Title:

Community-Based Geotagged Screening for Sickle Cell Disease and Trait Among Tribal Populations of Nandurbar, India

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Objective:

To assess the prevalence of sickle cell disease (SCD) and sickle cell trait (SCT) among tribal communities in the Nandurbar district of India by developing and implementing a community-level screening strategy, integrated with geotagging to enable long-term follow-up and targeted health interventions.

Methodology:

This cross-sectional, community-based survey was conducted through a door-to-door approach across the Nandurbar district, encompassing both rural and urban tribal settlements. The study was implemented in collaboration with the district electoral and school administrative authorities, enabling comprehensive coverage across government and private schools and spanning all age groups—from early childhood to late adulthood.

Three screening strategies were employed:

1. **High-risk or selective screening:** Focused on individuals with clinical symptoms or family history suggestive of hemoglobinopathies.

2. **Mass screening:** Inclusive of large population groups regardless of clinical risk, aiming for widespread reach.

3. **Multi-phasic screening:** Combined an initial rapid screening test followed by confirmatory diagnostics, including hemoglobin electrophoresis.

Geotagging was incorporated to spatially map the distribution of SCD and SCT, helping in the identification of high-prevalence zones within specific ethnic and geographic clusters.

Under the mentorship of experienced clinicians, participating students, including myself, received training in phlebotomy and interpretation of electrophoresis reports. I personally collected and processed over 10,000 blood samples in a span of 14 days, contributing to one of the largest community-level screenings in the region.

Conclusion:

This initiative demonstrates the feasibility and impact of a multi-tiered, geotagged screening approach for hemoglobinopathies in underserved tribal regions. The program not only identified high-risk zones and ethnic groups but also built local capacity for ongoing follow-up and intervention. Beyond data, it delivered critical health services to lakhs of individuals often excluded from conventional care systems, setting a replicable model for public health outreach in remote populations.