

West Nile Virus Seroprevalence Among Qatari And Immigrant Populations Residing In Qatar

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ABSTRACT

Background: West Nile Virus (WNV) is one of the most widely spread arboviruses and highly pathogenic worldwide. Despite frequent outbreak and transmission reports in the Middle East and North Africa (MENA), seroprevalence studies of WNV in Qatar are highly lacking. **Aim:** This study aims to investigate the actual prevalence of WNV among local and expatriate communities in the Qatar using a large sample size of seemingly healthy donors. **Method:** A total of 1992 serum samples were collected from donors of age 18 or older and were tested for the presence of WNV IgG and IgM using Serion enzyme-linked immunosorbent assay (ELISA) commercial microplate kits. The seropositivity was statistically analyzed using SPSS software with a confidence interval of 95%. **Result:** The seroprevalence of anti-WNV IgG and IgM in Qatar was 10.3% and 3.4%, respectively. The country-specific seroprevalence for WNV IgG and IgM, respectively, were Sudan (37.0%, 10.0%), Egypt (31.6%, 4.4%), India (13.4%, 3.2%), Yemen (10.2%, 7.0%), Pakistan (8.6%, 2.7%), Iran (10.6%, 0.0%), Philippines (5.4%, 0.0%), Jordan (6.8%, 1.1%), Syria (2.6%, 9.6%), Palestine (2.6%, 0.6%), Qatar (1.6%, 1.7%), and Lebanon (0.9%, 0.0%). Both IgG and IgM prevalence was significantly correlated with the nationality ($P \leq 0.001$). **Conclusion:** Qatari nationals have a relatively low burden of WNV disease. The highest prevalence of WNV was found in the Sub Saharan African nationalities (Sudan, Egypt). The seroprevalence of WNV is different from the previously reported arboviruses such as CHIKV and DENV, which was highest among Asian countries (India, Philippines). Further confirmatory tests such as viral neutralization assays are needed to confirm the IgM seropositivity in these samples.

