Evaluating mobile imaging telemedicine for oral cancer screening: Economic insights from Malaysia

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ABSTRACT

Late-stage oral cancer remains a significant public health burden in Malaysia, with limited progress in early detection despite national screening initiatives. Contributing factors include limited access to specialists, low screening coverage, and diagnostic delays. The locally developed MeMoSA®—a mobile telemedicine platform that enables non-specialists to capture and transmit oral images for remote expert review offers a scalable, cost-effective solution to address these challenges. This study evaluated the economic return of MeMoSA® for oral cancer screening, compared to conventional opportunistic screening in public dental clinics. A Markov cohort model was constructed to simulate 100,000 adults aged 40 years over a 40-year time horizon. The model captured transitions across health states, from healthy to precancerous, and various cancer stages. A societal perspective was adopted, accounting for healthcare provider costs, patient out-of-pocket expenses, travel costs, and productivity losses. The primary outcome was quality-adjusted life years (QALYs), which incorporated patient survival and their quality of life (QOL). Cost and QOL data were derived from patient surveys and clinical records in two tertiary hospitals. Economic benefit was estimated using a willingness-to-pay threshold of MYR54,894 per QALY. Incremental net monetary benefit (INMB) was calculated by comparing total costs and economic benefits between MeMoSA® and conventional screening. MeMoSA® increased early detection by 41.3%, diagnosed 724 additional lesions, and yielded 600 more QALYs. Screening costs were reduced by MYR114,996 from lower reliance on referrals and in-clinic specialists. Although total societal costs rose by MYR2.28 million due to greater treatment uptake, MeMoSA® generated a positive INMB of MYR61.5 million. The cost-benefit crossover occurred at year 27, driven by improved QOL from earlier interventions. MeMoSA® has demonstrated its ability to enhance early detection, improve health outcomes, and generate long-term economic benefits. These findings highlight the value of early investment and support its integration into national oral cancer screening programs.

Keywords: Oral cancer, screening, cost-benefit, economic, detection