Diabetes knowledge, beliefs and practices among people with diabetes attending a university hospital in Karachi, Pakistan

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المعارف والمعتقدات والممارسات لدى السكَّريين الذين يعالجون في أحد المستشفيات الجامعية في كراتشي، باكستان

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الخلاصة: أُعِدَّ استبيان منهجي حول المعارف والمعتقدات والممارسات الخاصة بالسكَّري، ووزِّع على 199 من السكريين ممن كان 92.5٪ منهم من النمط الثاني للسكري ويعالجون في مستشفى جامعة أغاخان في كراتشي. وقد كان العمر الوسطي لهم 35 عاماً بانحراف معياري مقداره 11 سنة، وكان متوسط فترة الإصابة بالسكري لدى الرجال 8 سنوات بانحراف معياري مقداره 7 سنوات، وفترة الإصابة بالسكري لدى النساء 9 سنوات بانحراف معياري مقداره 6 سنوات. وقد اتضح أن أحراز الرجال أعلى بالنسبة للمعارف من أحراز النساء (P=0.02)، و لم يكن هناك فارق ملحوظ في أحراز المعتقدات والممارسات. وقد صُنِّفت الأحراز إلى جيدة (أكثر من 60٪) لدى 13.6٪ من المشاركين فقط بالنسبة للمعارف ولدى 17.6٪ من المشاركين فقط بالنسبة للمعتقدات، ولدى 11.2٪ من المشاركين فقط بالنسبة للممارسات. وقد تلقَّى 38٪ من المساهمين التثقيف حول الرعاية في السكري.

ABSTRACT A structured questionnaire on knowledge, beliefs and practices regarding diabetes was administered to 199 persons with diabetes (92.5% type 2) attending the Aga Khan University Hospital, Karachi. Mean age [standard deviation (SD)] was 53 (11) years. Mean duration of diabetes (SD) was 8 (7) years in men and 9 (6) years in women. Men had a significantly better knowledge score than women (P = 0.02); there was no significant difference in the beliefs and practices scores. Scores were classed as good (> 60%) in only 13.6% of participants for knowledge, 17.6% for beliefs and 11.2% for practices. About 38% of the participants had received education on diabetes care.

Connaissances, croyances et pratiques concernant le diabète chez les personnes diabétiques consultant dans un hôpital universitaire à Karachi (Pakistan)

RÉSUMÉ Un questionnaire structuré sur les connaissances, croyances et pratiques concernant le diabète a été administré à 199 personnes diabétiques (92,5 % de type 2) consultant à l'hôpital universitaire Aga Khan de Karachi. L'âge moyen (écart-type [E.T.]) était de 53 ans (11). La durée moyenne du diabète (E.T.) était de 8 ans (7) chez les hommes et de 9 ans (6) chez les femmes. Les hommes avaient un score pour les connaissances significativement meilleur que les femmes (p = 0,02) ; il n'y avait pas de différence significative dans les scores pour les croyances et les pratiques. Les scores étaient classés comme bons (> 60 %) chez seulement 13,6 % des participants pour ce qui concerne les connaissances, 17,6 % pour les croyances et 11,2 % pour les pratiques. Environ 38 % des participants avaient bénéficié d'une éducation en matière de soins du diabète.

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Introduction

With an overall prevalence of over 10% among the adult population of Pakistan, type 2 diabetes has become a serious health problem for the nation [*1,2*]. Currently an estimated 6.5 million people aged 25 years and above are affected with diabetes in the country and, if no intervention strategies are adopted, the World Health Organization forecasts that the number will rise to 14.5 million by the year 2025 [*3*].

It is well established that poor control of diabetes results in markedly increased risk for heart disease, stroke, blindness, kidney failure, leg amputation and early death [*4,5*]. On the other hand, scientific evidence has clearly demonstrated that most diabetes-related pathologies are potentially avoidable if optimum metabolic control is achieved [*6,7*]. The management of diabetes is, however, dependent to a great extent on the affected person's own abilities to carry out self-care in their daily lives, and patient education is considered an essential component of achieving this objective [*8*]. There is further evidence that people affected with the disease often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications [*9–11*], and that this lack of awareness may be the underlying factor affecting attitudes and practices towards its care [*12*].

