Research paper

South Asian people with type 2 diabetes: a tool to assess learning

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What is known on this subject
- Knowledge and understanding needs must be assessed in order to provide appropriate education at the patient's level.
- Appropriate patient education is essential and is part of treatment.
- Assessment of knowledge enables healthcare professionals to plan appropriately for the individual patient's learning needs.
- Prevalence of type 2 diabetes in South Asians is increasing.
- Communication difficulties must be recognised and catered for.

What this paper adds
- This pilot study findings suggest the need for appropriate education at the individual patient's level.
- This paper also reports on the findings of the SADK in order to determine whether it was of any use as a reliable indicator of patient's learning.

ABSTRACT

Twenty-two South Asian adults with type 2 diabetes took part in a pilot study that aimed to evaluate how much they understood about their diabetes condition. The Statements to Assess Diabetes Knowledge (SADK) questionnaire, which was specifically designed to assess participants' learning, was applied before and after exposure to language-specific educational videos. The usefulness of these videos had not previously been evaluated in any way. Findings demonstrated that the SADK questionnaire was useful in showing that learning had occurred, each individual's improved understanding, and where further input was needed on a one-to-one basis. Further work is needed to test the effectiveness of the SADK questionnaire with a larger sample group.

Keywords: patient education, SADK, South Asian people, type 2 diabetes

Introduction

The prevalence of diabetes has been reported to be as high as 15.2% in South Asian people, in comparison with 3.8% in the white population (McKeigue *et al*, 1991; McKeigue and Sevak, 1994; British Diabetic Association, 1996; Burden, 2001, p.445; Hawthorne 2001, p.373; Patel *et al*, 2001, p.133; Barnett and Bain, 2004). Currently around 10% of elderly South Asians over the age of 60 have diabetes, and at least 20% of people aged 40 plus years, and these numbers are growing (Barnett, 1994, p.6). The prevalence of type 2 diabetes varies, with 20% of Muslims and 15.2% of Hindus affected (Patel *et al*, 2001, p.132; Shaikh *et al*, 2001, p.65).

Like all those with diabetes, South Asian people need to 'develop the skills to enable them to become experts in self-care' (Vass, 2003, p.1339; Marwa *et al*, 2004, p.48), regardless of culture, race or language. Several education-based studies involving South Asian people (see for example, Hawthorne, 1990, 2001; Hawthorne and Tomlinson, 1997) all found that structured tailored and culturally appropriate educational programmes had a greater impact on South Asian patients. However, illiterate people, especially women, were unable to apply their new-found learning to their daily lives, and this was reflected in their control, which remained poor.

It is imperative to assess the level of learning that has taken place, because improved understanding enables positive changes in control and management. Conventional methods of assessment are no use if patients cannot read or speak the same language as those providing healthcare or education. Consequently, healthcare professionals have to find new ways of teaching patients about their condition, and of assessing their learning.

Diabetes education for minority groups

According to Garcia *et al.* (2001a, p.16), 'there are few reliable and valid instruments with which to measure outcomes, particularly for individuals who speak a language other than English'. Consequently, patients don't understand their condition or management, resulting in poor diabetes control (Kinmond *et al*, 2002). A literature review revealed previous studies that focused on the provision of education of minority groups, and assessment of their learning. For example, the diabetes quality of life questionnaire (DQL; Bradley and Lewis, 1990, p.445) and the Diabetes Knowledge Questionnaire (DKQ; Garcia *et al*, 2001a) were developed to assess knowledge in people living in the US and the UK. These evaluative tools were only applicable for people who were able to read and write in English and thus were not suitable for a South Asian population with a high rate of illiteracy. In addition, some of the statements were either outdated or too ambiguous for accurate translation into another language, and also they were phrased primarily for Mexican Americans whose first language was Spanish (Brown *et al*, 1998, 1999). The psychometric properties stated that the DKQ was a reliable and valid measure of diabetes-related knowledge, and that it was relatively easy to administer to either English or Spanish speakers with a reliability coefficient of 0.78, indicating internal consistency and construct validation (Garcia *et al*, 2001a, p.16).

Development of the Statements to Assess Diabetes Knowledge (SADK) questionnaire

Following written permission from Dr Garcia (Garcia *et al*, 2001a, p.16, 2001b, p.972), each of the 24 statements in the DKQ was carefully examined and 15 were rephrased into English as spoken in the UK (see Appendix 1). The emphasis was on developing statements that were clear and unambiguous within an English-speaking UK context. Outdated statements were eliminated. The outcome of this exercise was a revised questionnaire, the Statements to Assess Diabetes Knowledge (SADK) that could then be translated into the five South Asian languages: Punjabi, Urdu, Hindi, Bengali and Gujarati (see Appendix 2). As an Indian herself, the researcher was already fluent in the first three languages, but a professional interpreting service was also used to ensure accuracy in all five languages, particularly with regard to the other two languages in which she was less confident. The translations were prepared in written and audiotape formats.

