

ASSESSMENT OF PATIENTS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL IN EASTERN INDIA

ALAK KUMAR DAS¹, DEBADRITA GHOSH², JINIA GHOSH^{3*}

¹Department of Pharmacology, Medical College, Kolkata, West Bengal, India. ²Department of Microbiology, Acharya Prafulla Chandra College, Kolkata, West Bengal, India. ³Department of Pharmacology, Calcutta National Medical College and Hospital, Kolkata, West Bengal, India. Email: dr.jiniaghosh@gmail.com

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ABSTRACT

Objectives: Proper assessment and understanding of knowledge, attitude, and practice (KAP) among diabetic population towards this disease are important as diabetes needs lifelong adoption of healthy lifestyles for prevention and control. We aimed to evaluate the knowledge, attitude, and practice of diabetic patients regarding their disease in a tertiary care center.

Methods: This was a questionnaire-based, cross-sectional study conducted on diabetic patients attending the diabetic clinic over 2 months. Administration of a pre designed, validated, and structured questionnaire consisting of 24 items was done by face-to-face interview.

Results: Responses from 129 subjects were analyzed. Most of the subjects could not define diabetes (60.45%). However they identified the symptoms of diabetes (polyurea 62.79% and polyphagia 55.81%), and knew that lifestyle modification was necessary to control diabetes (exercise 66.66%, and dietary modification 62.79%). Majority had the notion that bitter substances could cure diabetes (51.93%) and insulin should be avoided (28.68%). Most of the subjects did not monitor blood glucose at home (81.4%) and did not take care of their feet (59.69%). Positive associations were found between patients' knowledge and their family history, educational level, and duration of diabetes. Duration of diabetes and educational level were positively associated with practice of the patients.

Conclusion: Present study reflects that diabetic patients require support and guidance for practicing better disease management. The role of a clinical pharmacist, as well as clinical activities such as patient counseling and pharmaceutical care program may aid in improving patients' KAP of diabetes management.

Keywords: Diabetes, Knowledge, Attitude, Cross-sectional, Questionnaire.

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INTRODUCTION

Diabetes mellitus (DM) is characterized by the feature of hyperglycemia consequent to a set of metabolic disorders. Its pathophysiology may consist of interaction between several factors associated with environment and genetics. This ultimately results in decreased insulin secretion, reduced utilization, and increased production of glucose [1]. DM may be of several types (Type 1, Type 2, Gestational, and Specific types of diabetes due to other causes), among which Type 2 predominates. The characteristic feature of Type 2 DM is a variable degree of insulin resistance with impaired secretion and subsequent raised blood glucose.

India, emerging as the global capital of diabetes, inhabits approximately 72 million diabetic populations [2]. The insidious nature of the disease indicates that many patients remain undiagnosed till the emergence of complications. Many authors have reported that poor health literacy is one of the major social determinants in the progression of disease [3-5].

Knowledge, Attitude, and Practice (KAP) studies have generated sufficient evidence regarding the need to raise awareness among population in general and diabetic in particular about prevention, control of risk factors, and disease management [6-8]. Besides, obtaining information about the awareness level of diabetics should come first when considering a diabetes prevention program. Evidence suggests that programs aimed at proper awareness and education may change the peoples' attitudes towards diabetes, while patient education is the cornerstone to minimizing complications of diabetes. With proper education and awareness it is possible to detect DM and take better care of it earlier. This ultimately reduces various complications and co-morbidities in the diabetic population [9].

However, studies proved that there exists a large gap between KAP regarding diabetes among the diabetic population. This can be minimized by assessing their current KAP and their determinants. This can be helpful in future planning for preparation of better educational interventional programs for diabetic patients [10].

Thus it appears that assessment of KAP regarding diabetes is important to evaluate the existing gaps that need to be addressed. Therefore, we conducted this study to assess the patients' KAP regarding DM in our tertiary care hospital.

METHODS

This was an observational, cross-sectional questionnaire-based study done in a tertiary care center in Eastern India. Adult diabetic subjects (age between 18 and 70 years) of either sex on antidiabetic medicines for more than 3 months attending diabetic clinic who were willing to participate in the study were included in the study. On the other hand, patients with poor physical and mental states and those who were unable to respond to the study questionnaire were excluded. Pregnant and lactating females were also excluded from the study. Following the approval of institutional ethics committee (Ref No: MC/KOL/IEC/NON-SPON/797/09/20, dated September 04, 2020), the study was conducted. Its duration was 2 months, October and November, 2020. An informed consent written in a language the study participants could best understand was taken before their enrolment.