Diabetes education, with consequent improvements in knowledge, attitudes and skills, leads to better control of the disease, and is widely accepted to be an integral part of comprehensive diabetes care [*13–15*]. At the same time, it is important to note that if recommendations are to be effective, they must be sensitive to and relevant to the culture of the people expected to carry them out [*16,17*].

Despite the high and increasing prevalence and the evidence that better knowledge is associated with better outcomes, Pakistan currently lacks structured education and information programmes regarding diabetes both for people at risk of the disease and for people suffering from it. So far, little has been done to assess the current knowledge levels and behaviours of people with diabetes, or to evaluate their educational needs. Education programmes are likely to be more effective if these are known.

This study attempted to assess disease-related knowledge, beliefs and practices among people with diabetes. As well as providing a baseline for evaluation, the data would be of use in developing an appropriate and culturally acceptable diabetes education programme.

Methods

The study was conducted in the outpatient clinics of a single centre, the Aga Khan University Hospital, Karachi, from December 2001 to March 2002. The hospital is a tertiary care hospital offering quality care to outpatients and inpatients of all socioeconomic classes. Patients were recruited from the consultant clinics, where the physicians are mainly specialized consultants and endocrinologists, and the community health centre where family physicians offer services at minimal charges.

The sample size was calculated using a 2-sided test of significance, an alpha level of 5% and 80% power to detect a bound on error for knowledge mean score of 2, with an estimated standard deviation of 10. The required sample size was calculated as 197.

The study group comprised 199 adults with diabetes aged ≥ 25 years attending the community health centre and consultant clinics of the Aga Khan University Hospital. The participants were selected sequentially based on the appointment registers, and

were of both sexes. The number of patients attending the 2 locations differed, normally 10–15 per day attended the consultant clinic and 4–5 per day attended the community health centre during the study period, consequently, more patients were recruited from the consultant clinic. Citing lack of time, 8% of those we approached refused to participate.

Participants were interviewed using a structured questionnaire to collect information on knowledge, beliefs and practices concerning their disease and management, in addition to demographic data.

A structured questionnaire was compiled adapting questions from published studies and adding questions that were considered of value based on local beliefs and clinical observations [*18,19*]. The questionnaire covered knowledge regarding symptoms of diabetes, optimal control levels, hypoglycaemia, recognition of microvascular and macrovascular complications, diet and exercise; beliefs about diabetes and use of insulin and nutrition related beliefs; and practices regarding diet, medication adherence and self-monitoring. Taking into consideration local myths, specific questions on belief were added.

Data were collected by 2 trained interviewers, medical graduates working as research officers in the department. They visited each clinic 2 days per week. The questionnaire was pilot tested on 10 patients from the same clinics to assess the suitability of content, clarity and flow of questions. A scoring system was developed for each component: each correct answer was given a score of 1. Three categories were defined on the basis of the score obtained by each participant: poor (< 40% of the total score); acceptable (41%–60% of the total score); and good (> 60% of the total score).

Data were analysed using *SPSS*, version 10. Chi-squared, independent samples *t*-test and 1-way analysis of variance were used to compare the groups.

Results

Descriptive statistics

A total of 199 people (95 men, 104 women) participated in the study (Table 1). The mean age [standard deviation (SD)] of the participants was 53.3 (11.2) years with no significant difference between the sexes. The overall illiteracy rate was 14.6%; more women (18.3%) than men (10.5%) were illiterate ($P = 0.008$). Furthermore, it was noted that for all education levels, women had a lower overall percentage than men. The mean duration (SD) of diabetes was 8.9 (7.3) years among men and 8.8 (6.2) years in women. Of the 92.5% of participants who had type 2 diabetes, 11.4% were on diet alone, 76.0% on oral hypoglycaemic drugs and 12.5% on insulin.

Approximately 38% of participants reported receiving some diabetes education at the clinics.

We found 42.2% of the participants could not give a single symptom for hypoglycaemia and only 22.3% could name ≥ 2 symptoms; nevertheless, 76.9% knew that the home treatment for hypoglycaemia is to take any sugared drink or food. Only 21.1% of the participants were aware of the target control levels for fasting blood sugar and 8.7% knew the target for the 2 hours postprandial blood sugar level. Around 18% of men and 27% of women did not know that diabetes can affect other organs of the body and were unable to name a single complication associated with diabetes.

