E+e-) (n=88; 0.054%). No previous studies have been conducted on Rh-phenotype that is comparable to this study.(K negative) was the most frequent Kell phenotype (n=119,074;73.08%), whilst (K positive) was the least (n=5,672;3.48%).
2. **TTI Prevalence**: (1,106) samples were proven to be TTIs positive among the same subjects(n=162,946). Positive findings for HIV, HBV, HCV, syphilis, and HTLV were found in (n=19; 0.01%), (n=229;0.14%), (n=301; 0.18%), (n=528; 0.32%),and (n=29; 0.02%), respectively. A cross-sectional study was conducted in Yemen in 2022 reported that syphilis was the most prevalent TTIs among blood donors followed by HCV, and HIV[3].
3. **Correlation between TTIs and various blood groups**: (O-Rh D-positive) exhibited the greatest TTIs susceptibility (n=388,0.24%), whereas (AB-Rh D-positive) was the lowest (n=388,0.04%).There was significant negative relationship between ABO-Rh D-types and Hepatitis-C-virus (HCV) (p=0.006). Likewise, significant positive correlations were found between Rh-phenotypes and Syphilis (p=0.002), as well as between Kell antigens and both Syphilis and Hepatitis-B-Virus (HBV) (p=0.001). A recent study conducted in Saudi-Arabia which investigated the prevalence and association of TTIs with ABO-RhD-Blood Groups, O-RhD+ve was more likely to develop TTIs, followed by A-RhD+ve[4]. No studies have investigated association between TTIs and Rh or Kell phenotypes.

Conclusion: (O-RhD+ve) was the commonest with statistically significant weak correlations between TTIs and various blood groups. It's recommended to conduct studies to measure infection risk knowledge among blood donors and general public. Moreover, nationwide studies reflect representative data on blood types and TTIs, which would improve public health policies/interventions. Finally, more emphasis on critical stages of TTIs-transmission might help developing framework for the future of transfusion medicine.public genetic testing to help healthcare providers make better medical judgments and enhance preventative medicine.

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