The subjects were interviewed by the investigator using a questionnaire that was pre-designed and validated. The questionnaire consisted of 24 questions to assess knowledge (total question=8), attitude (total

question=10), and practice (total question=6) regarding DM. The questionnaire consisted of four parts. Socio-demographic data were collected using part one (Part I) of the questionnaire. In this part information such as age, sex, occupation, marital and educational status, profession, type and duration of diabetes, and other co-morbid conditions were elicited. Part II, Part III, and Part IV were used to collect data regarding the patients' knowledge (Part II), attitude (Part III), and practice (Part IV) regarding DM.

KAP scores were obtained depending on the responses of the subjects. Each correct, incorrect and neutral response in the knowledge and attitude domain was scored 1, -1, and 0, respectively. For the eight items knowledge questions maximum attainable score was 17 and minimum score was -7. The knowledge score had four categories: up to 25% "poor," 26-50% "average," 51-75% "good" and >75% "excellent." Likewise for the ten items of attitude questions, the maximum attainable score was 10 and minimum score was -10. For the six items of practice questions the maximum attainable score was 6 and minimum score was 0. In the practice domain, each response indicating good practice was allotted a score of 1. In this domain, for all but question number six, a score of 1 was allotted to a "Yes" response and 0 to a "No" response. For question number six, a score of 0 was allotted for "Yes" response and a score of 1 was allotted for "No" response.

Statistical analysis

For data analysis, Statistical Package for the Social Sciences version 20.0 was used. Qualitative data were presented as frequency and percentage and quantitative data were presented as mean \pm standard deviation (SD). Unpaired t-test was applied to compare the means between two groups.

RESULTS

A total of 129 diabetic subjects were interviewed. The mean age of the subjects was 52.17 \pm 10.39 years (range 29-78 years). Fig. 1 provides the age wise distribution of the participants.

Most of the subjects were in the age group of 41-50 (40.31%) years followed by 51-60 (32.55%) years and 61-70 (10.85%) years. Subjects with an age group of 21-30 (1.55%) were found to be the least. The majority of the subjects were female (50.39%). Most of the subjects completed their education above primary level (58.13%) and were self-employee (34.1%). The majority of the subjects did not smoke (83.72%) and did not drink alcohol (88.38%). Most of them were suffering from Type 2 DM (98%) and the duration of DM was less than four years (51.17%). The majority of the subjects had positive family history of DM (56.58%). The most frequent co-morbid condition was hypertension (49.61%), followed by dyslipidemia (31.78%), neuropathy (18.60%), coronary artery disease (8.52%), and hypothyroidism (4.65%). The most common source of information regarding DM was doctors

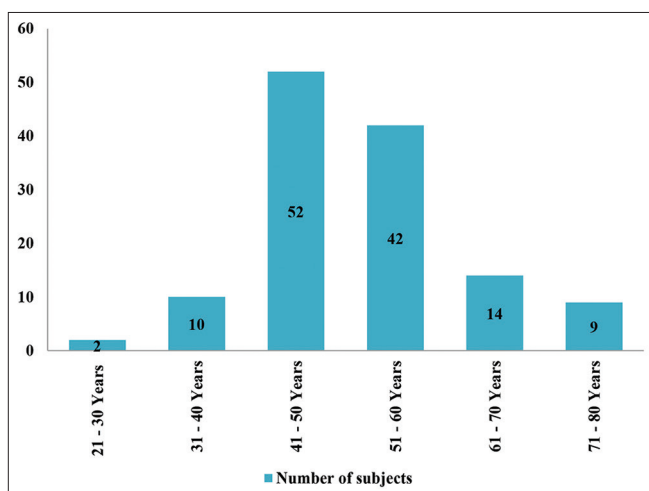


Fig. 1: Age-wise distribution of the study participants

(69.76%) followed by peer groups (20.15%). Most of the subjects (66.67%) were on oral antidiabetic drugs (OAD), followed by both OAD and insulin (30.23%). Only insulin was the mode of treatment in 3.1% subjects. Table 1 provides the characteristics of study subjects.

