Original Research Article

ASSESSMENT OF DIABETIC LITERACY AND PERCEIVED GAPS IN HEALTHCARE PROVISION AMONG TYPE 2 DIABETES NEPHROPATHY PATIENTS: A MIXED METHOD STUDY IN A TERTIARY CARE CENTER IN BANGALORE

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Abstract

Background: Patients with Type 2 diabetes and nephropathy receive care from medical professionals of different specialties. Diabetes literacy and patient-reported gaps in healthcare coordination are poorly understood. Our study aimed to assess diabetic health literacy and perceived gaps in clinical health care among adult diabetic nephropathy patients in a tertiary care center in Bangalore. **Materials and Methods:** This mixed-method cross-sectional study was conducted among 156 diabetic nephropathy patients (eGFR < 60 mL/min/1.73 m2) admitted to the Nephrology Department of Bangalore Medical College and Research Institute from March to October 2021. Face-to-face interviews using a pre-tested questionnaire were used to gather data. Data was analyzed using IBM SPSS (Statistical Package for Social Sciences) V.21.0 and interpreted in frequencies, percentages, mean, and chi-square. A p-value < 0.05 was considered statistically significant. **Result:** Out of 156, around 78.85% were females. Only 37.18% of patients had good knowledge. Around 86.54% of patients were being treated by a general practitioner. Only 12.18%, 1.92%, 1.28%, and 1.92% of diabetics underwent periodic foot, retinal, cardiac, and renal examinations by specialists respectively. **Conclusion:** The overall diabetic literacy was low. There was a significant gap at all levels of health care. This highlights the need for repeated reinforcement of awareness programs.

INTRODUCTION

Patients with diabetes, although now have longer lifespans than in the past due to improved treatments, are plagued by other medical complications.[1] To treat, manage, and prevent chronic illnesses like diabetes, people and communities must have relevant knowledge.[2-8] Diabetic health literacy refers to the extent to which individuals with diabetes possess the required competencies to acquire, comprehend, evaluate, convey, and list diabetes-related information in both daily life and healthcare environments to treat and self-manage their health condition.[9] Patients' lifestyles can be significantly improved with proper education and guidance on diabetes care, which may help them achieve the desired health outcomes. It can also reduce the economic burden on patients.[3] Diabetes being a multi-morbid condition, chronic kidney disease is a common comorbidity that affects 25% to 50% of patients with diabetes.[10] The Chennai study showed that the prevalence of overt nephropathy was 2.2 percent in Indians while microalbuminuria was present in 26.9 percent.[11] Diabetic nephropathy can be prevented with early diagnosis and appropriate clinical care.[12] A diabetic may face many challenges along the way, which could result in less-than-optimal outcomes and treatment. It is imperative to comprehend the healthcare struggles and needs of these individuals at every level before devising patient-centered strategies to provide support. No

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such study had been conducted to evaluate the patients' diabetic knowledge and fundamental care gaps in our population. Our study aimed to assess diabetic health literacy and perceived gaps in clinical health care among adult type 2 diabetes nephropathy patients admitted to a tertiary care hospital in Bangalore.

MATERIALS AND METHODS

Study Design: A hospital-based cross-sectional study.

Study Setting: The study was carried out by the Department of Community Medicine, Bangalore Medical College and Research Institute.

Study Period: The study was conducted from March to October 2021.

Sample Size Estimation: Taking p= 61.7% as the prevalence of knowledge regarding diabetes in our pilot study, considering an 80% confidence interval and 5% allowable error, the sample size calculated was 156. The non-probability sampling technique was applied to collect the eligible study participants. Written informed consent was taken and the purpose of the study was briefed to the participants.

Inclusion Criteria

Adult Type 2 diabetes patients with diagnosed nephropathy (eGFR < 60 mL/min/1.73 m2),[13] aged 18 years and above, admitted to the Department of Nephrology of Bangalore Medical College and Research Institute, who were available during the study period and consented to participate were included.

Exclusion Criteria

Severely ill patients, patients with cognitive impairments, and gestational diabetes mellitus patients were excluded.

