

## Evaluation of whether health education using video technology increases the uptake of screening for diabetic retinopathy among individuals with diabetes in a slum population in Hyderabad

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**Purpose:** A community-based intervention to compare the effectiveness of pamphlets and videos as education material to promote diabetic retinopathy (DR) screening in urban slums of Hyderabad and to identify barriers/facilitators for compliance with DR screening. **Methods:** A cross-sectional survey among people with diabetes (sample of 267) was followed by a health education intervention where patients were allocated into two groups (121 received pamphlets and 102 attended video sessions). The effectiveness of the intervention was assessed based on the uptake of DR screening. The facilitating factors and barriers to DR screening were explored through semi-structured interviews and focus group discussions with participants and health workers. Data analysis included Chi-square test for quantitative data and thematic analysis for qualitative data. **Results:** Among the 235 people in the health education intervention study, 131 (55.7%) received the pamphlet and 104 (44.3%) watched the educational videos. The uptake of DR screening within 2 months was higher in the group shown the educational video than who received the pamphlet (32.7% vs 11.45%;  $P < 0.05$ ). Absence of an accompanying person and good vision were barriers that prevented patients from screening. Realization of consequences of DR and proximity of the screening facility were identified as motivators. The major results we found in the initial survey of 267 people were that 74.5% had never had HbA1c test and locals underwent health check-ups more regularly than migrants (62.2% versus 34%;  $P < 0.05$ ). **Conclusion:** Educational videos led to greater behavior change than pamphlets in motivating diabetics for DR screening.

**Key words:** Advocacy, diabetic retinopathy, information-education-communication, video

Diabetes mellitus (DM) is an emerging epidemic in many countries of the world, and diabetic retinopathy (DR) is one of the most common complications. Almost two-thirds of all people with type 2 diabetes and almost all with type 1 will eventually develop DR.<sup>[1-3]</sup> Available evidence shows that there are more than 60 million persons with diabetes in India,<sup>[4]</sup> approximately 20% of whom have DR at any given time. Improving control of hyperglycemia and risk factors in people with diabetes and screening for DR followed by treatment if required are important strategies to control DR-related visual impairment and blindness. Traditional health promotion to increase the uptake of services has used information-education-communication (IEC) materials such as posters, pamphlets, and radio talks. Advocacy using a video as an awareness generation tool to motivate people with diabetes for DR screening has not been studied in India to date.

Several eye care institutions provide services for DR in Hyderabad, many of whom report an increase in the number of patients presenting with DR, often with loss of vision. In

addition, a high proportion of these individuals reside in slums in the city.

The primary objective of the study was to determine whether health education delivered using a video increased the uptake of DR screening compared with health education using traditional IEC materials among people with diabetes residing in a number of locations in one of the slums of Hyderabad. The secondary objective was to determine the barriers and facilitators for regular DR screening.

### Methods

The study was approved by the institutional ethics committee, Indian Institute of Public Health (IIPH), Hyderabad, and Public Health Foundation of India (PHFI). The study was conducted in urban slums of Hyderabad which have been in existence for at least 15 years. An information sheet in the local language, Telugu, was read out to each participant and the questionnaire was administered after obtaining their written consent in the

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Received: 11-Nov-2019

Revision: 01-Dec-2019

Accepted: 07-Dec-2019

Published: 17-Jan-2020

#### Access this article online

##### Website:

[www.ijo.in](http://www.ijo.in)

##### DOI:

10.4103/ijo.IJO\_2028\_19

#### Quick Response Code:



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**Cite this article as:** Ramagiri R, Kannuri NK, Lewis MG, Murthy GV, Gilbert C. Evaluation of whether health education using video technology increases the uptake of screening for diabetic retinopathy among individuals with diabetes in a slum population in Hyderabad. *Indian J Ophthalmol* 2020;68:S37-41.

form of thumb impression/signature of family member if not literate, or a signature if literate.

The sample size was calculated to be 242, assuming the uptake of screening for DR would be 10%–15% in the group given a pamphlet and 30% in the group shown a video at the 95% confidence level and using 5% precision and 80% power. An equal number of people were to receive the pamphlet or view the video.

#### Recruitment of participants and baseline data collection

People with diabetes were identified by household visits using purposive sampling. People with diabetes were those taking medication for diabetes (oral hypoglycemic agents and/or insulin) on prescription from an endocrinologist/diabetologist. All people with DM who had not yet visited an ophthalmologist were included; people already under the care of an ophthalmologist, those with hyperglycemia of pregnancy, or who had terminal illness were excluded.

