DIABETIC RETINOPATHY SCREENING IN HOSPITAL SETTINGS

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ABSTRACT

Introduction: Diabetes affects about 8,3% of elderly population on the planet. Its complications affect all organs and systems as there is a heavy effect on vision. Diabetic retinopathy is one of the leading causes of blindness. Timely screening and treatment can prevent it and slow the worsening of vision.

Aims and tasks: Assessing the implementing of new screening technique in hospital settings.

Methods and materials: Pictures were taken of the fundi of 29 patients in the Clinic of Endocrinology in Medical University-Plovdiv. Afterwards anonymous questionnaires were handed and filled by each patient.

Results and discussion: Visual opacities in the cornea did not allow us to take pictures of two of the ocular fundi. The methods shows high sensitivity and specificity (over 80%). All questionnaires were returned fit for analysis. The patients demonstrated high level of knowledge of their disease and admit to be very satisfied with the methodology.

Conclusion: The presented methodology shows great promise for implementation not only in general practice settings, but also in hospital settings.

Key words: *hospital care, diabetes, retinopathy*

Introduction: Diabetes affects about 8,3% of elderly population on the planet. Its complications affect all organs and systems, which includes heavy reduction in visual acuity. Diabetic retinopathy is one of the leading causes of blindness. As such the importance of screening for it are established. Timely screening and treatment can prevent it and slow the worsening of vision [2].

Telescreening presents us with an opportunity to increase efficiency and efficacy while reducing cost. In the last decade different telescreening trails are performed and tested in a variety of settings which allows us to find the best place for its implementation.

First large scale trials date back to 2000, when Liesenfeld et al test the emerging digital fundus photography and compare it to the golden standard for retinal photography. Results are promising showing similar specificity and sensitivity [2].

With the development of new technology new and improved methods for telescreening emerged. In 2003 Neubauer et al tested a retinal thickness analyzer with a combination of wide-angle fundus photography and macular thickness mapping. The results proved that the methodology offers all the prerequisites for establishing a successful tele-screening program [4].

In the following years the scale of the telescreening project quickly escalated. In 2004 a large multicenter took place. The trials demonstrated that it is feasible to electronically transmit and grade retinal images remotely using the TOSCA process with built-in quality assurance procedures proving acceptable [3]. At the same time quality assurance was needed to prove the required image quality. Schneider et al showed the benefits of such quality assurance process [7].

As screening devices need to be portable and easy to use the focus for telescreening changes to hand-held and light devices. In 2008 Neubauer et al try to use a 200° ultra-widefield scanning

laser ophthalmoscope in place of the standard mydriatic ophthalmology examination. Results from both methods are comparable [5].

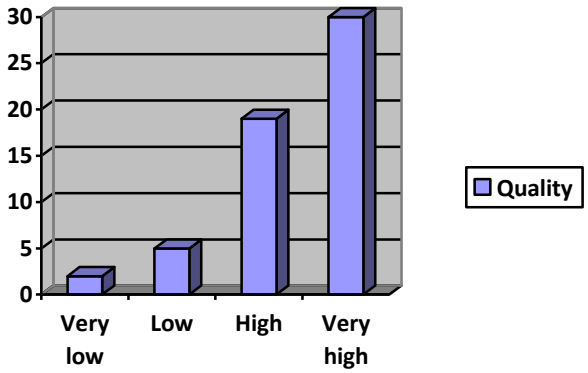
With telescreening equipment becoming cheaper, easily movable and wide spread some of the lesser problems preventing telescreening implementation become more prominent. Pupillary dilatation is required for most existing telescreening models. As Raman et al show mydriasis improves image quality and increases specificity and sensitivity [6].

The most modern telescreening programs allow for an automated analysis of the captured images, reducing the workload on physicians even further. Joshi et al provide an innovative way of integrating automated fundus image analysis in the telescreening framework to address well-known challenges in large-scale disease screening. At the same time offering a low-cost, effective, and easily adoptable screening solution to primary care providers [1].

Aims and tasks: Assessing the implementing of new screening technique in hospital settings.

Methods and materials: Pictures were taken of the fundi of 29 patients (58 eyes) in the Clinic of Endocrinology of Medical University-Plovdiv. Afterwards anonymous questionnaires were handed and filled by each patient.

Results and discussion: Due to a presence of a visual opacity in the cornea of one of the patients and lack of ocular bulb in another only 56 images were taken. The images were then sent to an ophthalmologist in a different place for assessment.

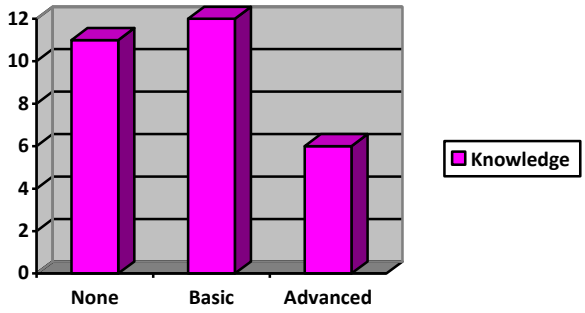


Out of the 56 fundus images 87,5% were assessed as high or very high quality.

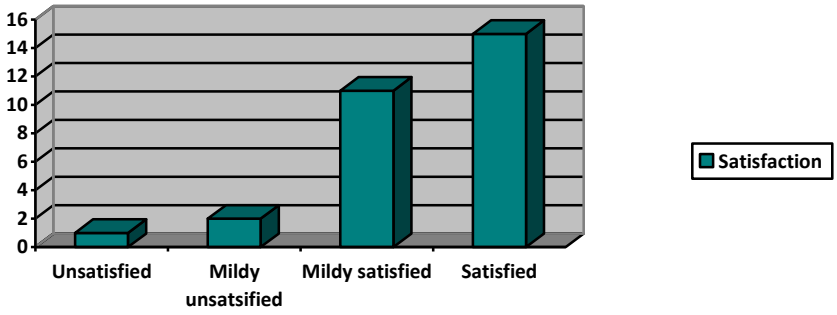
	Condition positive =23	Condition negative = 33
Test outcome positive =	True positive = 20	False negative = 6
Test outcome negative =	False negative = 3	True negative = 27

The method shows excellent sensitivity at 86,9 % and excellent specificity at 81,8 %. All questionnaires were returned fit for analysis. Accuracy of the methodology is also high – 83,9 %.

Despite similar studies showing improved image quality and increased specificity and sensitivity after pupillary dilatation, our results show high values even without mydriasis.



Patients were asked about their knowledge for diabetes. Since the questions were open answers were grouped in three categories – No information, basic information and advanced information. Results showed that 37,9% of the patients have no information about their disease. Of the rest 41,3% have basic knowledge including what good blood sugar levels are and when you should visit a general practitioner or endocrinologist and only 20,6% know that the disease can damage eye sight and that eye examinations are required every year.



Satisfaction levels are also good, with 89.6% of participants declaring a good level of satisfaction. Patients with larger duration of the disease had greater satisfaction. Those unsatisfied with the screening were new found cases.

Conclusion: Telescreening with the presented iExaminer system is a valid screening method. Results show great promise for future implementation with reduced costs, greater satisfaction and excellent sensitivity and specificity.

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