Knowledge regarding DM

According to 58.13% of subjects, DM was a disease characterized by low blood glucose and low insulin, whereas 2.32% thought that DM was characterized by low blood glucose and high insulin. About 39.55% of the subjects remained neutral in this respect.

According to 62.79% of subjects, frequent passage of urine was the symptom of DM, whereas 55.81% thought that frequent eating was the symptom. Frequent drinking (11.62%) and weight loss (5.42%) were the other responses regarding symptoms of DM. According to 66.66% of subjects, exercise should be done to control DM, whereas 62.79% thought that dietary modifications were necessary. However, 20.15% subjects remained neutral regarding the measures to control DM.

Most of the subjects thought that uncontrolled DM might lead to development of eye disease (76.74%). Other responses regarding the complications of uncontrolled DM were kidney disease (29.45%) and

Table 1: Characteristics of study subjects (n=129)

Parameters	n (%)
Age, Years	53.08 \pm 5.35
Gender	
Male	64 (49.61)
Female	65 (50.39)
History of smoking	
Smoker	21 (16.28)
Non smoker	108 (83.72)
Alcohol intake	
Drinks	15 (11.62)
Does not drink	114 (88.38)
Marital status	
Married	123 (95.34)
Never married	6 (4.66)
Educational status	
Up to primary level	54 (41.86)
Above primary level	75 (58.14)
Profession	
Unemployed	12 (9.30)
Self-employee	44 (34.10)
Govt. employed	8 (6.20)
Non Govt. employed	15 (11.62)
Housekeeper	50 (38.75)
Comorbidities	
Hypertension	64 (49.61)
Dyslipidemia	41 (31.78)
Neuropathy	24 (18.60)
Hypothyroidism	6 (4.65)
Coronary artery disease	11 (8.52)
Type of diabetes	
Type 1	3 (2)
Type 2	129 (98)
Duration of diabetes	
Up to 4 years	66 (51.17)
More than 5 years	63 (48.83)
Family history of diabetes	
Positive	73 (56.58)
Negative	56 (43.41)
Mode of treatment	
Oral antidiabetic drugs	86 (66.67)
Insulin	39 (30.23)
Oral antidiabetic drugs with insulin	4 (3.1)
Source of information	
Doctor	90 (69.76)
Media	5 (3.84)
Internet	8 (6.20)
Others (relatives and friends)	26 (20.15)

neurological disease (3.1%). According to 66.66% of the subjects, DM was not infectious. However, 7.75% thought that DM was infectious.

Most of the subjects (62.01%) thought that following control of blood glucose drugs should not be stopped. However, 11.62% of subjects did not support this view. Regarding symptoms of low blood glucose, sweating (30.23%), dizziness (35.65%), tremor (10.85%), and rapid heartbeat (3.1%) were the responses obtained. A large number of subjects (37.98%) however did not respond to this question regarding hypoglycemic symptoms.

Almost all the participants (95.34%) remained neutral regarding the query of whether missing doses of their diabetic medication would have a negative effect on their disease control. Only 4.65% of subjects affirmed this fact. Responses to assess knowledge regarding DM are presented in Table 2.

Attitude regarding DM

According to 51.93% of subjects, bitter substances could cure DM. 17.82% of the participants thought that exercise should be done only

Table 2: Response of the subjects towards knowledge regarding DM (n=129)

Q. No.	Questions	Response (%)
1.	Select the correct statement	
	a. Diabetes is a disease characterized by low blood glucose and low insulin	58.13
	b. Diabetes is a disease characterized by high blood glucose and low insulin	0
	c. Diabetes is a disease characterized by low blood glucose and high insulin	2.32
	d. Diabetes is a disease characterized by high blood glucose and high insulin	0
	e. Neutral	39.53
2.	Which of the following is/are the symptoms of diabetes? (Answers may be multiple)	
	a. Frequent passage of urine	62.79
	b. Frequent eating	55.81
	c. Frequent drinking	11.62
	d. Weight loss	5.42
	e. Neutral	7.75
3.	What should be done to control diabetes?	
	a. Exercise	66.66
	b. Dietary modifications	62.79
	c. Salt restriction in diet	0
	d. Neutral	20.15
4.	Diabetes, if remains uncontrolled may cause	
	a. Eye disease	76.74
	b. Kidney disease	29.45
	c. Neurological disease	3.10
	d. Neutral	19.37
5.	Is diabetes infectious?	
	a. Yes	7.75
	b. No	66.66
	c. Neutral	25.58
6.	Once diabetes is controlled drugs should be stopped	
	a. Agree	11.62
	b. Disagree	62.01
	c. Neutral	26.35
7.	Which of the following is/are symptoms of low blood glucose? (Answers may be multiple)	
	a. Sweating	30.23
	b. Rapid heartbeat	3.1
	c. Tremor	10.85
	d. Dizziness	35.65
	e. Neutral	37.98
8.	Do you think missing doses of your diabetic medication will have a negative effect on your disease control?	
	a. Yes	4.65
	b. No	0
	c. Neutral	95.34