Data Collection Tool: A pre-tested and semi-structured questionnaire, based on reviews of relevant literature and a study by Deepa M et al,[14] was used to collect data. Part I consisted of questions on sociodemographic variables. Part II was a structured knowledge questionnaire to assess diabetic health literacy (General information on diabetes, healthy and unhealthy behavior, and acute and chronic complications). The scores ranged from 0 to 8. The scoring system used to categorize the knowledge levels: low knowledge was assigned a score of less than two (i.e., less than Mean - 1 SD), average knowledge was assigned a score of two to six (i.e., Mean ±1 SD), and high knowledge was assigned a score of more than six (i.e., greater than Mean + 1 SD). Participants who reported missing more than two doses of oral hypoglycemic medicine in the previous 15 days were deemed non-compliant in pharmacological compliance, which was self-reported.[15] The perceived gaps in health care delivery were recorded as open-ended questions.

Statistical Methods: Data was analyzed using IBM SPSS (Statistical Package for Social Sciences) V.21.0 and interpreted in frequencies, percentages, mean, and chi-square. A p-value < 0.05 was considered statistically significant.

Ethical considerations: Institutional Ethical clearance (Ethical Approval Number: BMCRI/PG/131/2020-21, Bangalore Medical College and Research Institute Ethics Committee) was taken before commencing the study. The study was conducted as per the Helsinki Declaration and with informed consent from patients.

RESULTS

Out of 156 participants, 57.69% (90) were females and 42.31% (66) were males. The mean age of the participants was 58.10 + 7.29 years. Most of the participants, 41.67% (65) were more than 60 years of age. Around 43.59% (68) belonged to a nuclear family, 50.64% (79) were literate, and 44.87% (70) belonged to class V of the modified Kuppuswamy socioeconomic scale.[16] The sociodemographic details have been outlined in Table 1. The majority, i.e., 67.31% (105) were diagnosed as diabetic incidentally, 50% (78) had been diabetic for more than 10 years, and 23.07% (36) had a family history of diabetes mellitus. The diabetic profile of the participants is outlined in Table 2. The mean knowledge score was 4.33 ± 2.79. Around 80.77% (126) of participants knew about a condition called diabetes. Only 35.26% (55) knew about complications, while only 17.95% (28) knew about the basic rules of foot care. The responses regarding the different aspects of diabetes have been outlined in Table 3. Around 39.69% (62) took over-the-counter medication without any prescription. Only 37.18% (58) participants had good knowledge, 15.38% (24) had moderate knowledge, and 47.44% (74) had poor knowledge. Around 65.38% (102) of participants had poor pharmacological compliance. The diabetes knowledge was good among the male gender, age group 51-60 years, in a joint family, among literates, among employed, those who had diabetes for more than ten years, those with other comorbidities, and those who had good pharmacological compliance and the association was statistically significant. Table 4 shows the association between knowledge regarding diabetes with different sociodemographic and clinical variables. The majority of the participants, i.e., 96.15% (150) had regular health check-ups for ≤ 2 per year, and 86.54% (135) were being treated by general practitioners. Only 12.18%, 1.92%, 1.28%, and 1.92% of diabetes patients underwent periodic foot, retinal, cardiac, and renal examinations by specialists respectively, as shown in Figure 1. The commonly perceived gaps in clinical healthcare according to the participants were inadequate awareness about kidney disease (150), increased out-of-pocket expenditure (140), inadequate continuity of treatment (140), inadequate time spent by specialists with the patients (138), and difficulty juggling hospital visits with personal life (95). Figure 1 depicts

the reasons provided by the participants as the gaps perceived by them in receiving clinical care.

Table 1: Distribution of study participants according to sociodemographic variables

Sociodemographic variables		Frequency (n=156)	Percentage
Age	41- 50	31	19.87
	51-60	60	38.46
	>60	65	41.67
Gender	Male	66	42.31
	Female	90	57.69
Type of family	Nuclear	68	43.59
	Joint	44	28.21
	Three- Generation family	44	28.21
Religion	Hindu	123	78.85
	Christian	8	5.13
	Muslim	25	16.03
Educational status	Literate	79	50.64
	Illiterate	77	49.36
Occupational status	Employed	48	30.77
	Unemployed	108	69.23
Socio-economic Status	Class V	70	44.87
	Class IV	59	37.82
	Class III	27	17.31

