Web-based application for diagnosing benign paroxysmal positional vertigo (BPPV): Tool for enhancing efficiency and reducing clinical workload

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Statement of the Problem: Benign Paroxysmal Positional Vertigo (BPPV) was observed in about 26% of vertigo patients. The diagnosis requires a professional, time-consuming, or necessary equipment, like video-computer nystagmography, which is expensive and scarce in higher-tier hospitals. These limitations disrupt several patients from receiving proper diagnosis and treatment, establish the need for a more accessible and affordable option.

Methodology & Theoretical Orientation: We created a web application that utilizes a Python framework and integrates OpenCV and MediaPipe for video analysis to assisting in the diagnosis of BPPV. The patient who presented with symptoms of vertigo was included in the study. The application analyzes eye movements captured on video recordings of patients, which are important markers of BPPV. Application results were compared to specialist diagnoses to determine test sensitivity and specificity.

Findings: In a study of 110 individuals, the application had a 0.7368 (90% CI: 0.5121 to 0.8819) and a specificity of 0.7419 (90% CI: 0.5675 to 0.8630) after removing 49 owing to excessive head movement and 11 due to abnormal eye movement frequency. With a positive likelihood ratio of 2.855, The positive predictive value (PPV) was 0.6364 (90% CI: 0.4295 to 0.8027), and the negative predictive value (NPV) was 0.8214 (90% CI: 0.6441 to 0.9212).

Conclusion & Significance: The web-based application presents a viable and efficient substitute for the conventional use, especially in situations with limited resources. This instrument may offer a viable solution for the generalization of its use in healthcare facilities, as it minimizes the time required for screening, the level of clinical workload, and the associated expenses. For an accurate assessment, we still strongly recommend applying this application as a screening tool combined with additional symptom screening.

Biography

Sarat Bunyanon, is an otolaryngology resident at Phramongkutklao Hospital, Bangkok, Thailand. He earned his Doctor of Medicine degree from Phramongkutklao College of Medicine with a commendable academic record. Dr. Bunyanon has extensive experience, having completed his medical internship at Prachaksilapakom Hospital and serving as a general practitioner at Veterans General Hospital in Bangkok from 2018 to 2021. He has participated in significant medical research, including a study on the prevalence of Blatocystis sp. in rural communities. He also has a strong foundation in medical volunteerism, contributing to the PrincessMother's Medical Volunteer Program and leading field medical training exercises.