Research Article

Understanding Diabetes and Eye Health Management: A Comparative Study of Knowledge, Attitude, and Practices Among Individuals With and Without Systemic Illnesses

Shikha Sharma[1*], Ashish Chander[2]

[1] Optometry, Teerthanker Mahaveer University, *Moradabad, Uttar Pradesh, India*
[2] *Ophthalmology,Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India*

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Corresponding Author: ***Shikha Sharma*** Email: shikhasharma972064@gmail.com

ABSTRACT

Aim: This study aimed to assess and compare the knowledge, attitude, and practices (KAP) related to diabetes and eye health among individuals with systemic illnesses (such as diabetes and hypertension) and those without systemic diseases in Moradabad, India.

Method: Conducted between January and March 2023, this cross-sectional survey involved 357 participants aged 18 years and older from a tertiary care eye institute. Participants were randomly selected and provided informed consent before face-to-face interviews. A pretested questionnaire collected data on demographics, knowledge, attitudes, and practices regarding diabetes. Statistical analysis was performed using SPSS Version 21.0, with chi-square tests and Fisher's Exact Test used to examine associations between variables.

Results: The mean age of participants was 53.7 years, with a predominance of females (53.7%) and urban dwellers (60.8%). Of the respondents, 79.3% had systemic diseases, and 41.2% had diabetes. Knowledge gaps were evident: 58.4% believed diabetes was hereditary, but only 19.9% were aware of diabetic retinopathy. Those with systemic illnesses exhibited significantly better knowledge about diabetes inheritance (Chi-Square = 33.082, $p < 0.001$), blood sugar monitoring (Chi-Square = 72.966, $p < 0.001$), and eye health impacts (Chi-Square = 29.324, $p < 0.001$). They also engaged more frequently in healthcare practices, including visits to general practitioners and eye doctors, and were more aware of dilated eye examinations (Chi-Square = 14.918, $p < 0.001$).

Conclusion: Individuals with systemic illnesses show better diabetes knowledge and healthcare practices compared to those without. Targeted educational interventions are crucial to address these knowledge gaps and improve diabetes management.

Keywords: Diabetic Retinopathy, Knowledge-Attitude-Practice (KAP), Awareness, Diabetes Mellitus, Eye Health

1. INTRODUCTION

Diabetes mellitus (DM) is a major public health challenge in both developed and developing countries, with an increasing global prevalence. India, in particular, faces an alarming rise in diabetes cases due to rapid urbanization, changes in dietary habits, and sedentary lifestyles [1, 2]. According to estimates, the number of people with diabetes in India is projected to reach 101.2 million by 2030 [1]. Despite the increasing burden of the disease, there is a significant gap in public knowledge, especially in rural areas, regarding diabetes prevention, management, and complications [3, 4]. Studies have shown that education and awareness programs can improve compliance with treatment and reduce the complications associated with diabetes [1, 5].

Previous research conducted in various regions of India, including the Indian Council of Medical Research (ICMR) India Diabetes Study, highlights the disparities in diabetes knowledge between urban and rural populations,

underscoring the need for targeted interventions [1,5]. Other studies have similarly emphasized the limited awareness of diabetes and its complications in both general and diabetic populations [2, 4]. These findings highlight the critical need for increased public education and health literacy to mitigate the burden of diabetes [3].

In this context, we conducted a study in Moradabad, India, to assess the knowledge, attitude, and practices (KAP) related to diabetes among the local population. In Moradabad district, the prevalence of type 2 diabetes in adults (≥30 years) hovers around 10–16%, with higher rates observed in urban and slum populations. Rural and urban settings alike show a strong link between diabetes and modifiable factors—BMI, socioeconomic status, age, and lifestyle behaviors. Studies from local tertiary hospitals reveal wide gaps in self-care practices—especially foot care, hypoglycemia awareness, and adherence to footwear and medication routines. To curb complications in Moradabad, community-based screening, culturally tailored education on diet, exercise, foot hygiene, and treatment compliance are essential [6]

This study also compared the KAP between individuals with systemic illnesses (such as diabetes and hypertension) and those without systemic diseases, aiming to understand the influence of existing comorbidities on diabetes awareness. This study will provide valuable insights into how systemic diseases impact knowledge and practices, potentially guiding future interventions tailored to these groups. The findings contribute to the growing body of evidence advocating for enhanced diabetes education across all socioeconomic strata [4,5].

