

Knowledge of Diabetic Patients about their Disease Status at Selected Sub-metropolitan of Nepal

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Abstract

Aims: Diabetes is a metabolic disorder, the effective management of which requires not only medication use but also patient diabetes knowledge for adopting necessary daily lifestyle changes. Those with better knowledge of diabetes management are expected to maintain well glycemic control. The aim of the study is to identify the extent of diabetes-related knowledge among people living with Type 2 diabetes mellitus.

Study design: Descriptive cross-sectional comparative study.

Place and Duration of Study: The study was carried out under the supervision of OPJS University and a field study was carried out in selected sub-metropolitan cities of Nepal from September 2019 to June 2020.

Methodology: A simple random sampling technique was used comprising a structured questionnaire to examine the knowledge and practices of diabetes among 415 participants. This study reports the psychometric properties of the 24-items version of the Diabetes Knowledge Questionnaire which was already validated and used by the various researchers. However, to provide content validity, the draft form of the items will be again examined by one specialist in the subject. Descriptive statistics along with inferential statistics were calculated and a $p < 0.05$ was considered significant for data analysis.

Results: More than half 222(53.5%) of the male participants have poor glycemic control and 14% of them were obese. The results of the present study revealed that there was a significant relationship between the Diabetes Knowledge Questionnaire and basic information, glycemic control and prevention of complications.

Conclusions: Based on the findings, the study concluded that there are many barriers to achieving glycemic control, the most significant barrier was found to be inadequate knowledge and understanding about diabetes mellitus among people with type 2 diabetes mellitus.

Keywords: Diabetic Patients; Disease Status; Knowledge; Sub-metropolitan

1. Main text

INTRODUCTION

Type 2 diabetes is a metabolic disorder. In order to manage it effectively, along with the use of medication, it also requires active patient awareness with appropriate life-style modifications.(1,2). The major problem with diabetes is that if it is poorly controlled it leads to increase in complications associated with diabetes.(3) Diabetes increases the risk of various microvascular and macrovascular diseases such as stroke, coronary artery disease, kidney failure, blindness, and foot amputation(4,5) leading to an increased morbidity and mortality. However, diabetes and its complications can be controlled and prevented by properly balanced diet and effective life style management.(6,7) There is evidence that good glycemic control may prevent diabetes-related complications.(8)

Diabetes treated for lifetime thus charge associated with diabetes and its associated complications imposes an extensive financial burden on the cost of care (9) for an individual (10), society (7,11,12) and the healthcare system.(13) Poor diabetes knowledge has a negative impact on self-care behavior.(14–16) Though health education of diabetic patients has an effective role in the proper management of diabetes, there is a shortage of well trained personnel in Nepal to provide appropriate education about diabetes mellitus and its associated co-morbidities and complications.(1,17) A formal assessment of knowledge about diabetes mellitus and its management of a diabetic patients is a prerequisite. Thus, aim of our study was to assess diabetes knowledge using diabetes knowledge questionnaire (DKQ)(18) among Type 2 diabetes patients.

MATERIAL AND METHODS

A cross-sectional study was conducted in a diabetic people of sub metro politician city of Nepal from September 2019 to June 2020. The study subjects were patients previously diagnosed with Type 2 diabetes mellitus (T2DM). The sample size calculation for this study is based on the previous study where the prevalence of type 2 diabetes mellitus was 43%. The formula used for calculation was, $n = z^2 \times [p(1-p)]/d^2$ with confidence interval of 95% and 5% precision level. With $z=1.96$ and $d=.05$ the total number of required participants was 377. Considering a 10% non-response rate estimated final sample size was 415 participants. This study was approved by the ethics and research committee of the OPJS University, Ranchi, India. We did the site mapping of sub metro politician city which includes ward's numbers and total population. Then, we did a site mapping of healthcare facility including a number of health facilities in each sub metro politician city (hospital, primary health center, health post, urban health center, primary health care outreach center), a health worker in each centers populations taking services in that health center, Equipment assessment in that health center, authorized person to diagnosed, number of T2DM cases with male and female

including their age, medicine availability of T2DM cases and follow up.