Some important local beliefs about nutrition and insulin use in diabetes are detailed in Table 4: 80.4% of participants believed that a person with diabetes should not eat root vegetables, while around 1 in

Table 1 Characteristics of participants

Variable	No.	%
Age (years)		
25–39	22	11.1
40–49	55	27.6
50–59	64	32.2
60–69	41	20.6
70+	17	8.5
Sex		
Male	95	47.7
Female	104	52.3
Education level		
Illiterate	29	14.6
Primary	30	15.1
Secondary	62	31.2
Intermediate	26	13.1
University graduate & above	52	26.1
Occupation[a]		
Housewife	98	49.2
Blue-collar worker	17	8.5
White-collar worker	34	17.1
Self-employed	24	12.1
Retired	26	13.1
Duration of diabetes (years)		
< 1	20	10.1
1–5	72	36.2
6–15	88	44.2
> 15	19	9.5
Type of diabetes		
Type 2	184	92.5
Type 1	15	7.5
Type of treatment		
Diet	21	10.6
Oral hypoglycaemic drugs	140	70.4
Insulin	38	19.1
Place of treatment		
Consulting clinic	110	55.3
Community health centre	89	44.7

[a]Blue-collar workers included shopkeepers, drivers and labourers; white-collar workers included office workers and civil servants; self-employed was mostly businessmen.

4 believed that regular use of bitter gourd (*Momordica charantia*), a vegetable commonly known as *karela*, can cure diabetes.

Even though 94.0% of the participants tested blood glucose levels to check their metabolic control, only 73.4% maintained records. Wide variations occurred in the frequency of testing, ranging from daily to more than a year (daily 7.0%; weekly 17.6%; monthly 39.2%; 3-monthly 11.6%). Only 4% of respondents were also being assessed for $HbA1_c$. Overall, 29.6% of participants were self-monitoring their blood glucose levels, and 58.0% of those were on insulin.

Although 92.3% of the participants on insulin were using a combination of regular and intermediate-acting insulin, no more than 57.8% of them administered their insulin injections half an hour before meals whereas others were injecting either 1 hour prior to the meal or immediately before or after meals. Almost 73.6% were injecting insulin at an angle of 90 degrees; only 47.2% were injecting subcutaneously while others were injecting intradermally or intramuscularly. Even though 58.8% said that exercise should be done ≥ 4 times per week, only 29.0% were actually doing so.

Knowledge, beliefs and practices scores

The results of the diabetes knowledge, beliefs and practice scores are given in Table 2. The mean score for knowledge was significantly lower in females, and more females had poor knowledge compared to males ($P = 0.02$). No significant difference was, however, evident in the mean scores for beliefs and practices.

Table 3 gives the mean knowledge, beliefs and practices scores. The mean knowledge scores decreased with increasing age ($F = 4.62$; $P = 0.001$). Significantly higher knowledge scores were found in males ($F = 4.748$; $P = 0.03$), those with a higher education level ($F = 34.40$; $P < 0.001$), white-collar workers ($F = 8.055$; $P < 0.001$), those

Table 2 Distribution of participants according to their diabetes knowledge, beliefs and practices scores

Variable	Males (n = 95) No.	Females (n = 104) No.	Total (n = 199) No.	(%)
Knowledge score				
Poor	37	59	96	48.2
Acceptable	45	31	76	38.2
Good	13	14	27	13.6
Beliefs score				
Poor	46	62	108	54.3
Acceptable	32	24	56	28.1
Good	17	18	35	17.6
Practices score				
Poor	54	56	110	55.3
Acceptable	33	34	67	33.7
Good	8	14	22	11.0

Poor: < 40% of the maximum possible score (knowledge 59; beliefs 15; practices 14).
Acceptable: 41%–60% of the maximum possible score.
Good: > 60% of the maximum possible score.

with type 1 diabetes ($F = 12.30$; $P = 0.001$), people on insulin treatment ($F = 8.83$; $P < 0.001$) and people attending the consultant clinics ($F = 6.30$; $P = 0.013$).