2. MATERIALS & METHODS

2.1 Methods

The study received approval from the institutional ethics committee and adhered to the Declaration of Helsinki principles. Conducted between January and March 2023, this cross-sectional survey targeted participants aged 18 years and older visiting a tertiary care eye institute. Participants were randomly selected from among the attendants at the institute. To ensure data quality and uniformity, a quality control system was implemented during data collection. Eligible participants were approached and informed about the study's objectives before providing informed consent, either by signing or using a thumb impression. Data collection was conducted face-to-face by trained interviewers, with each interview lasting approximately 20–25 minutes at locations comfortable for the participants.

A pretested questionnaire, developed with input from experienced faculty and literature reviews and late on the questionnaire was validated, before adminstered to the patients. It covered demographics, knowledge, attitudes, and practices about diabetes. The questionnaire comprised 13 questions focused on Demographics and Health-Related Data, 14 questions assessing knowledge, 4 questions evaluating attitudes, and 8 questions related to practices. (Annexure I) It was pretested on institute staff to assess internal consistency, but pretest data were not included in the final analysis. As part of the structured questionnaire (Annexure 1), clinical information was recorded, including blood pressure, blood sugar levels, and vision-related findings. The ophthalmological assessment included visual acuity categorization for each eye as either (a) ≥6/18 or (b) <6/18. Additionally, clinician-diagnosed vision conditions were noted, including (a) Diabetic Retinopathy, (b) Cataract, (c) Glaucoma, (d) Other, (e) None, or (f) Could not be obtained. These data were captured based on prior clinical records or reported diagnoses where available. Post-interview, general information on diabetes, including its risk factors, complications, and management, was provided to all participants. Sample size calculations, based on an awareness level of 34% from prior studies (using $p = 0.34$, $q = 0.66$, $\alpha = 0.05$, and allowable error $d = 5\%$), indicated a required sample size of 339.

2.2 Statistical Analysis

Statistical analysis was conducted using SPSS Version 21.0. Descriptive statistics summarized continuous and categorical data, including means, standard deviations, frequencies, and percentages. Chi-square tests were used to examine associations between categorical

variables and systemic illness, with significance set at $p < 0.05$. Fisher's Exact Test was applied for 2x2 tables with low expected cell counts. Crosstabulations assessed healthcare utilization patterns, including visits to general practitioners and eye doctors, and participation in dilated eye examinations. Significant differences between groups were determined by chi-square and likelihood ratio tests, with p-values reported to indicate statistical significance. Missing data were managed appropriately, and test assumptions were verified.

3. RESULTS & DISCUSSION

3.1 Results

A total of 357 participants with a mean age of 53.7 years were surveyed. The sample is predominantly female (53.7%) and urban-dwelling (60.8%). Most respondents are Hindu (55.4%), with a majority having no formal education (45.2%). Income levels are mainly between ₹10,001 and ₹49,999 per month (87.8%) (Table 1). Health data shows that 79.3% of respondents have systemic diseases, with diabetes affecting 41.2%. Spectacle use is reported by 42.6% of participants. Common eye conditions include cataracts (9.4%) and diabetic retinopathy (3.7%). Diabetes duration varies, with 20.7% having had it for less than a year and 2.3% for over 15 years. Hypertension is reported by 36.6%, with only 0.9% experiencing it for more than 15 years (Table 1).