The inclusion criteria were as follows: individuals 30 years of age or more, diagnosed with type 2 T2DM, who were currently using insulin, oral hypoglycemic agents or diet, understood the questions on the DKQ-24 questionnaire and signed the written informed consent. The DKQ-24 is a valid and reliable instrument that evaluates the knowledge related to T2DM. It has an alpha Cronbach of 0.78, is relatively easy to administer, and is validated in the Nepali population. The aspects to evaluate include basic information (10 items) glycemic control (7 items) and the prevention of complications (7 items). It has three response options (yes, no, I don't know).

As proposed by the author of validation for Nepali, the questionnaire was coded in the right answers (1), wrong (0) and do not know (2). Subsequently, and for the presentation and analysis of the results of the sample, modified in a dichotomous scale (1 and 0) to distinguish between the presence of knowledge and presence of unknowns and misconceptions, being transformed into one of the answers that match the right answer for the desired variable (e.g. knowledge: right answer = 1) and the rest to 0 (for wrong answers or ignorance).

American Diabetes Association (ADA) guideline was used to define glycemic control in this study. Patients with values of HbA1c < 7% were classified as "good glycemic control", whereas those with HbA1c ≥ 7% were classified as "poor glycemic control". Cronbach's alpha for the knowledge score was 0.933 in 24 scales of DKQ-24. Statistical tests were considered significant at $p < 0.05$. A cutoff point of 7 was considered "sufficient knowledge" by researcher consensus. Data were entered using the Epi data 3.02 version (www.epidata.dk). Data analysis was done by studying and coding the responses from the questionnaires. The range and consistency check was made to ensure accuracy, and Statistical Analysis Data were analyzed by Statistical Package for Social Science (SPSS 24.0. Inc., Chicago, IL, USA). Demographic and clinical variables were presented by using descriptive statistics. Data distribution was analyzed by the principal component analysis (PCA) to compare groups with non-normal distribution. Patients with values of HbA1c < 0.05. The ethical approval was taken from ethical committee of OPJS university, India.

RESULTS

Knowledge Assessment

More than half 222(53.5%) of the male participants were poor glycemic control followed by 139(33.5%) of female participants. The 58(14%) of the male participants BMI were obese followed by 37(8.9%). (Table 1)

Table 1. Sociodemographic distribution of participants (N=415)

Variables	Male		Female	
	*F	*P	*F	*P
Religion				
Hindu	190	45.8	142	34.2
Buddhist	26	6.3	20	4.8
Christian	9	2.2	2	0.5
Muslim	6	1.4	4	1.0
No religion	7	1.7	9	2.2
Ethnic background				
Dalit	16	3.9	16	3.9
Disadvantage Janatatis	27	6.5	21	5.1
Disadvantaged non-dalit Terai group (except Terai Brahmin)	21	5.1	11	2.7
Religious minorities	10	2.4	6	1.4
Advantaged Janajatis	86	20.7	65	15.7
Upper Caste	78	18.8	58	14.0
Highest level of education				
Informal education	47	11.3	34	8.2
No schooling	24	5.8	12	2.9
Primary (grade 1-5)	41	9.9	16	3.9
Lower secondary (grade 6-8)	73	17.6	64	15.4
Secondary (grade 9-10)	14	3.4	13	3.1
Higher secondary (grade 11-12)	25	6.0	29	7.0
Graduate and above (Bachelors and above)	14	3.4	9	2.2
Marital status				
Unmarried/ Never married	31	7.5	18	4.3
Married	155	37.3	111	26.7
Widowed	19	4.6	15	3.6
Divorced	7	1.7	10	2.4
Separated	16	3.9	17	4.1
De-facto/ cohabitating	10	2.4	6	1.4
Occupation				
Salaried job	31	7.5	12	2.9
Business	75	18.1	48	11.6
Wage-based labour	19	4.6	20	4.8
Small-informal business	33	8.0	35	8.4
Agricultural work	35	8.4	23	5.5
Housewife/househusband	8	1.9	13	3.1

Variables	Male		Female	
Student	5	1.2	5	1.2
Retired	26	6.3	19	4.6
Others	6	1.4	2	0.5
BMI				
Underweight (<18.5)	5	1.2	4	1.0
Normal (18.5–<25)	76	18.3	65	15.7
Overweight (25–<30)	99	23.9	71	17.1
Obese	58	14.0	37	8.9
HbA1C				
HbA1c<7% were classified as “good glycemic control”	16	3.9	38	9.2
HbA1c>7% were classified as “poor glycemic control”	222	53.5	139	33.5

*F=Frequency; *P=Percentage

The mean knowledge score was 12.97. Cronbach's alpha for the knowledge score was 0.930 in 24 scales of DKQ-24. (Table 2).