The next step was to test this translated tool in order to determine whether it was of any use as a reliable indicator of patients' learning (Carter, 2000, p.215). The pilot study reported here allowed the researcher to check the translation for the correct use of phraseology, grammar and syntax, and to confirm whether or not the South Asian participants would be able to interpret these statements correctly in their own languages (Porter and Carter, 2000, p.24).

Examples here illustrate some of the changes that were made to the items in the DKQ. Item 2 stated that 'The usual cause of diabetes is lack of effective insulin in the body'. In the SADK statement, the word *effective* was removed to prevent misinterpretation, to read 'the usual cause of diabetes is lack of insulin in the body'. This was done because the word *effective*, when translated, became very misleading.

Item 7 in the DKQ stated that 'Diabetes can be cured'. Attempts to translate this question into the five South Asian languages caused confusion because the results implied that diabetes was simply treatable. To avoid this, the statement was rephrased in the SADK as 'We cannot get rid of diabetes, but we can control it'.

For the DKQ item 8, the value of the blood glucose was stated in milligrams per decilitre (mg/dl), a traditional unit of measurement as used in the US. This was converted into the SI units (Système International d'Unites), used in the UK.

In item 11 the DKQ used the abbreviations IDDM (insulin-dependent diabetes mellitus) and NIDDM (non-insulin-dependent diabetes mellitus). These were omitted from the SADK, because they could not be translated.

The finalised SADK was a tool to assess learning, tailored to cater for the needs of the South Asian participants, especially those with poor literacy skills. It was crucial to illustrate the uniqueness and appreciation of the differences of each language, and this part of the study highlighted the complexity for the researcher to ensure that all the participants' cultural and language needs were catered for, to ensure its success. Working with a professional translating service based at a language college in the West Midlands, the researcher's main aim was to ensure the quality and credibility of the translated materials used in this study.

All the translated written and audio transcripts were then sent for professional proofreading to consider the style, vocabulary and syntax of the translated text such as names, abbreviations, layout and technicality (Foyle Language Services Ltd, 2003; Cameron, 2004). Following proofreaders' feedback, alterations were made to each of the written scripts, prior to producing audio formats. Thus, both the written scripts and audiotapes were also checked for quality, syntax and vocabulary to ensure quality and appropriateness in appreciation for particular groups of people and thereby avoid alienation and intimidation (Foyle Language Services Ltd, 2003; Cameron, 2004). All of the study participants were given a choice for their preferred language and format, prior to the research study.

The pilot study

Aims

The aims of this study were to:

- assess the usefulness of the SADK in determining South Asian patients' knowledge about diabetes
- evaluate the effectiveness of language-specific educational videos for South Asian patients with diabetes.

This paper focuses only on the first aim. A quasi-experimental design was used because a classic experimental approach was unsuitable as there were no ethical grounds for establishing a control group. All patients with diabetes are entitled to education about their condition and it would not be appropriate to withhold that education from any of them during this project. A quasi-experimental approach is one in which an intervention is tested without either a control group or randomisation (Polit and Beck, 1999, p.181). The quasi-experimental approach was first developed by Campbell and Stanley (1963), for the evaluation of interventions using the underlying epistemology of a positivist view. Quasi-experiments are not seen to be as powerful as randomised control trials; nevertheless, they are practical and easily conducted in the 'real world', and with smaller samples where it is impossible 'to conduct true experiments', argue Polit and Beck (1999, p.186).

Triangulation was an integral part of the study design. Triangulation is the use of more than one approach in a research study. There are several ways of doing this: multi-method, multiple sources of data, multiple methods of analysis and multiple investigators (Polit and Beck, 1999; Burns and Grove, 2003). According to Burns and Grove (2003, p.5) and Polit and Beck (1999, p.431), using triangulation encapsulates a more complete, holistic and contextual portrait, as each paradigm generates different kinds of knowledge and supportive information, enhancing the credibility of and complementing the study findings. This study used multiple sources of data in terms of a sample drawn from members of different South Asian communities: Punjabi-speaking, Hindi-speaking, Urdu-speaking, Bengali-speaking and Gujarati-speaking.

Dudley Local Research Ethics Committee approved the study.

Sample

All potential participants were currently attending the diabetes clinic in the trust. None of the participants were participating in any research trials at the time of this study, and this was clarified by a direct approach by the researcher. The trust's research and development department confirmed this verbally. The reason for this investigation was to avoid any conflict of interest of either the research process or the outcome of the study.