RESULTS

Figure 1. Prevalence of WNV in Qatar

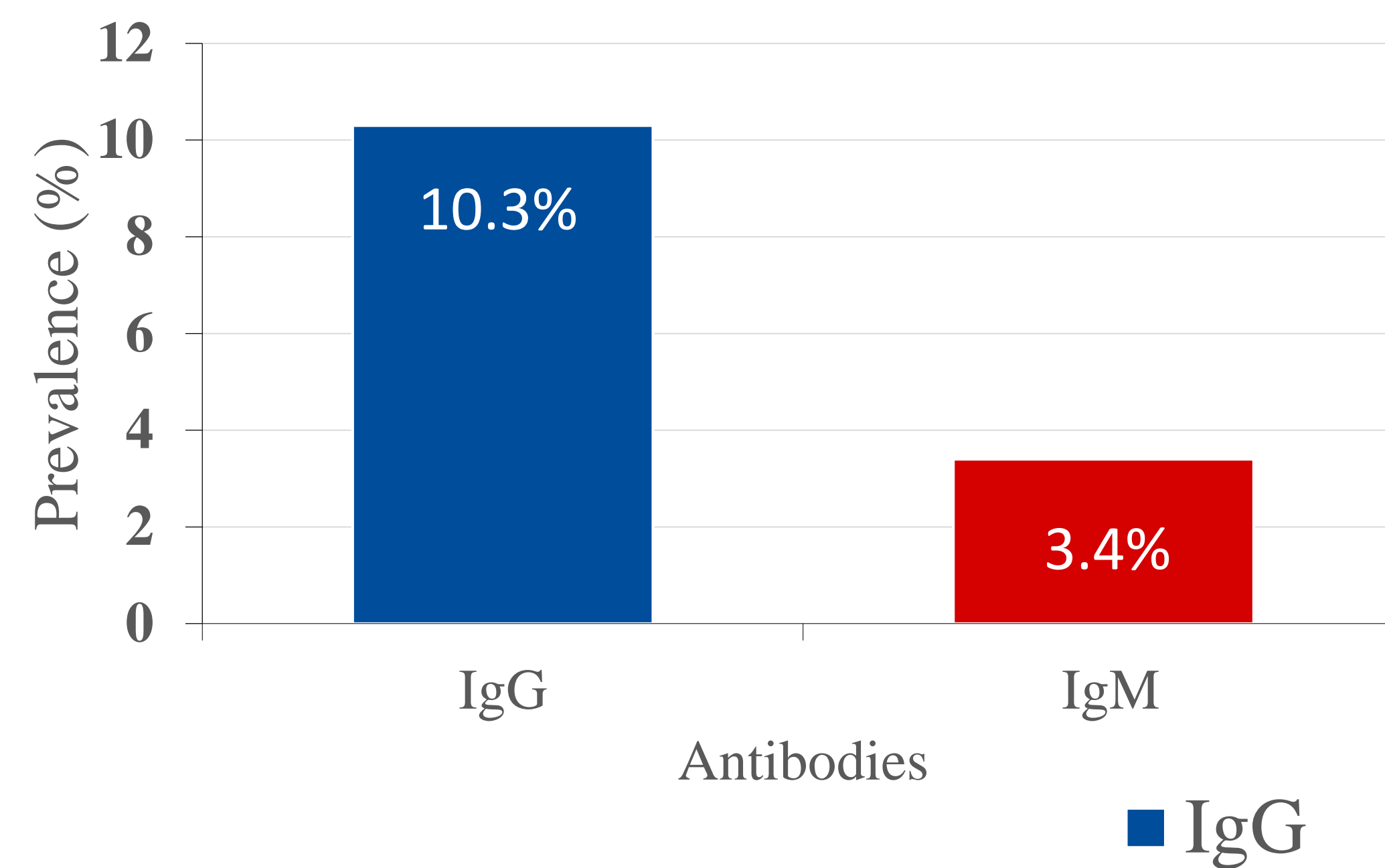


Figure 2. Prevalence of