Teleophthalmology Screening for Early Detection of Ocular Diseases in Underserved Populations in Israel

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Background: The purpose of this study was to investigate the feasibility and effectiveness of an innovative, telemedicine, community-based intervention to increase detection of previously undiagnosed ocular diseases in high-risk populations in Israel.

Methods: A team comprised of an ocular technician, a project manager and a driver was sent to underserved areas in Israel. Patient demographics, ocular and medical information were recorded. Visual acuity, intraocular pressure and fundus photographs were obtained. The data was transferred to the Ophthalmology Reading Center in Tel-Aviv Medical Center, where it was interpreted by an ophthalmologist. A letter was sent to the patients indicating examination results. It instructed them to return for a follow-up examination if indicated.

Results: A total of 124 individuals underwent telemedicine remote screening examinations in 10 locations. The mean age was 79.9±7.2 years, with female predominance of 67%. The major pathologies detected were: (1) reduction in visual acuity >6/12 in at least one eye (n=48, 38.7%); (2) glaucoma suspicion in the optic disc (n=18, 14.5%); (3) ocular hypertension >21mmHg (n=15, 12.1%); (4) age-related macular degeneration(AMD) (n=15, 12.1%); (5) diabetic retinopathy (DR) (n=6, 4.8%) ; (6) visually significant cataract (n=6, 4.8%) and (7) other pathologies (n=11, 8.9%); 97.7% of the patients reported high satisfaction rates (they were satisfied or very satisfied from the project model).

Table 1. Fundus photograph interpretation of individuals enrolled in the project.

Macula	(%)	N	Optic disc	(%)	N
Normal	61.1	69	Normal	73.9	113
Pigment changes / small drusen	21.2	24	CDR >0.65	18.8	29
Intermediate AMD	8.8	10	β zone with rim thinning – PPA	3.9	6
PDR/NPDR	6.2	7	Disc Hemorrhage	2.6	4
Geographic atrophy	3.5	4	RNFL defect	1.3	2
Macular scar	2.6	3	Rim <0.2	0.6	1
Neovascular AMD	0	0	CDR asymmetry >0.2	0	0
Branch vein occlusion	0	0	Other	3.9	6
Other	1.8	2	Readable	81.5	154
Readable	59.8	113	Unreadable	18.5	35
Unreadable	40.2	76			

CDR = cup to disc ratio; PPA = peripapillary atrophy; RNFL = retinal nerve fiber layer; AMD = age macular degeneration; PDR= proliferative diabetic retinopathy; NPDR = non-proliferative diabetic retinopathy

Figure 1. Proportion of patients diagnosed with ocular diseases

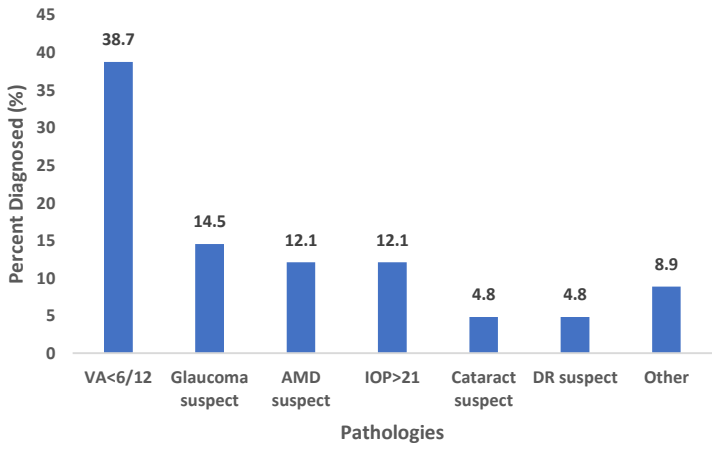


Figure 2. Follow-up recommendation after data interpretation by an ophthalmologist.

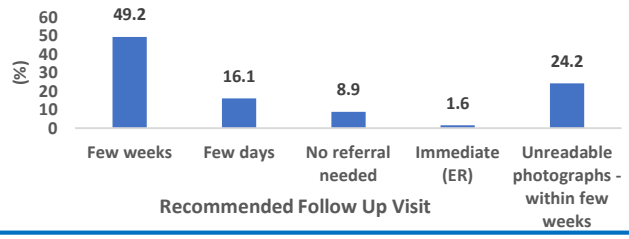
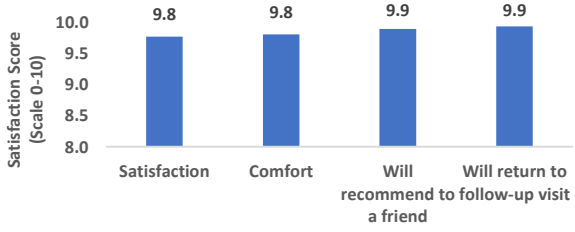


Figure 3. Level of satisfaction with the teleophthalmology screening project.



Conclusions: Our pilot telemedicine screening project effectively detected ocular diseases in underserved areas in Israel and helped improve access to eye care. This project has the potential of reaching a national level, allow for early diagnosis, and prevent vision loss and blindness in underserved areas.