Original Article

Diabetic retinopathy screening uptake after health education with or without retinal imaging within the facility in two AYUSH hospitals in Hyderabad, India: A nonrandomized pilot study

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Purpose: In India, people with diabetes (PwDM) often seek care in the government-approved alternative medicine system, AYUSH (Ayurveda, Yoga and naturopathy, Unani, Siddha and Homeopathy). The purpose of this pilot study was to assess whether health education plus retinal imaging for diabetic retinopathy (DR) within an AYUSH hospital increased the uptake of screening for DR compared with health education and referral. **Methods:** The study was a nonrandomized pilot conducted in two AYUSH hospitals. Both hospitals received intervention on educating the AYUSH practitioners about DR screening and distributing health education materials to diabetic patients. In one hospital in addition to education, retinal imaging by a trained technician with remote grading by an ophthalmologist was provided, while in another hospital PwDM were referred to nearby eye hospitals for screening. The uptake of screening was assessed through registers and phone calls. **Results:** At baseline, only 10.7% of 178 PwDM were aware of DR and only 8% had undergone DR screening. After the intervention, in the hospital where screening was provided, all (100%) eligible patients (101) underwent digital imaging, whereas in the other hospital only 25% of 77 eligible patients underwent screening in eye hospitals ($P < 0.001$). **Conclusion:** AYUSH hospitals could provide a feasible and acceptable location for providing DR screening services. Further studies are required to assess scale-up of such intervention.

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Diabetes mellitus (DM) is now recognized as an epidemic in India.[1] An estimated 65 million have DM and more than half of these remain undiagnosed.[2] In addition to a genetic predisposition, the increase in DM in India is attributed to changes in lifestyle associated with increasing urbanization.[3] Diabetic retinopathy (DR) is one of the major microvascular complications of DM which can lead to visual impairment and blindness. In a nationwide screening among people with diabetes (PwDM) age 40 years and above, 22% were found to have DR.[4]

In India, people often access treatments that fall outside the purview of standard biomedical practice (i.e., complementary and alternative medicine).[5] One system is AYUSH (Ayurveda, Yoga and naturopathy, Unani, Siddha and Homeopathy).[6] The AYUSH system is often used by persons with chronic diseases, including diabetes.

The aim of this study was to assess whether DR screening offered at an AYUSH health facility improves the uptake of screening compared with an intervention focused on health education and referral to an eye hospital for DR screening.

Methods

Study design and setting

The study adopted a nonrandomized experimental design. The study was conducted between 1st August and 31st October 2018 in Hyderabad, India.

Sample size

A sample of 88 patients in each intervention group was needed to detect a 30% difference in the uptake of DR screening at the 95% level of significance, 80% power, and design effect of 2.

Sampling

Two high-volume AYUSH (Homeopathy) hospitals were identified. Each arm included one hospital which was not randomly allocated. The DR screening intervention hospital was a public hospital with 300–400 outpatients per day and 20–25 practitioners. The comparison hospital was a

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private health facility with 100–150 patients per day and 6–10 practitioners. These were the only two AYUSH health facilities with a large clientele and therefore were included in the study. The doctors and interns who attended to PwDM in these hospitals during the study period were included in the study. Similarly, all PwDM who attended the outpatient department during the study period were included, except those known to have DR, who were excluded from the study.

Orientation of health staff

In both hospitals, we provided individual health education sessions to eligible practitioners and interns regarding screening and management of DR. We used standard health education material developed under the Trust-supported DR program. The practitioners were advised to provide health education and counselling to their diabetic patients with regard to screening and management of DR and to give patients the health education materials. The materials comprised written handouts and also posters with pictures of a normal eye and an eye with DR.

Allocation

In the intervention hospital, additionally, a non-mydriatic imaging system (3Nethra, Forus) was placed in the outpatient department and a trained technician was hired to take the retinal images. Images were loaded from the camera's software onto a cloud and graded remotely by an ophthalmologist who sent the reports to the technician through email. The reports were collected by the clients in 1–2 days. Visual acuity was not measured. In the comparison hospital, practitioners were requested to refer patients for DR screening to the nearest government eye hospital that provided free services.

All eligible diabetic patients were recruited and those required DR screening were advised so by the AYUSH practitioners. In both hospitals, registers were used to record every PwDM attending the outpatient department, which also included whether they were advised DR screening. All eligible patients who were advised DR screening were interviewed to collect data on sociodemographic variables, history of DM, treatment, eye examinations, and awareness of the need for DR screening. All the patients who were screened for DR were followed up to ascertain the screening results, by the principal investigator in both the hospitals.

Written informed consent was obtained from each participant in both the phases of the study. Anonymity and confidentiality were maintained during data management, analysis, and reporting. Ethics approval (TRC-IIPHH/TRCIEC/135/2018) for the study was obtained from the ethics committee of the Indian Institute of Public Health, Hyderabad.

Analysis

Data were entered and analyzed in STATA 13.0. For DR screening uptake, the proportion of patients screened for DR within 1 month was compared in the two groups using Chi-square test.

Results

We included a total of 294 PwDM who attended diabetic clinics in the two AYUSH hospitals during the study period, 217 in the intervention hospital A and 77 in the other hospital. Overall, 178 (60.5%) were advised screening for DR, 101 (46.5%) in the intervention and 77 (100%) in the comparison hospital, respectively.

The sociodemographic characteristics of patients recommended screening in the two hospitals differed in several aspects. There were more males than females in both hospitals [Table 1]. A higher proportion of PwDM attending the intervention hospital were ≥60 years of age, than in the comparison hospital (38% vs 27%, respectively), and a higher proportion had diabetes for more than 5 years (73% vs 37%, respectively). In both settings, the majority of PwDM used a combination of allopathic and AYUSH treatments, and levels of awareness of the need for DR screening were very low. Of all the 294, only 8% had undergone any ophthalmic examination for diabetic-related vision problems prior to the study.