WNV in Qatari vs Non-Qatari nationals

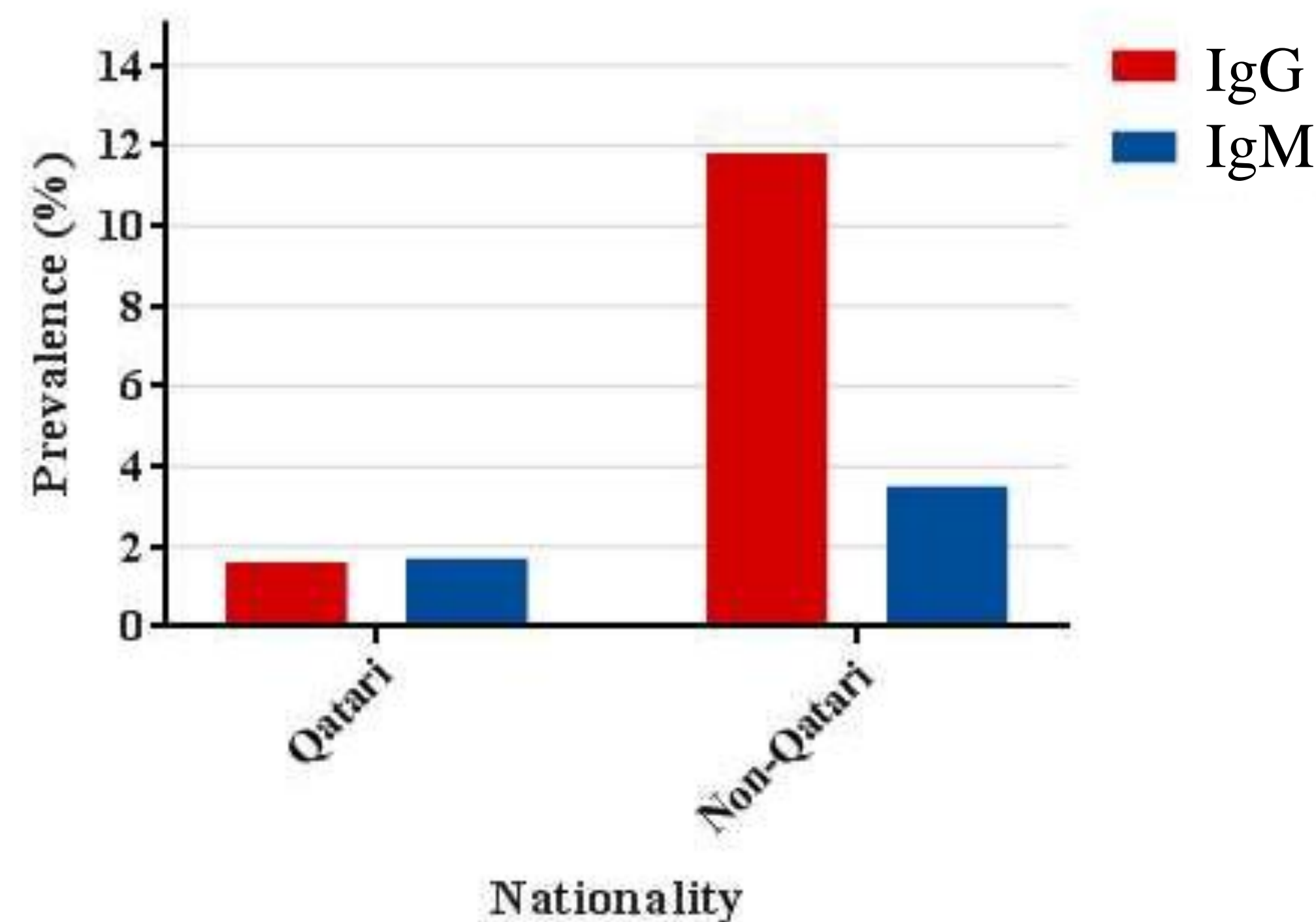


Figure 3. Prevalence of WNV