



RESEARCH ARTICLE

KNOWLEDGE, ATTITUDE AND PRACTICE OF DIABETES MELLITUS AND DIABETIC  
RETINOPATHY IN RURAL POPULATION OF KARNATAKA

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ABSTRACT

**Purpose:** The worldwide prevalence of diabetes mellitus has risen dramatically in the developing countries. Diabetic retinopathy is a microvascular complication of diabetes, has a significant impact on global health and that may threaten patient's visual function. There are limited studies on knowledge, attitude and practice on diabetes mellitus and diabetic retinopathy in rural population. Such data are extremely important to plan the public health policies. The aim of the study is to report the KAP (Knowledge, attitude and practice) study of diabetes mellitus and diabetic retinopathy among patients and attendants of patients visiting hospital in rural Karnataka. Practice was evaluated only in diabetic patients.

**Methods:** This observational study was conducted on patients and attendants of patients (n- 200) visiting various out-patient departments of hospital between November 2014 and December 2014. The participants answered questionnaire which included demographic profile, awareness about diabetes mellitus and diabetic retinopathy, attitude towards going for eye examination and practice of diabetes control and management.

**Result:** Of 200 participants, 46 (23%) were diabetic, 172 (86%) heard of diabetes mellitus, 80 (40%) were aware of complications of diabetes mellitus. Among these 172 participants, 62 (36.04%) had heard of diabetic retinopathy and 20 (32.25%) were aware of treatment for diabetic retinopathy. Source of information of complications of diabetes mellitus were medical personnel 47 (58.76%), relatives 31 (38.75%) and media 2(2.5%). Only 38 (61.29%) out of 62 who had heard of diabetic retinopathy had attitude to go for eye examination. 32 (84.21%) participants who had attitude of going for eye examination only when vision is affected.

**Conclusion:** This study reflects the poor knowledge and awareness in rural population. It emphasizes the need for increasing diabetes mellitus and diabetic retinopathy awareness activities in the form of mass campaigns, training anganwadi workers, ASHA workers and paramedical personnel who work at community level in rural areas.

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INTRODUCTION

Diabetes mellitus (DM) is a common public health problem. (Ginsberg 3<sup>rd</sup> edition) In 2011, 366 million people (8.3% of the world's adult population) were living with diabetes; by 2030 this will have increased to 54% that is 552 million (IDF Atlas Fifth Edition). (<http://www.idf.org/diabetesatlas/5e/the-global-burden>) India is gaining potential epidemic status with more than 62 million individuals currently diagnosed with the diabetes. (Joshi and Parikh, 2007; Kumar et al., 2013) The difference in incidence patterns are seen in different

geographical areas in India. (Wild et al., 2004; Anjana et al., 2011) According to 2011 census nearly 70% of India's population live in rural areas. (Available from [censusindia.gov.in](http://censusindia.gov.in)) The poverty in rural areas, illiteracy, dominance of communicable diseases, disproportionate distribution of health resources between rural and urban areas, food insecurity, poor sanitation all might contribute for under-prioritizing and undermining the looming threat of diabetes mellitus in rural areas. (Anjana et al., 2011) Such inadequacies may also lead to development of infrastructure which result in poor screening, preventive services, non adherence to diabetic management guidelines, (Khalil and George, 2012) with these the diabetic complications are more likely suffered by rural population compared to urban population. To overcome this rural urban inequality in diabetic intervention many

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programmes have to be implemented. The morbidities caused by ocular complication of diabetes has placed this disease as the 4th leading cause of blindness worldwide. (Tumosa, 2008) There are 4 million cases of blindness due to diabetic retinopathy. (Vision 2020) (Belfort, 2010) If diabetic retinopathy is detected early the blindness caused by it can be prevented. Creation of awareness about diabetic retinopathy by diabetic patients could help in the early detection, management and prevention of this complication. (Mohammed and Waziri 2009) The information about level of awareness in a population helps in formulating a prevention programme for diabetes. (Badrudin *et al.*, 2002) Previously done studies on knowledge, attitude and practice (KAP) studies have supported the need for greater awareness of prevention, diagnosis, risk factor control and disease management (Demaio *et al.*, 2013; Rani *et al.*, 2008; Zaman *et al.*, 2012; Norris *et al.*, 2001; Al-Maskari *et al.*, 2013; Mazzuca *et al.*, 1986) and most studies are related to diabetes have focused on people with diagnosed diabetes mellitus or newly diagnosed diabetes mellitus attending urban clinics or hospitals. (Demaio *et al.*, 2013; Rani *et al.*, 2008; Al-Maskari *et al.*, 2013) However, there is a paucity of evidence amongst the general community specifically in rural and remote areas. The aim of the study is to report the KAP (Knowledge, attitude and practice) study of Diabetes mellitus and Diabetic retinopathy among patients and attendants of patients visiting hospital in rural Karnataka.