by obese diabetic subjects. However, the majority (75.96%) of them did not support this notion. About 68.99% subjects thought that diet had important role for managing DM.

Almost all the participants (99.22%) remained neutral regarding the notion that herbal drugs had fewer complications in the treatment of DM. According to 59.68% of subjects, regular exercise could help to control DM. According to 74.41% of participants untreated diabetes could lead to organ damage. About 28.68% of subjects thought that insulin should be avoided as far as possible. However, the majority of the subjects remained neutral regarding whether insulin should be avoided as far as possible. About 69.76% of subjects showed a positive attitude regarding the fact that high blood pressure can worsen the prognosis in diabetic patients. The majority of the subjects (70.54%) agreed regarding yearly ophthalmological check-ups in diabetic subjects. On the aspect of whether insulin was habit-forming, the majority (86.82%) of the subjects remained neutral. Responses to assess attitudes regarding DM are presented in Table 3.

Practice regarding DM

About 55.04% of the subjects used to take diet containing fruits regularly. Almost all the subjects included green leafy vegetables

Table 3: Response of the subjects towards attitude regarding DM (n=129)

Q. No.	Questions	Response (%)
1.	Bitter substances can cure diabetes	
	a. Yes	51.93
	b. No	29.45
	c. Neutral	18.60
2.	Exercises should be done by only obese person	
	a. Yes	17.82
	b. No	75.96
	c. Neutral	6.20
3.	Diet has important role for managing diabetes	
	a. Agree	68.99
	b. Neutral	30.23
	c. Disagree	0.77
4.	Herbal drugs have less complication	
	a. Agree	0
	b. Neutral	99.22
	c. Disagree	0.77
5.	Regular exercise helps to control diabetes	
	a. Agree	59.68
	b. Neutral	40.31
	c. Disagree	0
6.	If not treated diabetes can lead to organ damage	
	a. Agree	74.41
	b. Neutral	25.58
	c. Disagree	0
7.	Insulin is to be avoided as far as possible	
	a. Agree	28.68
	b. Neutral	43.41
	c. Disagree	27.90
8.	In a diabetic patient, high blood pressure can worsen the prognosis	
	a. Yes	69.76
	b. No	9.30
	c. Neutral	20.93
9.	A diabetic patient should have his or her eyes checked every year	
	a. Agree	70.54
	b. Disagree	9.30
	c. Neutral	20.15
10.	Insulin is habit forming	
	a. Agree	3.10
	b. Disagree	10.07
	c. Neutral	86.82

in their diet (93.02%). However, the majority of the subjects did not have glucometer (79.07%). Most of the subjects (81.4%) did not check their blood glucose level regularly. Majority of the subjects did not take care of their feet (59.69%). Most of the participants (94.58%) did not take herbal medicines. Responses to assess practice regarding DM are presented in Table 4.

Factors associated with KAP scores

The mean score of KAP was 5.87 ± 1.92 , 8.79 ± 0.88 , and 3.12 ± 1.14 , respectively. Among the participants, 6.9% had good, 68.21% average, and 24.8% poor knowledge. KAP scores were comparable between male and female subjects. There was a significant difference regarding knowledge score between the subjects with family history positive and negative ($p=0.0001$). However, no significant difference was found regarding attitude ($p=0.29$) and practice (0.99) scores between these groups. Similarly a significant difference was found in knowledge score between the subjects whose duration of DM was more than 4 years compared to those with a duration <4 years ($p=0.0001$). However, no significant difference was found regarding attitude ($p=0.30$) and practice (0.06) scores between these groups. Participants with education above primary level had significantly better knowledge ($p=0.01$) and practice ($p=0.0001$) scores compared to those with education up to primary level. However, regarding attitudes between these groups, significant difference was not found ($p=1.00$). Association between different variables with KAP score is presented in Table 5.