A total of 267 people with diabetes were recruited and answered a close-ended questionnaire administered by the principal investigator and the trained research team which had been validated in an earlier pilot study. The questionnaire was written in English, translated into the local language (Telugu) and back-translated into English. The questions were on sociodemographic information,

diabetes-related health information, associated comorbidities, and current health-seeking behaviors [Appendix 1].

#### Health education interventions

The pamphlet was prepared in the local language (Telugu) which highlighted the symptoms of DM and DR, lifestyle modification for healthy living, list of eye hospitals in the locality, and information that the retina examination would be at no cost. Project staff read the contents to people who were not literate. The video told the story in the local language (Telugu) of a person with diabetes who wanted to pursue a career as an athlete, but could not achieve this because of visual impairment due to advanced DR. This topic was chosen as physical fitness is a requirement for being a police constable, which is one of the sought out occupation in the project area. The actor who played the main character was from the area, and the filming was done in local nongovernment organization, whose office is near the slums. The video ended with a message from an ophthalmologist from a reputed eye hospital. DR awareness videos developed by other renowned organizations were also shown afterward. The videos highlighted key information on diabetes and its effects on the eye, as well as the importance of annual screening. At the conclusion of the video show, all queries were answered, the address of local eye care facilities was shared, and participants were informed that the retina examination would be free. Places in the slum where the DVDs could be shown were identified such as schools, community halls, and anganwadi centers. Participants able and willing to attend these locations were shown the videos together their escort, if present. Other participants received the pamphlet.

Participants' contact numbers, or those of family members or health workers, were collected. A database of the contact numbers was maintained and kept confidential with the principal investigator. These people were contacted, either by phone or in person, usually 2 months after the health education, to enquire whether they had undergone screening for DR. Their responses (yes/no) were entered into an Excel spreadsheet. The interviewers were aware which health education intervention had been delivered. Participants' responses were cross-checked by reviewing the records of the hospitals where screening took place and by contacting ASHA workers and local volunteers who helped us to approach diabetics.

#### Data analysis

Statistical package SPSS version 16.0 was used for data analysis. Chi-square test was used to compare the relationship between the variables of interest. All reported *P* values were two-tailed and the significance level was *P* < 0.05.

#### Qualitative study

Semi-structured telephone interviews were conducted by the principal investigator and project team with eight health workers and 11 people with diabetes (5 who did not undergo DR screening and 6 who did). Two focus group discussions (FGDs) were also held with four and six participants those who did not undergo DR screening. A topic guide was developed to identify the DR screening facilitators and barriers after a pilot interview with a few participants. All interviews were audio recorded and professionally transcribed. A thematic coding framework was developed, the information was read multiple times to understand the themes, and some of the components in the conversation were subsequently excluded because they

**Table 1: Sociodemographic characteristics of participants (n=267)**

Variable		Frequency	Percentage
Gender	Female	152	56.9%
	Male	115	43.1%
Residential status	Local	164	61.4%
	Migrated	103	38.6%
Education status	No formal education	101	37.8%
	Formal education	166	62.2%
Level of education	10th and below	112	41.9%
	Intermediate	18	6.7%
	Degree and above	36	13.5%
Religion	Hindu	216	80.9%
	Muslim	39	14.6%
	Sikh	4	1.5%
	Christian	8	3%
Community	Scheduled caste	55	20.6%
	Scheduled tribe	13	4.9%
	Other backward communities	198	74.2%
	Others	1	0.4%
Marital status	Married	261	97.8%
	Never married	4	1.5%
	Divorced	2	0.7%
Living arrangements	Live with children	249	93.3%
	Live by themselves	18	6.7%

were irrelevant, not evident in the data, or overlapped closely with other statements. Data were analyzed separately for facilitators and barriers.

## Results

### Characteristics of the study population

A total of 267 participants were recruited whose mean age was 53 years (range 7–80 years). There were more females (56.9%) than males and the majority lived with their children [Table 1]. Most were 40–59 years of age, and among those 60–80 years of age females predominated (60.6%). About 90.3% had type 2 DM, the duration of diabetes was 1–10 years (mean 6.9 + 4.9 years; range 1–30 years) in 83.9% ( $n = 224$ ) people, and 82.8% ( $n = 221$ ) were using oral hypoglycemic agents. Blood sugar was controlled in 69.3% ( $n = 185$ ) people (interpreted if they were informed by the doctor or the technician that the levels were normal or by their blood chemistry reports). Only 25.5% ( $n = 68$ ) had been tested for HbA1c, 69.7% ( $n = 186$ ) had hypertension, and 59.2% ( $n = 158$ ) admitted to having been counselled about DM-related complications by their physician. Almost half (48.7%,  $n = 130$ ) preferred to see a physician only when they were sick and 89.9% preferred to visit private rather than public health facilities. Religion and gender did not have any statistically significant association with any outcome variables such as comorbidities, awareness, frequency of health check-up, type of diabetes, and control of diabetes [Table 2].