among different nationalities

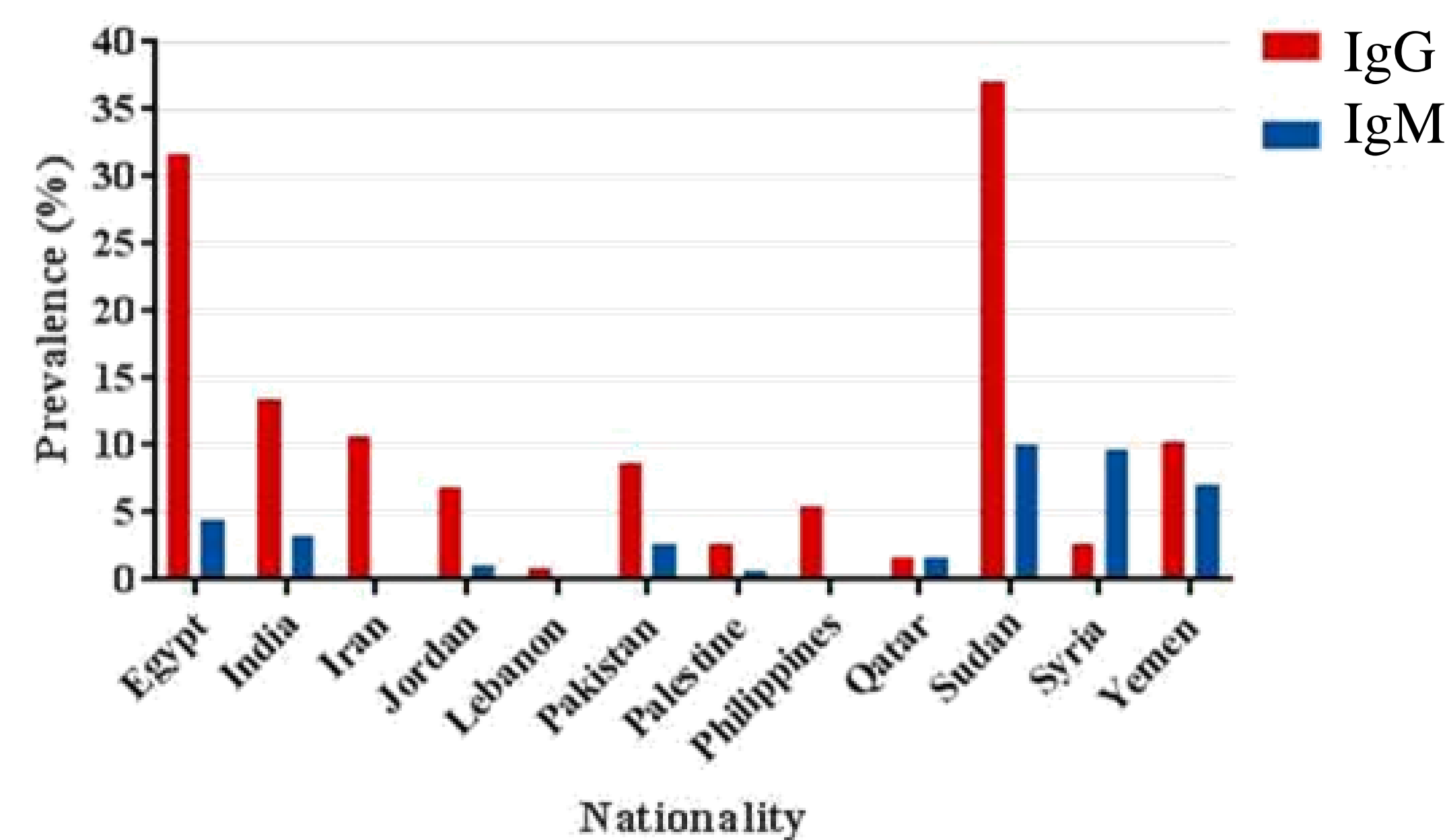
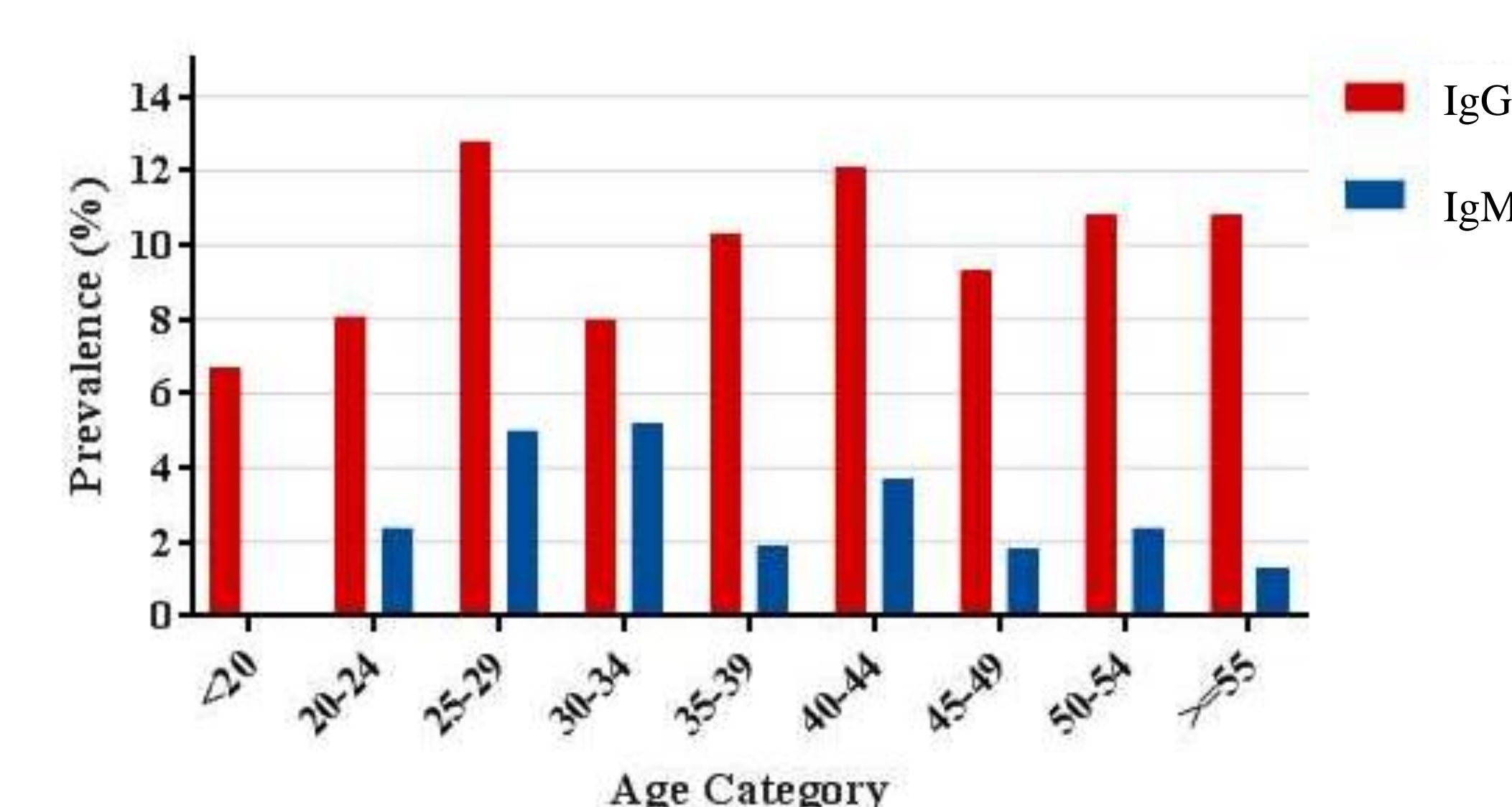