## MATERIALS AND METHODS

**Type of study:** Cross-sectional study

**Period of study:** November 2014- December 2014

**Place of study:** MVJ Medical College and Research Hospital, Hoskote, Bangalore, Karnataka

**Sample size:** 200

A total of 200 patients and attendants of patients visiting various out-patient departments of hospital between November 2014 and December 2014. A questionnaire was given to the participants for collecting the necessary information. A questionnaire was given either in English or kannada which included socio demographic profile, awareness about diabetes mellitus and diabetic retinopathy, attitude towards going for eye examination and practice of diabetes control and management. Practice was evaluated only in diabetic patients. Literate subjects self-administered the questionnaire, the chief author read out the questionnaire to the illiterate participants. The questionnaire (appendix 1) included questions pertaining to socio demographic profile, knowledge about diabetes mellitus and diabetic retinopathy, attitude towards going for eye examination and practice of diabetes control and management. The socio-demographic data included gender, age in categories (20-34, 35-44, 45-54, 55-64, above 65 years), educational level in categories (no schooling, primary school 1-5<sup>th</sup> standard, high school 6-10<sup>th</sup> standard, above 10<sup>th</sup> standard) and income per annum. Information regarding participant is diabetic or not is collected and if he or she is diabetic, duration of diabetes was also asked.

Questions evaluating knowledge of diabetes were associated with the categorical responses such as “yes” or “no” and questions were:

- Have you ever heard of diabetes? Yes or No
- If you have heard of diabetes- Do you know complications of diabetes mellitus? Yes or No

Questions evaluating knowledge of diabetic retinopathy were associated with the categorical responses such as “yes” or “no” and questions were:

- Have you ever heard of diabetic retinopathy? Yes or No
- Do you know the treatments available for diabetic retinopathy? Yes or No

If yes, then what are the treatments available for diabetic retinopathy?

- Good control of diabetes alone is adequate
- Laser treatments
- Surgery

Source of information was also assessed by asking:

How did you come to know about this/ these complications?

- a) Medical personnel-Doctors/ Nurse/ Ophthalmologist/ Optometrist
- b) Relatives- Family member/ Friends/ Relatives with diabetes
- c) Media- Television / radio/ newspaper/ social media

Attitude was assessed by asking:

- Should subjects with diabetes go for eye examination? Yes or No
- If yes then, how frequently should a person with diabetes undergo an eye checkup?
  - a) Every 6 months
  - b) Yearly
  - c) Two yearly
  - d) Only when vision affected

Questions evaluated practice of diabetes control and management only for those who have been diagnosed with diabetes by asking:

1. Are you on medication? Yes or No
2. How often do you have your blood sugar checked?
  - a) Frequently (more than once a year)
  - b) Regularly (at least once a year)
  - c) Whenever I consider my diabetes has become worsen
  - d) Never after diagnosis

## Definitions

**Knowledge group for Diabetes:** This group contained population that responded ‘yes’ to both questions: (i) Have you heard of diabetes mellitus? and (ii) Do you know complications of diabetes mellitus?

**Knowledge group for Diabetic retinopathy:** This group contained population that responded 'yes' to both these questions: 1. Have you heard of diabetic retinopathy? and 2. Do you know the treatments available for diabetic retinopathy ?

The attitude was considered to be positive if they had responded yes to the question: Should subjects with diabetes go for eye examination ?

**Statistical analysis:** Data was entered in excel sheet and analyzed using Statistical software SPSS (SPSS Inc, version 17). Frequency and percentage was used for categorical variables like participant's socio-demographic characteristics including age, gender, religion, level of education and income per annum .Association between the knowledge of diabetes mellitus and diabetic retinopathy with age, gender, religion, level of education, income per annum were analyzed using Chi-square test. The statistical significance level was fixed at  $p < 0.05$ . Practice of diabetes for those with known diabetics were reported using simple descriptive statistics.

treatment for diabetic retinopathy. Table 1 shows factors influencing knowledge of diabetes mellitus and diabetic retinopathy. Knowledge about diabetes mellitus was noted in 80 individuals (40%), and about diabetic retinopathy in 20 individuals (10%). Knowledge of diabetes mellitus among males is 40.44% and female is 39.33% and that of diabetic retinopathy is 8.98% and 10.81% respectively. In 20-34years age group people were more knowledgeable in diabetes and diabetic retinopathy than other age groups, however it was not statistically significant ( $p$  value  $> 0.05$ ). Study subjects whose educational level is above 10<sup>th</sup> standard showed higher knowledge than other categories. Participants in the income group between 30,000– 1 lakh were having higher knowledge for diabetes mellitus and diabetic retinopathy.