### Allocation of the intervention and uptake of screening

Among the 235 people in the health education intervention study, 131 (55.7%) received the pamphlet and 104 (44.3%) watched the educational videos. Participants viewing the video were more likely to be local residents than migrants and a higher proportion had attended formal education than the group given the pamphlet [Table 3]. Two months following the health education intervention, the uptake of screening was almost three times higher in the group shown the video than in the group given the pamphlet: 11.5% (15/131) and 32.7% (34/104), respectively [odds ratio 2.9 (1.48–5.52,  $P = 0.0018$ )]. The characteristics of participants who did and who did not attend screening by intervention are shown in Table 3. Uptake of screening was higher among females than males in the pamphlet group but not in the video group; migrant slum dwellers and those who had attended formal education were more likely to undertake screening after either intervention than local residents or those without formal education. There was no difference in the uptake of screening by age.

In the interviews and FDGs, factors which were barriers to screening were that their children did not consider this necessary; in this regard, a participant stated that “they will not take for a preventive health check-up, if symptoms are there only they have to take time out for us, why will they take for preventive check-up” and one participant in a one-to-one interview stated that their children said “we took you to the spectacle shop and just got new ones, so wait for some more time.” Other noted barrier was low perception of risk; in an interview, a participant stated that “when it happens we will see. but now everything is fine.” While compiling the factors which facilitated uptake of screening, we found the common ones were easy access to the screening location – a health worker stated that “the health facility which was recommended was 3-5 km from here and share autos take 10-15 min to reach

**Table 2: Association of various variables**

Residential status with few outcome variables			
	Regular health check-up		<i>P</i>
	Yes, <i>n</i> (%)	No, only when sick, <i>n</i> (%)	
Local	102 (62.2)	62 (37.8)	<0.05
Migrated	35 (34)	68 (66)	
HBA1C tested			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	
Local	25 (15.2)	139 (84.8)	<0.05
Migrated	43 (41.7)	60 (58.3)	
Regular check-up	45 (32.8)	92 (67.2)	0.004
Only when sick	23 (17.7)	107 (82.3)	
Diabetes well-controlled			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	
Regular check-up	114 (83.2)	23 (16.8)	<0.05
Only when sick	71 (60.7)	46 (39.3)	
Aware of the complications of diabetes			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	
Regular check-up	119 (86.9)	18 (13.1)	<0.05
Only when sick	79 (60.8)	51 (39.2)	
Aware of the risk of blindness from DR			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	
Regular check-up	118 (86.1)	19 (13.9)	<0.05
Only when sick	81 (62.3)	49 (37.7)	
Counselled about eye complications of diabetes			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	
Regular check-up	77 (56.2)	60 (43.8)	0.253
Only when sick	82 (63.1)	48 (36.9)	

which was easy for them, if it was far they would have given it a thought to visit.” Fear of losing vision was also noted as one of the main facilitator – one male diabetic who has visited a facility stated “ultimately if I lose our vision, it’s going to affect, and no one at house will come to my help so I have to go.” The other facilitator pointed out by health workers was the content of the video and the camp – a health worker quoted that “when you came with the group that gave awareness by video and talk it cleared all their doubts and they left to get their retina check-up that video, and interactive session worked,” while another health worker stated “the talk and meeting pulled the crowd” [Table 4].

## Discussion

DR usually starts after an interval of 5–7 years in people with DM and so it is not unusual for people to delay eye and retinal examinations, particularly as visual acuity is usually not affected in the early stages of DR and may also be normal in the presence of proliferative, sight-threatening DR. But screening is essential

