Seroepidemiology of Varicella Zoster Virus in Children aged 0-14 years in Kilifi.

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Background: Varicella Zoster Virus (VZV) causes a highly transmissible varicella infection (chicken pox) that is often mild and self-limiting in children but more severe in adults, neonates, and immunocompromised individuals. Large scale serological survey provides useful insights on age-specific immunity profiles and transmission dynamics of VZV in the population. However, this data is lacking in Africa and in most middle and low-income settings. In this study, we estimated age-specific proportion of seropositivity of VZV IgG antibodies in children between 2009 and 2019 and calculated the underlying Force of Infection (FOI).

Methods: Archived blood samples from 2331 children aged 0-14 years were obtained from biennial surveys conducted between 2009 and 2019. VZV IgG antibodies were tested using fluorescent-bead-based multiplex immunoassay (MPI, Luminex Xmap technology). Antibody levels of $\geq 0.26$ IU/ml were considered protective. Chi-square test statistic was used to assess differences of seroprevalence between groups and a multivariate logistic model was used to quantify the impact of different covariates on VZV seroprevalence. An age-dependent catalytic model was used to estimate the FOI in children aged 0.5-4, 5-9, and 10-14 years.

Results: The overall seroprevalence of VZV was 32.6% (95%CI 30.7-34.5). Age-specific seroprevalence rose steadily from 6.7% (95%CI 3.5-12.4) in children aged 0-11 months to 61.6% (95%CI 56.5-66.5) in those aged 10-14 years. Significant variability in seroprevalence was observed across the survey years (p-value$<0.001$, $\chi^2$77.90) and across the different age categories (p-value$<0.001$, $\chi^2$299.93). Age was significantly associated with VZV seropositivity after adjusting for sex and survey year. Children aged 5-9 years had the highest force of infection 0.098 (95%CI 0.077-0.120) per susceptible year while the oldest age-group had the least FOI 0.039 (95%CI 0.002-0.107). The average age of infection was 14.3 years

Conclusion: The results from this study showed an overall low VZV seroprevalence with highest transmission in school-age children. This study provides valuable baseline data that could be used in future to identify vaccine target group. However, data on varicella-associated complications, hospitalisation, and mortality is needed to inform cost-benefit analyses of varicella vaccination programmes especially in low-income countries where there are competing health needs.