

INTISARI

Latar Belakang: Diabetes melitus (DM) merupakan masalah kesehatan yang serius di Indonesia, dengan salah satu komplikasi berupa retinopati diabetika yang mengancam penglihatan (VTDR). Komplikasi ini dapat dicegah dengan deteksi awal sehingga dibutuhkan perangkat deteksi retinopati diabetika (DR) yang murah, mudah digunakan, mudah diajarkan serta dapat dilakukan pada fasilitas layanan primer.

Tujuan: Mengembangkan perangkat kamera retina portabel berbasis ponsel cerdas (Ret-InnoQ) dan penunjangnya berupa perangkat lunak untuk deteksi DR (m-RADR), serta mengukur sensitivitas dan spesifitasnya.

Metode Penelitian: Penelitian ini merupakan studi uji diagnostik observasional bersifat potong lintang (*cross-sectional*) yang didahului dengan studi pengembangan (*research and development*). Penelitian ini dilakukan dalam 4 fase yang terdiri atas: (1) fase pengembangan dan produksi perangkat keras, (2) fase uji teknis perangkat keras, (3) fase validasi perangkat keras, dan (4) fase pengembangan dan uji validasi perangkat lunak. Citra retina 834 mata yang menderita DR dari 624 pasien DM diambil menggunakan Ret-InnoQ dan baku emas berupa Topcon TRC-50DX. Identitas pasien disamarkan dan citra retina dinilai oleh dua orang dokter spesialis mata konsultan retina dengan menggunakan klasifikasi non-VTDR dan VTDR.

Hasil: Sensitivitas Ret-InnoQ dalam mendeteksi DR yang perlu dirujuk (VTDR) didapatkan sebesar 92,15% dan spesifisitas sebesar 89,46%. Sensitivitas m-RADR dalam mendeteksi DR dari citra retina Ret-InnoQ didapatkan sebesar 93,05%, namun spesifisitasnya didapatkan hanya sebesar 31,21%.

Kesimpulan: Ret-InnoQ memiliki potensi digunakan untuk mendapatkan citra retina dalam program deteksi DR. Sebagai pelengkap Ret-InnoQ, m-RADR dapat digunakan untuk membantu deteksi VTDR, meskipun masih diperlukan penyempurnaan.

Kata Kunci: Deteksi retinopati diabetika, kamera retina portabel, kamera retina berbasis ponsel cerdas, kecerdasan buatan, tele-diagnostik

ABSTRACT

Background: Diabetes mellitus (DM) is a major health issue in Indonesia, with one of the complications being vision-threatening diabetic retinopathy (VTDR). This complication could be prevented with early screening and detection, in which tools for detecting diabetic retinopathy (DR) that is affordable, easily operated, simple for health providers to learn, and feasible to be used in primary health care centers are needed.

Aim: To develop smartphone-based portable retinal camera (Ret-InnoQ) and its supporting software for detecting DR (m-RADR), as well as to evaluate the sensitivities and specificities of both inventions.

Methods: This was a cross-sectional, observational diagnostic study preceded by research and development. It was divided into 4 phases: (1) development and production of device, (2) technical trials of device, (3) validation study of device, and (4) development and validation study of software. Retinal photographs of 834 eyes with DR from 624 DM patients were obtained using Ret-InnoQ and Topcon TRC-50DX as gold standard. These photographs were masked and graded by two vitreoretinal specialists to be given classifications of non-VTDR and VTDR.

Results: Ret-InnoQ sensitivity in detecting referable DR (VTDR) is 92,15% and its specificity is 89,46%. m-RADR sensitivity in detecting DR from retinal photographs obtained using Ret-InnoQ is 93,05%, however the specificity was only 31,21%

Conclusion: Ret-InnoQ has the potential to be used for obtaining retinal photographs in DR screening programmes. As its supporting software, m-RADR could help in detecting VTDR, albeit with much needed improvements.

Keyword: Diabetic retinopathy screening, portable retinal photography, smartphone-based retinal photography, artificial intelligence, teleradiologic