DISCUSSION

DM is considered as one of the major health problems in India and other developing countries. Diabetes is amenable to control through both non-pharmacological lifestyle modifications and pharmacological treatment.

Table 4: Response of the subjects towards practice regarding DM (n=129)

Q. No.	Questions	Response (%)
1.	Do you include fruits in your diet regularly?	
	a. Yes	44.96
	b. No	55.04
2.	Do you take green leafy vegetables in diet?	
	a. Yes	93.02
	b. No	0.07
3.	Do you have glucometer?	
	a. Yes	20.93
	b. No	79.07
4.	Do you check your sugar regularly?	
	a. Yes	18.60
	b. No	81.4
5.	Do you check your foot regularly?	
	a. Yes	40.31
	b. No	59.69
6.	Do you take herbal drugs?	
	a. Yes	5.42
	b. No	94.58

Lifestyle measures for lowering blood glucose include increased physical activity, dietary modification, and control of weight gain. Hence, a healthy lifestyle should be adopted to control the prevalence of the disease.

Since the study was conducted among a diabetic population and the most prevalent DM was Type 2, mean age of the subjects was 52.17 ± 10.39 (Mean \pm SD) years and most of the subjects were from the age group of 41 to 50 years (40.31%). A considerable portion of the subjects had their education up to primary level. This may have an impact upon KAP score.

In the current study, among the participants, 6.9% had good, 68.21% had average, and 24.8% had poor knowledge. These findings are consistent with the findings of two other studies conducted in Bangladesh where most of the diabetic subjects had average knowledge regarding DM [11,12]. In contrary to our findings, several studies have reported that knowledge about DM is generally poor among diabetic patients [13-16]. However, there are studies where diabetic patients were found to have good knowledge. Islam *et al.* reported that 45.6%, 37.7%, and 16.7% of participants had shown good, average, and poor knowledge of DM [17]. Besides, a study from Malaysia also identified good KAP scores among Type 2 DM patients [18].

Similar to the findings in a study conducted by Akash *et al.* [19], we found that most of the participants gained knowledge regarding DM mainly from their friends, relatives, and health-care professionals.

There were some good aspects regarding the knowledge domain of the participants. We found that most of the subjects had knowledge regarding symptoms of DM (62.79% polyurea and 55.81% polyphagia). This was similar to a study conducted by Goyal *et al.*, where 80% of the subjects were aware of the symptomatology of DM [20]. Most of the subjects were aware that both of exercise (66.16%) and diet (62.97%) had important role in controlling DM. A majority of the participants (76.74%) had knowledge that retinopathy might be a complication of uncontrolled DM. In a KAP study conducted by Saikumar *et al.*, it was revealed that 50.8% of patients were aware of frequent eye check-ups and only 19% knew about retinopathy [21]. Most of the participants (66.66%) also had the knowledge that DM was not infectious. Besides, majority of them (62.01%) thought that following control of blood glucose drugs should not be stopped.

However, there were some aspects reflecting the participants' poor knowledge regarding DM. We found that most patients didn't know what DM was (58.13%). This is consistent with the findings of a study done by Shah *et al.*, where 63% of the study participants could not define diabetes [16]. Besides, we found that only 29.45% of subjects were aware of the fact that uncontrolled DM might lead to kidney disease. A large number of subjects (37.98%) did not respond regarding the symptomatology of hypoglycemia. Besides, almost all the participants (95.34%) remained neutral regarding the query of whether missing doses of their diabetic medications would have a negative effect on disease control.

Table 5: Association between different factors with KAP score

Variables	Knowledge	Attitude	Practice
Sex			
Male	5.89 ± 1.13	8.77 ± 0.87	3.25 ± 1.11
Female	5.86 ± 2.04	8.82 ± 0.92	3.0 ± 1.17
Family history			
Positive	7.27 ± 1.13	8.86 ± 0.87	3.12 ± 1.2
Negative	4.05 ± 1.00	8.7 ± 0.91	3.13 ± 1.08
Duration of DM			
>4 years	7.48 ± 1.09	8.87 ± 0.83	3.32 ± 1.18
<4 years	4.35 ± 1.16	8.71 ± 0.94	2.94 ± 1.09
Education			
Up to primary level	5.39 ± 2.17	8.85 ± 0.94	2.09 ± 0.56
More than primary level	6.23 ± 1.67	8.85 ± 0.94	3.87 ± 0.84