Table 1: Demographic and Health Characteristics of Study Participants

S.No	Category	Subcategory	Frequency	Percent
1	**Gender**	Female	189	53.70%
		Male	163	46.30%
2	**Locality**	Rural	138	39.20%
		Urban	214	60.80%
3	**Religion**	Hindu	195	55.40%
		Muslim	156	44.30%
		Others	1	0.30%
4	**Education**	High School	40	11.40%
		Intermediate	57	16.20%
		Degree	50	14.20%
		No education	159	45.20%
		Post Graduate & above	31	8.80%
		Primary Education	15	4.30%
5	**Occupation**	Business Person	42	11.90%
		Home Duties	185	52.60%
		Others	18	5.10%
		Service	63	17.90%
		Unemployed	44	12.50%
6	**Family Income per Month**	< ₹10,000	4	1.10%
		> ₹50,000	32	9.10%
		Dependant	1	0.30%
		Refused to answer	6	1.70%
		₹10,001 to ₹49,999	309	87.80%
7	**Systemic Disease**	No	73	20.70%
		Yes	279	79.30%
8	**Systemic Illness**	Asthma	1	0.30%
		BP, Other (Thyroid)	1	0.30%
		BP	26	7.40%
		BP, Asthma	1	0.30%
		BP, Diabetes	95	27.00%
		BP, Diabetes, Heart complaint	1	0.30%
		BP, Diabetes, Other (Thyroid)	2	0.60%
		Diabetes	145	41.20%
		Don't Know	5	1.40%
		Heart complaint	2	0.60%
		None	73	20.70%
9	**Spectacle Wear**	No	202	57.40%
		Yes	150	42.60%
10	**Other Eye Disease**	Cataract	33	9.40%
		Cataract, Glaucoma	1	0.30%
		Cataract, Diabetic Retinopathy	1	0.30%
		Diabetic Retinopathy	13	3.70%
		Glaucoma	1	0.30%
		None	282	80.10%
		Others (Exotropia)	8	2.30%
		Others (BRVO)	2	0.60%
		Others (Pseudophakia)	3	0.90%
		Others (Pterygium)	1	0.30%
		Others (Vitreous H'ge)	1	0.30%
		Others Vision Related	2	0.60%
		Refused to answer	4	1.10%
11	**Duration of Diabetes**	1-5 Years	53	15.10%
		11-15 Years	38	10.80%
		2-5 Years	29	8.20%
		6-10 Years	42	11.90%

Knowledge and practices concerning diabetes and eye health reveal that 58.4% believe diabetes is hereditary. Blood sugar monitoring habits vary, with 39.4% checking monthly. Awareness of diabetic retinopathy is low (19.9%), but most (70.8%) acknowledge that diabetes can affect the eyes. Awareness of dilated eye examinations is limited (33.8%), with 27.9% knowing about laser treatment for retinopathy. Most participants (92.6%) agree on the need for regular eye exams (Table 2 and Table 3).

Table 2: Diabetes and Eye Health Awareness

S.No	Category	Frequency	Valid Percent
1	**Belief in the Heredity of Diabetes**		
	Believe it is hereditary	130	58.40%
	Do not believe it is hereditary	31	13.90%
	Unsure	61	27.70%
	Total	222	100.00%
2	**Frequency of Blood Sugar Monitoring**		
	Daily	5	2.10%

	2-3 times a week	41	17.40%
	Once a week	55	23.30%
	Once a month	92	39.40%
	Every 2-3 months	13	5.50%
	Less frequently	9	3.80%
	Total	215	100.00%
3	**Awareness and Treatment**		
	Awareness of Hypertension		
	Unfamiliar	138	64.20%
	Some knowledge	71	33.00%
	Total	209	100.00%
4	Knowledge of Dilated Eye/Retina Examination		
	Aware	119	33.80%
	Not Aware	233	66.20%
	Total	352	100.00%
5	**Treatment Options for Diabetic Retinopathy**		
	Don't know	44	64.70%
	Laser treatment	19	27.90%
	Surgery	3	4.40%
	Laser & Surgery	1	1.50%
	Total	68	100.00%
6	Importance of Controlling Blood Pressure		
	Important	54	79.40%
	Not Important	1	1.50%
	Unsure	13	19.10%
	Total	68	100.00%

Table 3: Eye Care and Diabetes Management

S.No	Category	Frequency	Valid Percent
1	**Reasons for Visiting the Eye Doctor**		
	Experienced new eye problems	33	27.70%
	Diabetic; Monitor for retinopathy	25	21.00%
	Routine check	21	17.60%
	Doctor's suggestion	13	10.90%
	Preventive health	8	6.70%
	Other (Cataract)	6	5.00%
	Other (Vision Problem)	2	1.70%
	Total	119	100.00%
2	**Recent Visits to General Health Practitioners**		
	< 1 Month	55	15.60%
	1-12 Months	248	70.50%
	> 12 Months	8	2.30%
	Not Visited	28	8.00%
	Refused to Answer	2	0.60%
	Total	341	100.00%
3	**Treatment Methods for Diabetes Control**		
	Medicines only	87	36.90%
	Medicines & Controlled Diet	77	32.60%
	Medicines, Physical Exercise, Diet	24	10.20%
	Controlled Diet only	7	3.00%
	Physical Exercise only	1	0.40%
	Don't know	37	15.70%
	Total	236	100.00%
4	**Best Corrected Visual Acuity (BCVA)**		
	> 6/18	128	73.60%
	< 6/18	45	25.90%
	Total	173	100.00%
5	**Clinician Diagnosis of Vision Condition**		
	None	131	37.20%
	Could not be obtained	124	35.20%
	Cataract	27	7.70%
	Presbyopia	19	5.40%
	Pseudophakia	21	6.00%
	Diabetic Retinopathy	12	3.40%
	Total	352	100.00%