**Table 3: Characteristics of participants by intervention arm and uptake of screening**

Intervention Arm		Pamphlet (n=131)						DVDs (n=104)					
		All		Not screened (n=116)		Screened (n=15)		All		Not screened (n=70)		Screened (n=34)	
Mean age (range) years		54 (7-80) years		54.6 (7-80) years		49.9 (35-70) years		55.2 (18-78) years		55.4 (18-78) years		54.8 (35-75) years	
		n	%	n	%	n	%	n	%	n	%	n	%
Gender	Female	76	58.0	65	85.5	11	14.5	63	60.6	43	68.3	20	31.7
	Male	55	42.0	51	92.7	4	7.3	41	39.4	27	65.9	14	34.1
Residential status	Local	77	58.8	72	93.5	5	6.5	83	79.8	59	71.1	24	28.9
	Migrated	54	41.2	44	81.5	10	18.5	21	20.2	11	52.4	10	47.6
Education status	No formal education	63	48.1	55	87.3	8	12.7	35	33.7	23	65.7	12	34.3
	Formal education	52	39.7	45	86.5	7	13.5	69	66.3	47	68.1	22	31.9
Level of education	10 <sup>th</sup> and below	47	35.9	42	89.4	5	10.6	45	43.3	30	66.7	15	33.3
	Intermediate	5	3.8	4	80.0	1	20.0	9	8.7	6	66.7	3	33.3
	Degree and above	16	12.2	15	93.8	1	6.3	15	14.4	11	73.3	4	26.7
Marital status	Married	130	99.2	115	88.5	15	11.5	100	96.2	67	67.0	33	33.0
	Never married	1	0.8	1	100.0	0	0.0	2	1.9	1	50.0	1	50.0
	Divorced	0	0	0	0	0	0	2	1.9	2	100.0	0	0.0
Living arrangements	Live with children	122	93.1	107	87.7	15	12.3	99	95.2	67	67.7	32	32.3
	Live by themselves	9	6.9	9	100.0	0	0.0	5	4.8	3	60.0	2	40.0
Community	Scheduled caste	33	25.2	32	97.0	1	3.0	20	19.2	14	70.0	6	30.0
	Scheduled tribe	5	3.8	4	80.0	1	20.0	1	1.0	1	100.0	0	0.0
	Other backward communities	92	70.2	79	85.9	13	14.1	83	79.8	55	66.3	28	33.7
	Others	1	0.8	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0

**Table 4: Barriers and facilitators for compliance for DR screening**

Barriers	Facilitators
Children do not consider DR screening to be a necessity	Travel assistance and travel company
Transport and other logistics assistance to reach the screening site	Fear of losing eyesight without treatment
Lower perception risk because of good eyesight	Proximity of point of care
Apathy	Easy access to point of care
Apprehension of screening and the treatment that could follow	Group discussion and story content in the video
Cost of care	No cost to patient care

Support: The Queen Elizabeth Diamond Jubilee Trust, London School of Hygiene and Tropical Medicine, London and Public Health Foundation of India

to reduce the burden of DR-related visual impairment and blindness. Awareness creation and health education are very important to improve uptake of DR screening, as awareness can be low in India.<sup>[5]</sup> This study showed that the uptake of DR screening was higher in people with diabetes shown an informational video followed by a question and answer session than among those given a pamphlet. Others have shown that narrative forms of health communication can affect behavior change in chronic health conditions,<sup>[6-12]</sup> and storytelling is very important for an effective video presentation. We used a story in our video and involved people from the community to enact the roles. A systemic review has substantiated these views<sup>[13]</sup> although educational videos may not be effective in isolation.<sup>[14]</sup> Some studies have exclusively focussed on the use of video to increase DR screening as in studies among people with type 2 DM in the United Kingdom<sup>[15]</sup> and in Australian aboriginals.<sup>[16]</sup>

We identified several barriers and facilitators in relation to the uptake of DR screening. These were similar to other

reports and included social influences, understandings about the consequences or action or inaction, lack of time and financial resources, and misconceptions.<sup>[17]</sup> Inadequacy of service and lack of early symptoms in DR are the other important barriers.<sup>[18-20]</sup> Based on the study, we propose that the factors that bring sustainability to health education programs include regular reminders, integrating blood sugar testing with DR screening, linkage with health workers, and occasional mass screening.

The limitations of the study are that for logistical reasons, participants were not randomly allocated to the different interventions which led to unequal allocation, with those shown the video having higher levels of formal education than those given the pamphlet which may have biased the uptake of screening. In addition, those assessing the outcome were not masked to which type of health education the participants had received.

## Conclusion

Video awareness had a greater impact on the uptake of screening for DR in this urban slum in Hyderabad than standard written health education materials. Narrative films are a promising strategy to initiate dialog on diabetes and its complications and to stimulate behavior change. Further studies are warranted, with random allocation of the intervention, which could be achieved by showing the DVD on a tablet in an individual's home. In addition, those assessing the outcome should be masked to the allocation group, and consideration could be given to whether a range of DVDs should be prepared of case scenarios of men and women with different ages, reflecting the different challenges they and their families might encounter if they were to become visually impaired.