Regarding attitude to DM we found some good as well as poor aspects. A majority (75.96%) of the subjects did not support the notion that exercise should be done only by obese people. This is in contrast to the study by Shah *et al.* where they found that 84.05% of participants believed exercise should be done by obese patients [16]. Most of the subjects believed that dietary modification had important role for managing DM (68.99%), that hypertension could worsen the prognosis in diabetic patients (69.76%), that regular exercise could help to control DM (59.68%), and that yearly ophthalmological check-ups were necessary in diabetic subjects (70.54%).

There were some misconceptions regarding the management of DM. We found that 51.93% of the subjects believed that bitter substances could cure DM. This was similar to the study conducted by Shah *et al.* where 53.37% of subjects had the same belief [16]. Almost all the participants (99.22%) remained neutral regarding the notion that herbal drugs had fewer complications in the treatment of DM. We found that 28.68% of subjects believed insulin to be avoided if possible, and the majority of the them remained neutral regarding the aspect of whether insulin was habit forming (86.82%). Shah *et al.* showed that 48.31% of subjects had the notion of avoiding insulin if possible [16].

We found majority of the subjects had good practice of including fruits (55.04%) and green leafy vegetables (93.02%) in their diet. Most of them (94.58%) did not take herbal medicines. However, the majority (79.07%) of the subjects did not have glucometer. This is in contrast to a study conducted in Mathura, where 65% of the diabetic subjects used to monitor their blood glucose level at home using a glucometer [20]. In our study, most of the subjects did not check their blood glucose level regularly (81.4%), and they had no habit of taking care of their feet (59.69%). This was consistent with the findings in the study where it was found that approximately 70% of the diabetic patients had suboptimal knowledge of foot care [20]. However Shah *et al.* showed that 54.21% of subjects contained fruits and 31.93% of subjects contained green leafy vegetables in their diet. They also found that only 10.08% of subjects had glucometer and 56% of subjects took care of their feet [16].

The mean score of KAP was 5.87 ± 1.92 , 8.79 ± 0.88 , and 3.12 ± 1.14 , respectively. There was significant difference regarding knowledge score between the subjects with positive and negative family history. This was similar to a study conducted by Al-Maskari *et al.* [7] However, no significant difference was found regarding attitude ($p=0.29$) and practice (0.99) scores between these groups. This is in contrast with a study conducted in Dhaka, Bangladesh, where the investigators found positive association of family history with attitude and practice [22]. Similarly, a significant difference was found in knowledge score between the subjects whose duration of DM was more than 4 years compared to those with duration less than 4 years ($p=0.0001$). This is similar to a study conducted in Iran where the disease duration had a correlation with patients' levels of KAP [23]. Participants who completed their education more than primary level had significantly better knowledge ($p=0.01$) and practice ($p=0.0001$) scores compared to those with education up to primary level. The higher level of patients' education is a strong predictor of better disease knowledge, which is in line with the findings of the previous studies conducted in low- and middle-income countries, where diabetes knowledge was related to patients' education levels [24,25]. This was reflected in case of practice also where patients' level of education had been identified as a significant predictor for their self-care practices [26].

CONCLUSION

Our study indicates that a gap between KAP regarding DM among the diabetic population exists, which can be minimized by assessing their current KAP and their determinants. This study also reflects that the diabetic patients require support and guidance for practicing better disease management. The role of a clinical pharmacist is to improve patient's KAP towards management of DM. Clinical activities such as patient counseling, home medication review, pharmaceutical

care programs may help to increase the patients' practice in disease management. Improving KAP factors has an impact on better management of diabetes by improving medication adherence, blood glucose control, morbidity, and mortality of the patients.

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AUTHORS' CONTRIBUTIONS

Preparation of the protocol was done by Alak Kumar Das. Collection of data was done by Debadrita Ghosh and Alak Kumar Das. Statistical analysis was done by Jinia Ghosh and Alak Kumar Das. Preparation of the manuscript was done by Jinia Ghosh, Debadrita Ghosh and Alak Kumar Das.

CONFLICT OF INTEREST

There is no conflict of interest.

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