Uptake of DR screening

All the patients (100%) who were advised DR screening in the intervention hospital were screened for DR using the imaging system in the outpatient department compared with only 20 (25%) in the comparison hospital who reported that they had been screened in an eye hospital within 1 month of referral ($P < 0.001$).

Findings of screening

In the intervention hospital, only 24 (24%) of the 101 screened had "any abnormality detected" and were advised to see a specialist. Among these, five had mild nonproliferative DR and four had moderate nonproliferative DR. Another four had mild to moderate glaucoma, five had cataract with no retinal changes, and the remaining six were referred for other reasons. In the comparison hospital, only 3 (15%) of the 20 patients screened had retinal changes and were advised to visit a retina specialist.

Discussion

To our knowledge, this study is the first to identify the gaps and needs for screening for DR in the highly popular AYUSH systems of medicine in India. In our study, AYUSH practitioners had good knowledge, attitudes, and practices for the management of DM and its complications. Although a majority mentioned that they counselled their patients for screening, we observed that among those eligible for screening only 10.7% knew that screening was required prior to our intervention. AYUSH practitioners could play an important role in counselling patients with diabetes to increase their awareness that DR can be a sight-threatening complication and that screening can detect the signs before loss of vision.[7] Retinal imaging is also known to be highly cost-effective in screening for DR.[8]

We observed that providing a screening facility within the health facility improved uptake of DR screening, but a referral advice to visit an eye hospital was not an attractive proposition. Studies show that noncompliance for screening uptake is observed more in socioeconomically deprived and ethnic minorities.[9] A study among general physicians (allopathic) in South India noted that 84% of physicians knew about the need for annual eye screening for DR, but only1.3% practiced ophthalmoscopy in their clinics.[10] Nonavailability of ophthalmoscopes, lack of dilating drugs, and lack of confidence to diagnose changes were the reasons given for low numbers of eye examinations. Similar findings were observed in studies from Nigeria and Sudan.[11,12] Providing a digital imaging service in hospitals, including AYUSH hospitals, and linking them with remote reporting facilities led to high screening uptake in our study. This approach was acceptable to patients, it was feasible, and a large number of patients could be screened. Evidence suggests that using electronic records, patient education, and

Table 1: Sociodemographic characteristics of patients recruited to the intervention study in hospitals A and B

Socio-demographic chracteristic		Intervention hospital (*n*=101)			Comparison hospital (*n*=77)		
		Male 57 (56%)	Female 44 (43%)	Total 101 (100%)	Male 47 (61%)	Female 30 (39%)	Total 77 (100%)
Age group (years)	<40	3 (5%)	5 (8%)	8 (8%)	3 (6%)	2 (7%)	5 (7%)
	40–59	32 (57%)	23 (50%)	55 (55%)	30 (64%)	20 (67%)	50 (65%)
	60+	22 (38%)	16 (37%)	38 (38%)	14 (30%)	8 (27%)	22 (29%)
Duration of diabetes (years)	0–5	19 (33%)	9 (20%)	28 (28%)	29 (62%)	20 (67%)	49 (64%)
	5–10	27 (48%)	29 (66%)	56 (56%)	11 (23%)	5 (16%)	16 (21%)
	>10	11 (20%)	6 (14%)	17 (17%)	5 (11%)	7 (23%)	12 (16%)
Health system used	Allopathic + AYUSH	43 (75%)	35 (80%)	78 (77%)	36 (77%)	21 (70%)	57 (74%)
	Nonallopathic	10 (16%)	13 (25%)	23 (22%)	10 (21%)	9 (30%)	19 (25%)
Knows about diabetic retinopathy screening	Yes	3 (5%)	6 (14%)	9 (9%)	5 (11%)	4 (13%)	9 (12%)

combination of primary care and ophthalmic services in a single facility can improve the uptake of screening.[13]

The AYUSH system of medicine forms part of the National Health Mission in India. In 2014, a separate Ministry of AYUSH was established to ensure the optimal development and propagation of AYUSH systems of healthcare.[14] A large part of the population avail these systems, particularly for chronic diseases such as DM. While treatment for DM in AYUSH systems is limited, there is a need to extend the services provided to the detection of complications with referral to appropriate allopathic care for management. Every opportunity of contact with high-risk cases for diabetes and/or DR should be utilized. Appropriate strategies/models need to be developed connecting each type and level of care to specialized institutes for screening, diagnosis, and referral for DR.[15]

Limitations

Our study had some limitations. For the intervention, only two hospitals were included, both of which were purposively selected as they saw a large number of PwDM. The findings cannot, therefore, be generalized to other hospitals from the city or elsewhere. The hospital was the unit of intervention, as allocating individuals had risk of contamination. The sample size of 88 could not be obtained in the private health facility, and thus the power of our results would be low. In addition, data on the uptake of screening in the comparison hospital were only for 1 month after referral, which may have underestimated the uptake of DR screening by a few percentage points. Because only two hospitals had a high case turnover, we included both in the study. However, one was a public-funded hospital, while the other was a private health facility. Therefore, they were not strictly comparable. This could also impact the findings.

Conclusion

This pilot study suggests that integrating counselling and screening for DR into the AYUSH health system is feasible, practical, and acceptable to patients. Further studies are required using a larger number of hospitals, and a before and after design may be more informative and take account of some of the differences between hospitals.

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Conflicts of interest

There are no conflicts of interest.

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