Figure 1 The pie chart shows about the source of information of complications of diabetes mellitus were medical personnel 47 (58.75%), relatives 31 (38.75%) and media 2 (2.5%).

**Table 1. Factors influencing knowledge of diabetes mellitus and diabetic retinopathy**

Factors	Total	Knowledge of diabetes mellitus			Knowledge of diabetic retinopathy		
		Yes (%)	No (%)	P value	Yes (%)	No (%)	P value
Age groups (years)							
20-34	57	30 (52.63)	27 (47.36)	0.178	9 (15.78)	48 (84.21)	0.404
35-44	39	14 (35.89)	25 (64.10)		3 (7.69)	36 (92.30)	
45-54	51	20 (39.21)	31 (60.78)		4 (7.84)	47 (92.15)	
55-64	28	9 (32.14)	19 (67.85)		1 (3.57)	27 (96.42)	
65 and above	25	7 (28)	18 (72)		3 (12)	22 (88)	
	200	80	120		20	180	
Gender							
Female	111	44 (39.63)	67 (60.36)	0.0135	12 (10.81)	99 (89.18)	0.182
Male	89	36 (40.44)	53 (59.55)		8 (8.98)	81 (91.01)	
	200	80			20	180	
Education							
No schooling	41	4 (9.75)	37 (90.24)	0.0001	1 (2.43)	40 (97.56)	0.001
1-5th std	37	6 (16.21)	31 (83.78)		1 (2.5)	36 (97.29)	
6-10th std	54	23 (42.59)	31 (83.78)		3 (5.55)	51 (94.44)	
above 10th std	68	47 (69.11)	21 (30.88)		15 (22.05)	53 (77.94)	
	200	80			20	180	
Income							
<30000	92	29 (31.52)	63 (68.47)	0.013	5 (5.43)	87 (94.56)	0.141
30000-1lakh	74	30 (40.54)	44 (59.45)		9 (12.16)	65 (87.83)	
1-3lakhs	32	19 (59.37)	13 (40.62)		6 (18.75)	26 (81.25)	
>3lakhs	2	2 (100)	0		0	2 (100)	
	200	80			20	180	
Religion							
Hindu	179	74 (41.34)	105 (58.65)	0.329	17 (9.49)	162 (90.50)	0.574
Muslim	17	4 (23.52)	13 (76.47)		2 (11.76)	15 (88.23)	
Christian	4	2 (50)	2 (50)		1 (25)	3 (75)	
	200	80	120		20	180	

## RESULTS

A total of 200 patients and attendants of patients visiting various out-patient departments of hospital were interviewed for knowledge, attitude and practice for diabetes and diabetic retinopathy. All participants were above 20 years of age. Women were 111 (55.5%) of the population. 68 (34%) were educated secondary school and above, others were educated till high school and below. Out of 200 participants, 46 (23%) were diabetic, 172 (86%) heard of diabetes mellitus, 80 (40%) were aware of complications of diabetes mellitus, 62 (36.04%) had heard of diabetic retinopathy and 20 (32.25%) were aware of

Our study showed diabetic subjects were having more knowledge regarding diabetes mellitus (50%) and diabetic retinopathy (21.73%) compared to non-diabetic subjects (37% and 6.5% respectively) Only 38 (19%) out of 200 had attitude to go for eye examination. Figure 2 graph shows 32 (84.21%) of 38 participants who had attitude to go for eye examination thought that they should get their eyes checked only when their vision is affected, 4 (10.52%) thought that they should visit annually, 2 (5.26%) deemed that visiting eye clinic once every two years was appropriate and none of them thought that they should visit once every six months.