Comparing individuals with and without systemic illnesses, those with systemic conditions are more aware of diabetes being hereditary (Chi-Square = 33.082, $p < 0.001$) and have better knowledge of blood sugar monitoring frequency (Chi-Square = 72.966, $p < 0.001$). Awareness of hypertension is also higher among those with systemic illnesses (Chi-Square = 6.390, $p = 0.041$), but knowledge about its impact on diabetic complications is not significantly different (Chi-Square = 5.279, $p = 0.152$). The recognition of the impact of diabetes on eye health is significantly higher among individuals with systemic illnesses (Chi-Square = 29.324, $p < 0.001$), while treatment knowledge for diabetic retinopathy shows no significant difference (Chi-Square = 9.443, $p = 0.093$). Awareness of dilated eye examinations and their benefits is also higher among those with systemic illnesses (Chi-Square = 14.918, $p < 0.001$; Chi-Square = 23.474, $p = 0.000$) (Table 4 and Table 5).

Table 4: Knowledge of Diabetes and Related Health Conditions Among Individuals with and Without Systemic Illnesses

S.No	Knowledge Area	Systemic Illness: No	Systemic Illness: Yes	Total	Chi-Square Value	Asymp. Sig. (2-sided)
1	**Is diabetes hereditary?**					
	Don't know	11	53	64	33.082	0.00
	No	14	18	32		
	Yes	26	109	135		
2	**How often a person with diabetes should check blood sugar?**					
	2-3 times/week	5	36	41	72.966	0.00
	Don't know	5	1	6		
	Every day	1	4	5		
	Once a week	6	49	55		
	Once a month	20	73	93		
	Once in 2 months	1	8	9		
	Once in 3 months	11	2	13		
	Once every 2 weeks	0	10	10		
	Refused to answer	2	2	4		
3	**Do you know anything about hypertension?**					
	No	60	166	226	6.39	0.041
	Refused to answer	5	5	10		
	Yes	44	72	116		
4	**Can hypertension affect risk of diabetic complications?**					
	Don't know	12	17	29	5.279	0.152
	No	6	6	12		
	Yes	26	49	75		
5	**Have you heard of diabetic retinopathy?**					
	No	93	189	282	2.688	0.101
	Yes	16	54	70		

6	**If yes, what is the source of knowledge about diabetic retinopathy?**					
	Eye doctor	5	37	42	12.473	0.014
	General doctor	5	8	13		
	Other	2	0	2		
	Relatives	4	9	13		
7	**Can diabetes affect eyes?**					
	Don't know	15	54	69	29.324	0
	Yes	36	131	167		
8	**Can hypertension affect eyes?**					
	Don't know	18	30	48	5.938	0.115
	No	4	5	9		
	Yes	27	42	69		
9	**Is decrease in vision due to diabetes treatable?**					
	Don't know	29	135	164	33.619	0
	No	3	6	9		
	Yes	18	43	61		
10	**How frequently should a diabetic person go for an eye check-up?**					
	Once in six months	20	32	52	44.085	0
	Depends on eye conditions	12	90	102		
	Don't know	9	28	37		
	Once a month	0	1	1		
	Once a year	9	34	43		
	Once in two years	1	0	1		
11	**Have you heard of dilated eye/retina examinations?**					
	No	88	145	233	14.918	0
	Yes	21	98	119		
12	**If yes, what is the source of knowledge about dilated eye/retina examination?**					
	Eye doctor	17	86	103	16.054	0.001
	General doctor	0	2	2		
	Relatives	4	10	14		
13	**What is the treatment available for diabetic retinopathy?**					
	Don't know	12	32	44	9.443	0.093
	Good control of Diabetes	0	1	1		
	Laser treatment	1	18	19		
	Laser, Surgery	0	1	1		
	Surgery	2	1	3		

Table 5: Attitudes Towards Diabetes Management and Eye Care Among Individuals With and Without Systemic Illness

