Population-based biochemistry, immunologic and hematological reference values for adolescents and young adults in a rural population in Western Kenya

Abstract:

There is need for locally-derived age-specific clinical laboratory reference ranges of healthy Africans in sub-Saharan Africa. Reference values from North American and European populations are being used for African subjects despite previous studies showing significant differences. Our aim was to establish clinical laboratory reference values for African adolescents and young adults that can be used in clinical trials and for patient management. A panel of 298, HIV-seronegative individuals aged 13-34 years was randomly selected from participants in two population-based cross-sectional surveys assessing HIV prevalence and other sexually transmitted infections in western Kenya. The adolescent (<18 years)-to-adults (≥ 18 years) ratio and the male-to-female ratio was 1:1. Median and 95% reference ranges were calculated for immunohematological and biochemistry values. Compared with U.S-derived reference ranges, we detected lower hemoglobin (HB), hematocrit (HCT), red blood cells (RBC), mean corpuscular volume (MCV), neutrophil, glucose, and blood urea nitrogen values but elevated eosinophil and total bilirubin values. Significant gender variation was observed in hematological parameters in addition to T-bilirubin and creatinine indices in all age groups, AST in the younger and neutrophil, platelet and CD4 indices among the older age group. Age variation was also observed, mainly in hematological parameters among males. Applying U.S. NIH Division of AIDS (DAIDS) toxicity grading to our results, 40% of otherwise healthy study participants were classified as having an abnormal laboratory parameter (grade 1-4) which would exclude them from participating in clinical trials. Hematological and biochemistry reference values from African population differ from those derived from a North American population, showing the need to develop region-specific reference values. Our data also show variations in hematological indices between adolescent and adult males which should be considered when developing reference ranges. This study provides the first locally-derived clinical laboratory reference ranges for adolescents and young adults in western Kenya.