Table 2. Reliability test

Scales	Cronbach's alpha
Eating too much sugar and other sweet foods is a cause of diabetes.	0.932
The usual cause of diabetes is lack of effective insulin in the body.	0.932
Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	0.931
Kidneys produce insulin.	0.934
In untreated diabetes, the amount of sugar in the blood usually increases.	0.931
If I am diabetic, my children have a higher chance of being diabetic.	0.929
Diabetes can be cured.	0.939
A fasting blood sugar level of 210 is too high.	0.932
The best way to check my diabetes is by testing my urine.	0.929
Regular exercise will increase the need for insulin or other diabetic medication.	0.929
There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).	0.929
An insulin reaction is caused by too much food.	0.928

Scales	Cronbach's alpha
Medication is more important than diet and exercise to control my diabetes.	0.928
Diabetes often causes poor circulation.	0.927
Cuts and abrasions on diabetics heal more slowly	0.927
Diabetics should take extra care when cutting their toenails.	0.927
A person with diabetes should cleanse a cut with iodine and alcohol.	0.927
The way I prepare my food is as important as the foods I eat.	0.927
Diabetes can damage my kidneys.	0.928
Diabetes can cause loss of feeling in my hands, fingers, and feet.	0.929
Shaking and sweating are signs of high blood sugar.	0.931
Frequent urination and thirst are signs of low blood sugar.	0.930
Tight elastic hose or socks are not bad for diabetics.	0.929
A diabetic diet consists mostly of special foods.	0.930

After testing the reliability, 13 scale Cronbach's Alpha value 0.930 were found. In fact, 33% had 'good knowledge', 33% had 'fair knowledge', and 67% had 'poor knowledge'. Percentages of correct answers to questions on DKQ-24 are shown in Table 3.

Table 3. Diabetes Knowledge questionnaire (DKQ)

DKQ	Correct answer		Wrong answer		Don't know	
	F	P	F	P	F	P
Basic information						
Eating too much sugar and other sweet foods is a cause of diabetes.	225	54.2	167	40.2	23	5.5
The usual cause of diabetes is lack of effective insulin in the body.	230	55.4	141	34.0	44	10.6
Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	222	53.5	145	34.9	48	11.6
Kidneys produce insulin.	151	36.4	203	48.9	61	14.7
In untreated diabetes, the amount of sugar in the blood usually increases.	200	48.2	181	43.6	34	8.2
If I am diabetic, my children have a higher chance of being diabetic.	128	30.8	256	61.7	31	7.5
Diabetes can be cured.	213	51.3	99	23.9	103	24.8
A fasting blood sugar level of 210 is too high.	178	42.9	216	52.0	21	5.1
The best way to check my diabetes is by testing my urine.	268	64.6	112	27.0	35	8.4
Regular exercise will increase the need for insulin or other diabetic medication.	199	48.0	146	35.2	70	16.9

DKQ	Correct answer		Wrong answer		Don't know	
There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).	210	50.6	164	39.5	41	9.9
Glycemic control						
An insulin reaction is caused by too much food.	176	42.4	179	43.1	60	14.5
Medication is more important than diet and exercise to control my diabetes.	324	78.1	41	9.9	50	12.0
Diabetes often causes poor circulation.	30	7.2	314	75.7	71	17.1
Cuts and abrasions on diabetics heal more slowly	79	19.0	257	61.9	79	19.0
Diabetics should take extra care when cutting their toenails.	117	28.2	200	48.2	98	23.6
A person with diabetes should cleanse a cut with iodine and alcohol.	204	49.2	117	28.2	94	22.7
Prevention of complications						
The way I prepare my food is as important as the foods I eat.	117	28.2	214	51.6	84	20.2
Diabetes can damage my kidneys.	130	31.3	197	47.5	88	21.2
Diabetes can cause loss of feeling in my hands, fingers, and feet.	80	19.3	262	63.1	73	17.6
Shaking and sweating are signs of high blood sugar.	289	69.6	62	14.9	64	15.4
Frequent urination and thirst are signs of low blood sugar.	288	69.4	73	17.6	54	13.0
Tight elastic hose or socks are not bad for diabetics.	294	70.8	78	18.8	43	10.4
A diabetic diet consists mostly of special foods.	294	70.8	90	21.7	31	7.5