S.No	Attitude Area	Systemic Illness: No	Systemic Illness: Yes	Total	Chi-Square Value	Asymp. Sig. (2-sided)
1	Should a person with diabetes go for regular eye examinations?	Don't know	1	3	4	3.373
		Yes	14	49	63	
		Total	15	52	67	
2	Can a person with diabetes with control of their blood sugar avoid visiting an ophthalmologist?	Don't know	1	12	13	6.287
		No	3	17	20	
		Yes	11	24	35	
		Total	15	53	68	
3	Is it important for a person with diabetes to control blood pressure?	Don't know	1	12	13	4.988
		Yes	14	40	54	
		Total	15	52	67	
4	What are the benefits of getting a dilated eye/retina examination?	Don't know	6	9	15	23.474
		Monitor existing condition	9	22	31	
		Prevent eye disease	5	58	63	
		Prevent eye disease, Monitor existing condition	1	7	8	
		Refused to answer	0	2	2	
		Total	21	98	119	

Healthcare practices show that individuals with systemic illnesses visit general practitioners or endocrinologists more frequently ($p < 0.001$). Testing for diabetes is widespread, with significant differences in reasons for testing between groups ($p < 0.001$). Eye care practices are also more rigorous among those with systemic illnesses, who more frequently visit eye doctors and undergo dilated eye examinations ($p < 0.001$). The primary reasons for eye doctor visits include diabetes-related issues for those with systemic illnesses ($p < 0.001$). Diabetes management also shows differences, with systemic illness participants more likely to use medicines or a combination of treatments ($p < 0.001$) (Table 6).

Table 6: Practices and Healthcare Utilization Related to Diabetes and Eye Care Among Individuals with and Without Systemic Illness

S.No	Question	Systemic Illness: No	Systemic Illness: Yes	Total	Chi-Square Value	Asymp. Sig. (2-sided)
1	**How long ago did you visit a general health practitioner (or endocrinologist)?**					
	< 1 Month	7	48	55	72.794	0.00
	< 1 Month	2	3	5		
	> 12 Months	8	0	8		
	1-12 Months	63	185	248		
	1-12 Months	3	0	3		
	Doctor suggestion	2	1	3		
	Not Visited	22	6	28		
	Refused to answer	2	0	2		
2	**Have you been tested for diabetes?**					
	No	50	12	62	86.884	0.00
	Yes	59	231	290		
3	**If yes, why did you decide to get tested?**					
	Doctor suggestion	42	161	203	95.856	0.00
	Experienced symptoms	0	6	6		
	Family History	2	4	6		
	Frequent urinations	0	1	1		
	Leg pain	0	1	1		

	Not applicable	50	12	62		
	Preventive Health	2	32	34		
	Routine checkup	13	25	38		
	Vision problem	0	1	1		
4	**How long ago did you visit the eye doctor?**					
	< 1 Month	3	14	17	101.888	0.00
	> 12 Months	4	28	32		
	> 12 Months	7	4	11		
	1-12 Months	28	78	106		
	Not applicable	50	12	62		
	Not remember	17	107	124		
5	**Did you have a dilated eye/retina examination?**					
	NA	88	145	233	28.134	0.00
	No	11	11	22		
	Yes	10	87	97		
6	**If yes, how long ago did you have a dilated eye/ retina examination?**					
	< 1 Month	0	9	9	25.35	0.00
	> 12 Months	0	6	6		
	1-12 Months	10	68	78		
	NA	88	145	233		
	Not remember	11	15	26		
7	**Why did you decide to visit the eye doctor?**					
	Diabetic; Monitor for retinopathy	0	25	25	37.761	0.00
	Doctor suggestion	2	11	13		
	Experienced new eye problems	6	27	33		
	Headache	1	0	1		
	NA	88	145	233		
	Near Vision problem	3	0	3		
	None	0	2	2		
	Other (Cataract)	0	6	6		
	Other (Vision Problem)	0	2	2		
	Preventive health	4	4	8		
	Refused to answer	0	5	5		
	Routine check	5	16	21		
8	**What are the treatment methods that you follow to control diabetes?**					
	Controlled Diet	3	4	7	125.424	0.00
	Don't Know	31	6	37		
	Medicines	9	78	87		
	Medicines & Controlled Diet	0	77	77		
	Medicines, Physical exercise, Controlled diet	5	19	24		
	NA	58	58	116		
	Physical exercise	1	0	1		
	Physical exercise, Controlled Diet	2	1	3		

3.2 Disscussion

The results of our study offer a detailed perspective on the knowledge, attitudes, and practices concerning diabetes among individuals with and without systemic illnesses. These findings indicate that individuals with existing systemic conditions, such as diabetes and hypertension, generally exhibit better awareness and more effective practices related to diabetes management compared to those without such conditions. This trend is notably consistent with the findings of Bhatia et al., who reported a hypertension prevalence of 45% among adults aged 45 and older in India [7]. Their study highlighted significant disparities in the diagnosis and treatment of hypertension, particularly noting that states with higher poverty levels showed poorer diagnostic and treatment outcomes, which is consistent with our observation of variable healthcare engagement among different demographic groups.