Table 2: Distribution of study participants according to diabetic profile

Variables		Frequency (n=156)	Percentage
Diabetic diagnosis	Government	70	44.87
	Private	86	55.13
Diagnosed when?	Routine check-up	3	1.92
	Presented with symptoms	43	27.56
	Incidental	105	67.31
	As a part of a health camp	5	3.21
Duration of diabetes	1-5 years	36	23.08
	5-10 years	42	26.92
	>10 years	78	50.00
Practiced alternative system of medicine	Yes	33	21.15
	No	123	78.85
Treatment	Oral drugs	91	58.33
	Insulin	14	8.97
	Both	51	32.69
Comorbidities	HTN	51	32.69
	CVD	11	7.05
	Stroke	2	1.28

Table 3: Distribution of study participants according to knowledge areas

Knowledge on diabetes	Correct answer Number (%)	Incorrect answer Number (%)
Knew about a condition called Diabetes	126 (80.77)	30 (19.23)
Risk factors of Diabetes	20 (12.82)	136 (87.18)
Knowledge on complications	55 (35.26)	101 (64.74)
Basic rules of foot care	28 (17.95)	128 (82.05)
Principles of dietary management and exercise	117 (75)	39 (25)
Effect of unhealthy habits (smoking, alcohol, others)	101 (64.74)	55 (35.26)

Table 4: Association between knowledge regarding diabetes and sociodemographic and clinical variables

Variable		Knowledge regarding diabetes (n=156) N (%)			χ 2 (p-value)
		Poor	Moderate	Good	
Age	41- 50	18 (58.06)	03 (9.68)	10 (32.26)	24.39 (0.00006)
	51-60	20 (33.33)	20 (33.33)	20 (33.33)	
	>60	48 (73.85)	10 (15.38)	07 (10.77)	
Gender	Male	10 (15.15)	08 (12.12)	48 (72.73)	64.81 (< 0.00001)
	Female	64 (71.11)	16 (17.78)	10 (11.11)	
Type of family	Nuclear	30 (44.12)	25 (36.76)	13 (19.12)	17.49 (0.0015)
	Joint	13 (29.54)	11 (25.0)	20 (45.45)	
	Three- Generation family	06 (13.64)	20 (45.45)	18 (40.91)	
Educational status	Literate	10 (12.66)	26 (32.91)	43 (54.43)	21.43 (0.00002)
	Illiterate	35 (45.45)	20 (25.97)	22 (28.58)	
Occupational status	Employed	10 (20.84)	13 (27.08)	25 (52.08)	31.90 (< 0.0001)
	Unemployed	75 (69.44)	13 (12.04)	20 (18.52)	
Duration of diabetes	1-5 years	22 (61.11)	04 (11.11)	10 (27.78)	32.13 (< 0.0001)
	5-10 years	18 (42.86)	09 (21.43)	15 (35.71)	

	>10 years	10 (12.82)	14 (17.95)	54 (69.23)	
Comorbidities	Present	16 (25.0)	18 (28.13)	30 (46.87)	24.19
	Absent	25 (27.17)	55 (59.78)	12 (13.05)	(< 0.0001)
Pharmacological compliance	Poor	88 (86.27)	10 (9.81)	04 (3.92)	70.21
	Good	11 (20.37)	16 (29.63)	27 (50.0)	(< 0.0001)
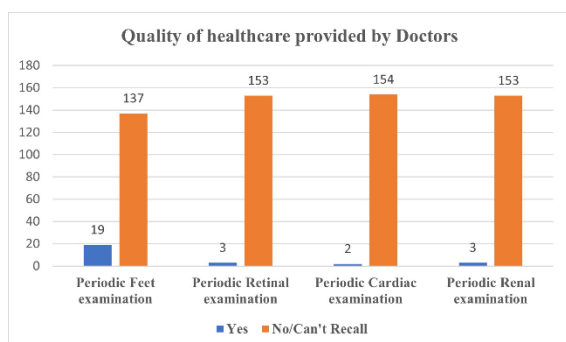
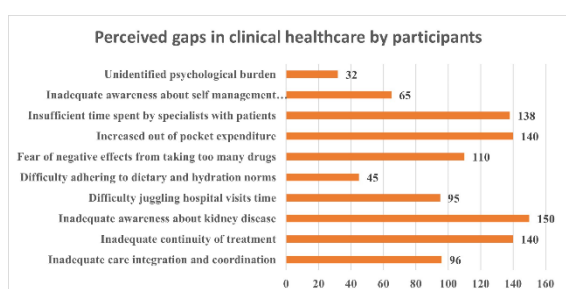**Figure 1: Quality of healthcare provided by doctors**