The Kaiser-Meyer-Olkin Measure of sampling adequacy test shows the significant association p-value (<0.001) and the Kaiser-Meyer-Olkin value 0.896. The three PCA component are basic information, glycemic control and prevention of complications (Table 4)

Table 4. Principal Component Analysis (PCA) on the component of DKQ

SN	PCA on the component of DKQ	Component values
Basic information		
1	Eating too much sugar and other sweet foods is a cause of diabetes.	0.643
2	The usual cause of diabetes is lack of effective insulin in the body.	0.682
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	0.781

SN	PCA on the component of DKQ	Component values
4	Kidneys produce insulin.	0.682
5	In untreated diabetes, the amount of sugar in the blood usually increases.	0.859
6	If I am diabetic, my children have a higher chance of being diabetic.	0.883
7	Diabetes can be cured.	0.864
8	A fasting blood sugar level of 210 is too high.	0.847
9	The best way to check my diabetes is by testing my urine.	0.801
10	Regular exercise will increase the need for insulin or other diabetic medication.	0.818
Glycemic control		
1	There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).	0.846
2	An insulin reaction is caused by too much food.	0.749
3	Medication is more important than diet and exercise to control my diabetes.	0.825
4	Diabetes often causes poor circulation.	0.872
5	Cuts and abrasions on diabetics heal more slowly	0.917
6	Diabetics should take extra care when cutting their toenails.	0.973
7	A person with diabetes should cleanse a cut with iodine and alcohol.	0.973
Prevention of complications		
1	The way I prepare my food is as important as the foods I eat.	0.973
2	Diabetes can damage my kidneys.	0.947
3	Diabetes can cause loss of feeling in my hands, fingers, and feet.	0.839
4	Shaking and sweating are signs of high blood sugar.	0.909
5	Frequent urination and thirst are signs of low blood sugar.	0.951
6	Tight elastic hose or socks are not bad for diabetics.	0.979
7	A diabetic diet consists mostly of special foods.	0.885

The principal component analysis (PCA) value shows the significant association $p < 0.001$. (Table 5)

Table 5. Scoring between the PCA component

PCA (415)	Mean	std.	t	Mean	Lower	Upper
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		deviation		difference		
Basic information (10 items)	5.6723	1.47231	78.484	5.67229	5.5302	5.8144
Glycemic control (7 items)	3.2386	0.52792	124.970	3.23855	3.1876	3.2895
Prevention of complications (7 items)	4.0578	1.15325	71.680	4.05783	3.9466	4.1691

*95% Confidence Interval of the Difference, $p < 0.001$

DISCUSSION AND CONCLUSION

Researchers have focused more attention on the issues of the knowledge on the management of diabetes among diabetic patients. Most studies on the knowledge, attitude, and practices of diabetes done in Nepal and elsewhere target patients with diabetes.(2,14,16,19) Unlike these, this study targeted the diabetic patients. A formal assessment of diabetes knowledge of subjects with diabetes can be carried out by administering the DKQ in daily clinical practice with this simple DKQ either with written or oral evaluation. Process of identification of areas where patient's diabetes knowledge could be improved with diabetes education is easy with this DKQ. The input was obtained from people with diabetes and draft a questionnaire was pilot-tested on a small group of people with diabetes, and their feedback was collected and included in modified DKQ prior to conducting this pilot study.

The majority of the low level of knowledge among diabetes patients was recorded in males.(19,20) Besides this, the majority of the patients had a family history of glycemic control, which thus served as one of the major causes of diabetes among patients(21–24). Supported the idea where the majority of the male patients have poor knowledge about glycemic controls.

In this present study, we have noticed that there is an association between HbA1c levels and patient diabetes knowledge. There are many barriers to achieving glycemic control, the most significant barrier was found to be inadequate knowledge and understanding about diabetes among people with diabetes.(25,26) The poor diabetes knowledge, which might be acting as a barrier to achieving glycemic target goals. In this present study diabetic disease duration significantly correlated with DKQ score and it is similar to findings of other investigators.(19,20,24,27) The results of the present study revealed that there was a significant relationship between DKQ and basic information, glycemic control and prevention of complications.

ACKNOWLEDGEMENT

The support of the OPJS University and the research participants are appreciated.

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