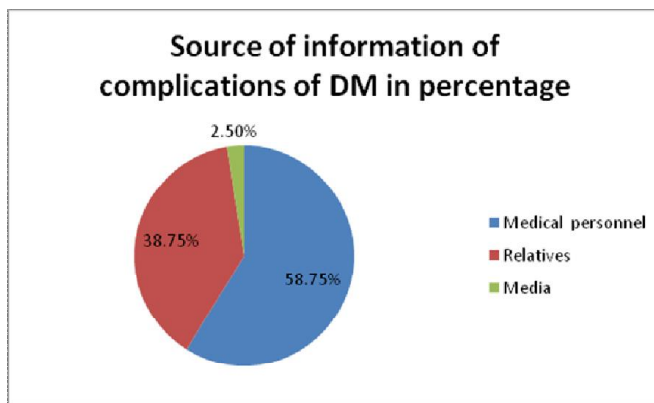


Figure 1. Source of information of complications of diabetes mellitus in percentages

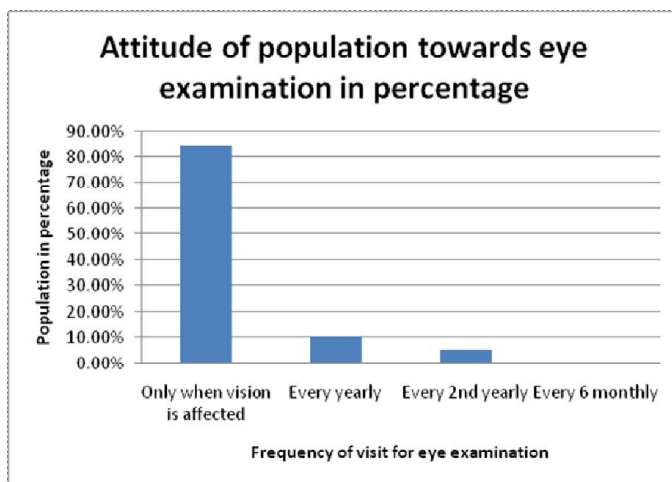


Figure 2. Attitude of population towards eye examination in percentages

Out of 200 participants, only 62 (31%) had heard of diabetic retinopathy and in those 62, 20 (32.25%) were aware of availability of treatment for diabetic retinopathy. Among 20 individuals, 15 (75%) thought that achieving good control of diabetes alone is enough to cure it, 5 (25%) knew availability of laser treatment and none of them knew that surgery is the available treatment modality for diabetic retinopathy. Practice was evaluated in only diagnosed diabetic patients, 46 (23%) in 200 individuals were diabetic, 40 (86.95%) out of 46 diabetics were on medications and 16(34.75%) checked blood glucose levels more than once yearly, 19(41.30%) checked once yearly, 10 (21.73%) checked only when they considered their diabetes worsened and 1 (2.17%) never checked their blood glucose since diagnosis.

## DISCUSSION

Diabetes is a chronic disease and is in epidemic proportion in most of the countries. Retinopathy is microvascular complications of diabetes and is caused by changes in the blood vessels of the retina. It is one of the major cause of blindness throughout the world in the age group of 20-60 years. (Thylefors *et al.*, 1995; Global initiative for the elimination of avoidable blindness, 1997) 34.6% is the prevalence of diabetic retinopathy (DR) in patients with diabetes. (Yau *et al.*, 2012) If

the retinopathy is detected early then blindness caused by it can be prevented. The information about level of awareness in a population helps in formulating a prevention programme for diabetes. (Badrudin *et al.*, 2002) The study on knowledge, attitude and practice assists us in obtaining information of awareness, implementing and strengthening prevention programmes. The results of this study suggested that 40 % of study population had knowledge of diabetes mellitus. In two of the studies one conducted in India reported to have 50% (Namperumalsamy *et al.*, 2004) and other conducted in USA reported 52% (Muñoz *et al.*, 2008) of knowledge of diabetes mellitus. Only 10% of study subjects had knowledge of diabetic retinopathy, Rani *et al.* conducted a study which showed 37% of knowledge of diabetic retinopathy (Rani *et al.*, 2008) which is more than our study. The lower level of knowledge in our study could be because of definition used to define the knowledge. Looking at the factors contributing to knowledge of diabetes mellitus and diabetic retinopathy, people educated above 10<sup>th</sup> standard of school have significant association for knowledge of diabetes mellitus and diabetic retinopathy with education. Similar findings were noted from a study in India that showed that people with the highest level of literacy had better knowledge of diabetes mellitus and diabetic retinopathy. (Rani *et al.*, 2008) This significant correlation supports that education is important in creating awareness. Knowledge of diabetes mellitus was more common among women. This was similar to the study conducted in rural population of India. (Rani *et al.*, 2008) This information is of importance because most of the rural females were housewives. As they would help in creating awareness by influencing other family members. As such there was no significant association was found between knowledge of diabetes and age and religion, this may be attributed to the small sample size included in the study. This was also observed in Myanmar study.<sup>(24)</sup> Thus there is no requirement of any intervention strategy involving these factors to improve KAP of population.