Furthermore, this study aligns with Thakur and Nangia's research, which documented low rates of awareness, treatment, and control for hypertension and diabetes in Punjab and Haryana [8]. They reported hypertension awareness, treatment, and control rates as low as 48%, 31%, and 18%, respectively, in Punjab, and even lower in Haryana. This underscores a broader issue reflected in our results: despite having systemic illnesses, many individuals still lack comprehensive knowledge and effective management practices.

Our findings also resonate with Sreedevi *et al.'s* study, which highlighted the necessity for stringent hypertension control measures among diabetes patients in Kerala [9]. The high rates of inadequate blood pressure control among diabetes patients in our study underscore the critical need for improved screening and management strategies, reinforcing the need for targeted interventions to address these gaps. Moreover, these results reflect Cao *et al.'s* observations that psychosocial factors and better engagement with health services significantly impact hypertension management in Kerala [10]. The better health practices observed in individuals with systemic conditions in our study suggest that improved healthcare engagement, as noted by Cao *et al.,* is vital for enhancing diabetes management and control.

The effectiveness of educational and support interventions, as demonstrated by Rahul *et al.*, with their modular-based training for diabetes management [11], and the success of mobile phone-based decision support systems in improving hypertension and diabetes control,

further supports the need for scalable and effective interventions. These findings emphasize that, despite some progress, the control rates for diabetes and hypertension remain suboptimal, necessitating broader implementation of successful interventions.

In comparing this findings with those of Venugopal *et al.,* (2020), who conducted a hospital-based cross-sectional study on diabetic retinopathy (DR) awareness and knowledge in Goa, several similarities and differences emerge [12]. Venugopal *et al,*, found that education level significantly influenced DR knowledge, consistent with our results presented in Table 2, which shows an association between DR knowledge and education. However, our study found that attitude patterns were not significantly associated with DR knowledge or the presence of diabetes, contrasting with Venugopal *et al.'s* findings that suggested varying attitudes might be influenced by different levels of knowledge. Moreover, while our study revealed a strong association between practice patterns and DR knowledge (OR = 7.47; 95% CI: 4.51–12.38, P < 0.001), similar to the significant associations reported by Venugopal et al., we found no association with diabetes presence, which was less clear in their results. Both studies found no significant links between DR KAP and demographic factors such as age, gender, and socioeconomic status, aligning with Venugopal *et al.'s* observations.

Comparing our study with Singh *et al.,* (2022), both highlight similar gaps in diabetic retinopathy (DR) awareness and screening practices. [13] Singh et al. found that 58.1% of participants knew that strict glucose control could prevent DR, and 52.6% were aware of its treatment, consistent with our findings. Both studies revealed low awareness of recommended screening frequencies and sources of information, primarily from healthcare providers. Singh et al. identified significant associations between DR awareness and factors like gender, diabetes duration, and residence, which aligns with our observations. They also noted that only 26.5% of participants had undergone DR screening, reflecting our findings of low screening rates. Both studies underscore the urgent need for enhanced education and regular screening to improve DR awareness and management.

Studies have shown that mobile phone-based reminder systems can significantly improve follow-up adherence and self-monitoring among patients with diabetes and hypertension [11]. Additionally, modular training programs aimed at enhancing diabetes self-management skills have demonstrated effectiveness in improving patient outcomes in resource-constrained settings [10]. Integrating diabetic retinopathy screening within broader non-communicable disease (NCD) programs-especially through task-sharing with community health workers-offers a practical and cost-effective model for early detection and prevention. These interventions, when appropriately adapted, have the potential to strengthen primary care systems and improve the overall control of diabetes-related complications.

4. CONCLUSION

In summary, our study highlights significant gaps in diabetes and hypertension management, consistent with existing research. It underscores the need for comprehensive strategies that include improved public education, enhanced healthcare access, and effective disease management interventions. Addressing these needs is crucial for mitigating the burden of diabetes and hypertension and improving health outcomes across diverse populations.

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Conflict of Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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Ethical Information

We haven't perform any Invasive tests in our research work. We have fulfilled the guideline of Helsinki.

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