Figure 2: Perceived gaps in clinical healthcare by participants

DISCUSSION

This study was carried out among adult type 2 diabetes patients with nephropathy admitted to the Department of Nephrology, Bangalore Medical College and Research Institute. Our study had 57.69% females. The mean age of the participants was 58.10 + 7.29 years. Most of the participants, 41.67% were more than 60 years of age, 50.64% were literate, and 50% (78) had been diabetic for more than 10 years. A study by Lo C et al also reported similar findings with the mean age of participants as 66.9 ± 11 years with a male preponderance (69.5%).[17] Another study by Santhanakrishnan I et al reported a female preponderance (80%) with 47.4% literates, which was consistent with our study.[15] The mean knowledge score was 4.33 ± 2.79. Around 80.77% (126) of participants knew about a condition called diabetes. Only 35.26% (55) knew about complications, while only 17.95% (28) knew about the basic rules of foot care. Better findings were reported by Saleh F et al in Bangladesh where the mean knowledge score was 15.29 ± 3.6 and the majority of patients (81%) understood the definition of diabetes mellitus, but 81% were ignorant of the fundamentals of foot care, and 98% were not aware of the risk factors.[18] Comparing our study's knowledge data on the aforementioned topics to those from previous research, we found significantly fewer or nearly identical results.[8,19] It is common knowledge that diabetic foot complications can arise from patients' neglecting their feet. People with type 2 diabetes are known to have the condition typically in their middle age. As the disease progresses, blood glucose levels rise, and patients may become dissatisfied with the recommended course of action for treatment and lifestyle changes. In our study, 37.18%, 15.38%, and 47.44% of participants had good, moderate, and poor knowledge of diabetes respectively. This knowledge score was found to be significantly associated with the male gender, age group 51-60 years, those residing in a joint family, among literates, among employed, those who had diabetes for more than ten years, those with other comorbidities, and those who had good pharmacological compliance. Chavan et al reported only 9.4% of participants had good knowledge of diabetes with a significant association with gender. Age group, marital status, and education were however not associated with knowledge.[20] The questionnaires used in the two studies differed, though, and this might account for the variations in the observations. Tamil Nadu had the highest composite knowledge score among the population under study, while Jharkhand had the lowest in a study by Deepa M et al.[14] The study findings highlight the need for improved education initiatives even for those with diabetes who were still grossly unaware of the complications. The commonly perceived gaps in clinical healthcare according to the participants were inadequate awareness about kidney disease, increased out-of-pocket expenditure, inadequate continuity of treatment, inadequate time spent by specialists with the patients, and difficulty juggling hospital visits with personal life. A study by Beaubien-Souligny W also reported delay in diagnosis, sub-optimal glycemic control, and delay in timely access to care as the perceived barriers to optimal clinical care among diabetic nephropathy patients in Canada.[21] Another study by Lo C among diabetes nephropathy patients identified inadequate education about chronic kidney disease, inadequate continuity of treatment, incoherent advice from experts and inadequate coordination between them, and lack of social support as some of the barriers in healthcare provision.[17] Further wide-scale research is required to establish causal associations and delve deeper into the identified pitfalls of healthcare provision.

Limitation: The cross-sectional study design limits our ability to establish causal associations, and it also prevents us from taking the impact of patient care individualization into account. The qualitative aspect was limited to open-ended questions due to time and resource constraints and needs a further robust approach.

CONCLUSION

The overall diabetic literacy was low among our study population. The qualitative aspect explored the perceived barriers to receiving optimum care in patients with multi-morbidity from diabetes and chronic kidney disease. Patients are ultimately in charge of managing their condition, and the primary responsibilities of health professionals are that of a supporter and educator. Reinforcement of health education, strong motivation, and a target-oriented customized approach is warranted to address this problem.

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