Ultralow-Cost Pre-Symptomatic Diagnostic Paper Tool for Protein-Energy Malnutrition

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Protein-energy malnutrition (PEM) according to World Health Organization (WHO) is an imbalance between supply and demand of protein and energy to ensure optimal growth, functioning of the body. Among 13 million annual childhood deaths, more than half are related to PEM, and that three-quarter deaths are of only mild to moderate PEM children. In spite of many existing diagnostic techniques, many children are dying globally without proper early diagnosis and treatment for PEM. Lateral flow assays (LFA) are a type of paper-based platform for the detection of analytes present in a complex mixture. LFA works on the principle of capillary action through the porous beds present in the paper device by which the results are displayed within 1-30 minutes. In this study, we are working on the development of a rapid inexpensive device to diagnose the PEM using saliva as the diagnostic fluid.A paper analytical device impregnated with amylose-Iodine complex was prepared by drop cast technique. One hundred participants were recruited into control and PEM groups based on the Gomez classification. Saliva and blood samples were collected and processed for analyzing salivary amylase (SA) and serum total protein (TP) levels spectrophotometrically and also by paper analytical devices. The correlation between SA and TP was established using BigML - and the algorithm is trained to detect the unknown protein levels in the serum with the help of SA levels. Thereby quantifying the qualitative data obtained from strip and diagnosing PEM at early stages.

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Second Award of $2,000

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