### Financial support and sponsorship

The Queen Elizabeth Diamond Jubilee Trust, London, UK.

### Conflicts of interest

There are no conflicts of interest.

## References

- Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
- World Health Organization, Geneva. Prevention of Blindness from Diabetic Mellitus. Report of a WHO Consultation, Geneva; November, 2005. Available from: <https://www.who.int/blindness/Prevention%20of%20Blindness%20from%20Diabetes%20Mellitus-with-cover-small>. [Lase retrieved on 2019 Sep 19].
- VISION 2020 the Right to Sight India. Guidelines for the Comprehensive Management of Diabetic Retinopathy in India. A Developed by Aravind Eye Care System; July, 2008. Available from: <https://www.iapb.org/wp-content/uploads/Guidelines-for-the-Comprehensive-Management-of-DR-in-India.pdf>. [Lase retrieved on 2019 Sep 19].
- Murthy GV, Gilbert CE, Shukla R, Vashist P, Shamanna BR. Situational analysis of services for diabetes and diabetic retinopathy and evaluation of programs for the detection and treatment of diabetic retinopathy in India: Methods for the India 11-city 9-state study. *Indian J Endocrinol Metabol* 2016;20(Suppl 1):S19-25.
- Sristi S, Sheeladevi S, Rani PK. Knowledge, attitude and practices on diabetes and diabetic retinopathy of rural population from an Indian state. *Int J Diabetes Dev Ctries* 2015;35:33-8.
- Murphy ST, Frank LB, ChatterjeeJS, Moran MB, Zhao N, Amezola de Herrera P. Comparing the relative efficacy of narrative vs non-narrative health messages in reducing health disparities using a randomized trial. *Am J Public Health* 2015;105:2117-23.
- Abu Abed M, Himmel W, Vormfelde S, Koschack J. Video-assisted patient education to modify behavior: A systematic review. *Patient Educ Couns* 2014;97:16-22.
- Latif S, Ahmed I, Amin MS, Syed I, Ahmed N. Exploring the potential impact of health promotion videos as a low cost intervention to reduce health inequalities: A pilot before and after study on Bangladeshis in inner-city London. *London J Prim Care (Abingdon)* 2016;8:66-71.
- Noar SM. Challenges in evaluating health communication campaigns: Defining the issues. *Commun Methods Meas* 2009;3:1-11.
- Hubley J. Patient education in the developing world – A discipline comes of age. *Patient Educ Couns* 2006;61:161-4.
- Dhawan N, Saeed O, Gupta V, Desai R, Ku M, Bhoi S, *et al.* Utilizing video on myocardial infarction as a health educational intervention in patient waiting areas of the developing world: A study at the emergency department of a major tertiary care hospital in India. *Int Arch Med* 2008;1:14.
- Shah N, Mathur VP, Kathuria V, Gupta T. Effectiveness of an educational video in improving oral health knowledge in a hospital setting. *Indian J Dent* 2016;7:70-5.
- Tuong W, Larsen ER, Armstrong AW. Videos to influence: A systematic review of effectiveness of video-based education in modifying health behaviors. *J Behav Med* 2014;37:218-33.
- Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet* 2010;376:1261-71.
- Dyson PA, Beatty S, Matthews DR. An assessment of lifestyle video education for people newly diagnosed with type 2 diabetes. *J Hum Nutr Diet* 2010;23:353-9.
- Meyer J, Johnson K, Bowyer J, Muir J, Turner A. Evaluating a health video on diabetic retinopathy. *Health Promot J Austr* 2016;27:84-7.
- Lake AJ, Browne JL, Rees G, Speight J. What factors influence uptake of retinal screening among young adults with type 2 diabetes? A qualitative study informed by the Theoretical Domains Framework. *J Diabetes Complications* 2017;31:997-1006.
- John A, Cooper J, Serrant L. Barriers to diabetic retinopathy screening in South Asian groups. *Prim Health Care* 2014;24:25-30.
- Sachdeva A, Stratton I, Unwin J, Moreton R, Scanlon PH. Diabetic retinopathy screening: Study to determine risk factors for non-attendance. *Diabetes Prim Care* 2012;14:308-16.
- Hartnett ME, Key IJ, Loyacano NM, Horswell RL, Desalvo KB. Perceived barriers to diabetic eye care: Qualitative study of patients and physicians. *Arch Ophthalmol* 2005;123:387-91.