The mean beliefs scores also decreased significantly with increasing age ($F = 3.43$; $P = 0.010$), while with increasing educational levels the scores increased (illiterate to graduate and above) ($F = 23.40$; $P < 0.001$). The scores were also higher in males ($F = 4.16$; $P < 0.04$), people with white-collar jobs ($F = 5.87$; $P < 0.001$) and those with type 1 diabetes ($F = 4.01$; $P < 0.04$). People who were on insulin had higher mean beliefs scores compared to those who were on oral hypoglycaemic drugs or diet alone ($F = 5.58$; $P = 0.004$).

The mean practices scores were significantly higher with longer duration of diabetes ($F = 2.72$; $P = 0.04$), for those on insulin therapy ($F = 18.49$; $P < 0.001$) and in people attending the specialist consulting clinics ($F = 14.68$; $P < 0.001$).

Discussion

Very limited literature exists on the knowledge, beliefs and practices of people with diabetes in Pakistan. A study looking only at knowledge among diabetes patients in Karachi found significant deficits in the study population [*9*]. The results of our study suggest that not only knowledge, but also the beliefs and practices of diabetes patients were less than satisfactory.

It is disturbing to note that the vast majority of participants were unaware of the ideal blood glucose control target levels and many were unable to name a single complication associated with diabetes. This lack of information and understanding of potential risks is worrying, and indicates participants' obliviousness to the gravity of their condition. This may be partially explained by the fact that diabetes, being almost asymptomatic, does not interfere with their daily routine and patients generally tend to ignore the condition until the disease is advanced [*20*].

Health beliefs are often affected by folklore and hearsay [*16,21*]. Our study has also highlighted certain beliefs and misconceptions prevalent among people with diabetes that are based on such belief systems. Most common among these are the nutrition-related beliefs, thereby identifying the need to provide education and counselling regarding diet. For example, there is a strong belief that a person with diabetes should not eat root vegetables as they are generally considered to be sweet. Another common perception in Pakistan is that there is no restriction on the amount of bread taken if it is prepared from gram flour (chickpea flour), indicating the need for understanding the concept of total calorie requirements.

The use of traditional remedies is prevalent in many cultures [*16,22,23*]. In the Indian subcontinent, traditional medicines

Table 3 Mean diabetes knowledge, beliefs and practices scores for different characteristics of the participants

Characteristic	Score[a]		
	Knowledge Mean (SD)	Beliefs Mean (SD)	Practices Mean (SD)
Age (years)			
25–39	28.1 (9.4)	8.1 (2.8)	6.3 (2.6)
40–49	26.0 (11.4)	7.1 (3.0)	6.3 (1.7)
50–59	22.6 (11.2)	6.2 (3.0)	6.3 (2.1)
60–69	20.2 (10.8)	5.9 (3.0)	5.8 (2.2)
70+	15.9 (11.0)	5.2 (3.0)	5.9 (1.8)
Sex			
Female	21.4 (11.8)	6.1 (3.3)	6.1 (1.9)
Male	24.9 (10.7)	7.0 (2.7)	6.2 (2.2)
Education level			
Illiterate	13.0 (8.6)	4.0 (2.9)	5.6 (2.1)
Primary	14.6 (8.3)	4.6 (2.0)	5.8 (1.9)
Secondary	21.6 (10.0)	6.1 (2.6)	6.1 (2.2)
Intermediate[b]	29.0 (8.5)	8.0 (2.5)	6.4 (2.3)
Graduate & above	32.4 (7.8)	8.65 (2.5)	6.6 (1.8)
Occupation			
Housewife	20.7 (11.6)	5.9 (3.1)	5.9 (2.2)
Blue-collar worker	17.6 (8.4)	5.2 (2.2)	5.8 (1.6)
White-collar worker	31.7 (8.8)	8.4 (2.8)	6.6 (1.7)
Self-employed	22.5 (11.1)	6.7 (2.5)	6.4 (2.4)
Retired	24.8 (10.0)	7.0 (2.7)	6.5 (1.9)
Duration of diabetes (years)			
< 1	19.0 (11.6)	5.6 (2.6)	5.0 (2.1)
1–5	21.8 (10.8)	6.2 (2.9)	6.3 (1.9)
6–15	24.1 (11.9)	6.7 (3.2)	6.3 (2.2)
> 15	27.6 (9.8)	7.4 (2.9)	6.0 (1.6)
Type of diabetes			
Type 2	22.3 (11.3)	6.4 (3.0)	6.1 (2.0)
Type 1	32.7 (6.9)	8.0 (2.6)	6.9 (2.5)
Type of treatment			
Diet	19.7 (11.9)	5.4 (3.1)	4.1 (1.8)
Oral hypoglycaemic drugs	21.8 (10.9)	6.3 (2.9)	6.1 (1.8)
Insulin	29.7 (10.7)	7.8 (3.3)	7.3 (2.3)
Place of treatment			
Community health centre	20.9 (11.0)	6.1 (2.9)	5.5 (2.0)
Consulting clinic	24.9 (11.5)	6.9 (3.1)	6.6 (2.0)
Overall	23.1 (11.4)	6.5 (3.0)	6.2 (2.0)