Figure 4. Prevalence of WNV among various age groups



CONCLUSION

Commercial Serion ELISA classic kits were to test for WNV antibodies in serum samples collected from blood donors in Qatar. A total of 1883 samples for IgG and 1763 samples for IgM were analyzed. The seropositivity results of these samples were statistically analyzed using SPSS statistics software with a confidence interval of 95% ($\alpha=0.05$). A total of 10.3% seropositivity for IgG and 3.4% seropositivity for IgM was observed. Non-Qatari donors had more positive results for both antibodies than Qatari donors. Among Qatari donors, 1.6% samples were positive for IgG and 1.7% samples were positive for IgM. Out of all countries tested, Sudan, closely followed by Egypt, produced highest seroprevalence for WNV IgG of 37.0% and 31.6% respectively. These results are validated since these countries fall in Sub-Saharan Africa where WNV is endemic. The highest seroprevalence for WNV IgM was also found among samples from Sudan, with 10.0% seropositivity. Upon comparison to previously published data, it can be observed that WNV is more prevalent in Sub Saharan Africa unlike CHIKV and DENV which is more prevalent in Asian countries. Our study derived that nationality significantly correlates with WNV seroprevalence with p-values of ≤ 0.001 . Age was found to not be significantly correlated to seroprevalence and had a p-value > 0.05 . Due to cross reactivity, ELISA results are not completely dependable and requires further testing using highly specific virus neutralization assays or Western blot procedures. This study emphasizes the importance of screening blood donor samples and recommends conducting further investigations about arboviral diseases in the region.

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HYPOTHESES AND AIMS

Based on previous published data regarding CHIKV and DENV in Qatar (2), we hypothesize that WNV is also highly prevalent and associated with certain nationalities residing in Qatar. This study aims to perform serological testing among MENA and non-MENA blood donors living in Qatar to characterize the populations' WNV seroprevalence. The data obtained will better aid the understanding of the seroepidemiology of WNV in these countries and the risk associated with WNV infections in Qatar, particularly through blood donations and organ transplantations.

METHODOLOGY

Serum Sample Collection from healthy blood donors (n = 1992)

Serum Sample Dilution 1:100 μ l

Antibody Detection (IgG, IgM) Using ELISA

Statistical Analysis Using SPSS

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