Among those who were aware the complications of diabetes, 47 (58.75%) came to know through medical personnel, 31 (38.75%) through relatives and 2 (2.5%) from media. A study from UK showed that verbal information from specialist nursing staff in the diabetes centre was most used and preferred as a source of information. (Robertson *et al.*, 2005) This highly suggests that health education by trained professionals and health campaigns promoted through media regarding diabetic and its complications like retinopathy could help in spreading information regarding this potentially blinding disease. Our study showed that major source of information was medical personnel, as the study population was patients and attendants of patients who visited various out-patient departments of hospital. Hence spreading knowledge of diabetes and its related complications through TV, newspapers, health education posters in the medicine clinic and eye clinic of all health centers and hospitals is extremely crucial as this will motivate diabetic patients to actively engage in health seeking behavior, such as go for eye check-up. Such awareness and knowledge could lead to better understanding and acceptance of the importance of routine eye examinations for the early detection and treatment of eye diseases, thereby reducing the incidence of retinopathy. Our study showed diabetic subjects were having more knowledge regarding diabetes mellitus and diabetic

retinopathy compared to non-diabetic subjects. This could be because diabetic subjects when they visit physician for treatment usually had been informed about diabetes and complications of diabetes. Previous studies both in developed and developing countries have reported that knowledge about diabetes is generally poor among diabetic patients. (Al-Maskari *et al.*, 2013; Kamel *et al.*, 1999) This study also showed a lower percentage of awareness about diabetic retinopathy compared to study from India (37.1%) (Rani *et al.*, 2008) and Australia (37%). (Livingston *et al.*, 1998) The lower percentage could be because of the criteria used to define knowledge. In our study only 38 (19%) out of 200 had attitude to go for eye examination. 32 (84.21%) of 38 participants who had attitude to go for eye examination thought that they should get their eyes checked only when vision is affected, 4 (10.52%) of them thought that they should make a visit annually, 2 (5.26%) deemed that visiting eye clinic once every two years was appropriate and none of them thought that they should come once every six months. One of the study conducted in Malaysia (Tajunisah *et al.*, 2011) reported 43.8% of the population did not know how frequently they should have an eye examination and also reported 14% of them thought that they should get their eye checked annually while another 21.9% thought only when they had problems with their vision, 19% thought once every six months and 1.5% thought once every two years was appropriate. In a study in UK, the Asian population was found to have less positive attitude for eye care compared to Caucasians. (Pardhan *et al.*, 2004) This fact emphasizes the role of treating physicians and counseling for follow up in raising the awareness of eye complications in diabetic patients as some patients were ignorant regarding this matter. Our study showed similar results in awareness of diabetic retinopathy as that one of the study conducted in Malaysia (Tajunisah *et al.*, 2011) except one finding which was in higher percentage i.e 75% in our study thought that achieving good control of diabetes alone is enough to cure compared to 8% in Malaysian study. This can be because the sample used in their study were diabetic patients who visited hospital for the first time unlike our population. The lacunae found in the knowledge suggests the need for more aggressive awareness campaigns on this subject. We found that higher percentage of practice amongst diabetics compared to a study conducted in Bangladesh (Islam *et al.*, 2014) this may be because of population taken for study were patients and attendants of patients who visited various OPDs of hospital. The potential drawback of our study is a report from a collection of data from patients and attendants of patients visiting various OPDs of hospital. The study would need to be repeated in a random sample of remote areas in order for the results to be truly representative of a national perspective. This baseline information of this study can be used to compare the outcomes of similar study after health promotion campaign. While planning the health promotion, lacunae of knowledge should be focused intensely. Health improvement can be done by increasing the capacity of the health workforce to detect and manage priority and emerging conditions, and improving the general and diabetes-specific health literacy of the population.

## Conclusion

This study reflects the poor knowledge and awareness in rural population. It emphasizes the need for increasing diabetes

mellitus and diabetic retinopathy awareness activities in the form of mass campaigns, training anganwadi workers, ASHA workers and paramedical personnel who work at community level in rural areas. The involvement of primary care physicians in mass campaigns and health educations should be conducted by primary care physicians help in raising the awareness. The development of an integrated health and social care pathway, including further education and better communication between all relevant parties, would help in reducing the prevalence of diabetic retinopathy.

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