SD = standard deviation.
[a]Maximum possible scores: knowledge 59; beliefs 15; practices 14.
[b]Up to 12 years education in school.

Table 4 Main beliefs about nutrition and insulin use in people with diabetes

Belief	Yes %	No %	Don't know %
A person with diabetes is allowed to eat vegetables grown under the soil	17.1	80.4	2.5
A person with diabetes can eat as much basen ki roti[a] as he or she wants	60.3	27.6	12.1
Regular use of karela[b] can cure diabetes	25.1	59.3	15.6
A person with diabetes can eat "diabetic foods" in any quantity	8.5	43.7	47.7
Insulin use indicates that the person has reached the last stage of disease	32.7	28.6	38.7
Regular use of insulin can lead to addiction	33.7	22.1	44.2
Children and adolescents with type 1 diabetes should be allowed to adjust insulin dose on their own	16.1	31.6	52.3
Women with type 1 diabetes should avoid pregnancy	9.0	13.1	77.9
A woman taking insulin should breastfeed her baby	17.1	7.5	75.4

[a]Bread made from gram (chickpea) flour.
[b]Bitter gourd (Momordica charantia).

play an important role in diabetes care, and a number of plants, herbs and vegetables are used therapeutically [*24*]. Among these, bitter gourd (*M. charantia*) is widely used as an alternative therapy for diabetes [*23,25*] and our study also found that around 25% of the participants thought that regular use could cure diabetes. While studies in diabetic rats [*23*] and humans [*25*] have shown that *M. charantia* has hypoglycaemic effects, no study has demonstrated that it can control diabetes. Moreover, sufficient data are not available on the potency and effectiveness of bitter gourd to recommend its use as an alternative therapy.

The concept of insulin use indicating gravity of illness and becoming dependent on the drug has been documented in the Vietnamese population [*21*]. Many of the participants in our study also considered insulin use to be indicative of reaching the last stage of disease. The belief that insulin is an addictive drug is based on the fact that insulin needs to be taken daily and the person cannot do without it.

There is evidence that people with type 1 or type 2 diabetes on insulin are more adherent to self-monitoring of blood glucose [*26*] and this finding was supported in our study. However, the observation that over three quarters of the study population did not perform self-monitoring or exercise regularly is noteworthy, and sends a worrying message to diabetes health care providers and educators. Self-monitoring, exercise and weight reduction programmes should be included as part of any diabetes education package.

Few patients receive formal diabetes education in Pakistan. This study provides further evidence that there is a lack of information available to people with diabetes, with a large proportion never receiving any diabetes education at all.

As our study was conducted in a single centre, the results may not give a true reflec-

tion of the general population. Nevertheless, the findings have significant implications for the quality of diabetes education available to people with diabetes in Pakistan. The fact that the study was conducted in an urban university hospital, where diabetes education may be more readily accessible, raises further concern as there is more likelihood that the majority of people, especially those living in the rural areas and having less access to information, will have even poorer diabetes perceptions and practices.

There is, therefore, a need for increased effort towards developing and making widely available diabetes education programmes that focus on empowering the person with diabetes, not only providing them with information and skills, but also the ability to make decisions and take ownership of controlling their diabetes.

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