The study participants all belonged to the South Asian community. In this community, there are three main subgroups: Indians, Pakistanis and Bangladeshis. These three subgroups contain three religious faiths: Islam, Hinduism and Sikhism. Members of these groups speak different languages depending on the area that people come from. For example, Sikh people mostly speak Punjabi but also may speak Hindi and Gujarati; Hindu people mostly speak Hindi but also Punjabi. People from Bangladesh who are of Bengali origin speak Sylheti dialect, but older educated people may speak Urdu, the same as most Pakistani people. Islamic followers with their roots back in India may also speak a mixture of Punjabi, Urdu, Gujarati and Bengali. The language groups were identified on recruitment of the participants who all spoke either one or more of the five South Asian languages. However, it is imperative to remember that these are national languages and that individuals who originate from rural areas may speak a local dialect or language as their first language and find the national language difficult.

It was initially proposed to recruit approximately 40–50 participants in total from the researcher's current caseload, as a community diabetes specialist nurse, in a primary care trust. However, only 22 participants were eventually recruited. Each language group had 3–6 participants. The Gujarati-speaking group only had three participants, in comparison to six participants in the Urdu-speaking group. According to Hussain-Gambles et al (2004, p.9) there are many factors that hinder South Asian people from participating in research studies, such as the inability to understand and/or speak English. Even the assumptions held or often perceived by researchers can also hinder research participation. Poverty and low

socio-economic status may mean that South Asians may not have the resources to travel far. Extended family involvement might mean not one but two or more people turning up with the study participant, which can often lead to confusion about 'who's answering for who?'. Cultural views such as dignity and modesty may also hinder participation. Women may not talk openly in front of men, and/or even family members (Hussian-Gambles *et al*, 2004, p.9).

A sample of 22 participants all met the inclusion criteria, which were that all the participants must be adults with types 2 diabetes, have not attended a formal diabetes education session in the last six months, be from a South Asian origin, and speak one of the five South Asian languages. The exclusion criteria were set to avoid recruiting people who did not have type 2 diabetes, had received diabetes education input within the last six months, or were not from a South Asian background, and also excluded children. Table 1 illustrates the ethnic makeup of the group, the participants' 'mother tongue', sex mix, and total age of 1334 years, with a median age of 57–60 years, and the duration of type 2 diabetes collectively was 180 years with a median of 8 years.

Table 1 Characteristics of participants

Participant ID and preferred language: U = Urdu; P = Punjabi; B = Bengali; H = Hindi; G = Gujarati	Ethnic group	Religion: I = Islam; H = Hindu; S = Sikh	Gender: F = female; M = male	Age (years)	Duration of type 2 diabetes (years)
1U	P	I	F	45	8
2U	P	I	M	50	7
3U	P	I	F	54	11
4U	P	I	F	47	8
5U	P	I	F	51	10
6U	P	I	M	53	8
1G	G	H	F	74	16
2G	G	H	M	72	1
3G	G	H	M	57	13
1P	I	S	M	85	12
2P	I	S	F	75	16
3P	I	S	M	60	5
4P	I	S	F	63	7
1H	I	H	M	71	3
2H	I	H	F	44	3
3H	I	H	F	64	8
4H	I	S	F	57	3
5H	I	S	F	69	12
1B	B	I	M	76	9
2B	B	I	M	63	5
3B	B	I	F	54	2
4B	B	I	M	50	5
Total 22			F = 12; M = 10	Total age = 1334	Total duration = 180
Median			F	57–60	8
Mode			F	50–57	8
Mean			F	60.64	8.2

Method

Participants were asked to meet with the researcher in their preferred language groups. Each group met once. In all, five meetings were held. The researcher led all of the meetings, with the help of an interpreter where necessary. At the beginning of the meeting each participant was asked to complete the SADK either in writing or using the audiotape. The group then watched a language-specific video about diabetes. These educational awareness videos were used in the author's primary care trust and produced in collaboration with the Focus Group for Asians with Diabetes (FAD), Diabetes UK and LifeScan UK. These videos promote self-care and management of diabetes through a soap opera approach, encouraging empowerment by targeting the South Asian communities. They are available in English and the five South Asian languages: Hindi, Gujarati, Urdu, Punjabi and Bengali (Dixit, 2003, p.25). The videos are titled *Understanding and Managing Diabetes within the Asian Community*, and all of them cover the same aspects of diabetes, for example, insight into different types of diabetes, signs and symptoms of diabetes, management of diabetes (diet and medication), the importance of monitoring, lifestyle changes for the whole family, emphasis on the progressiveness of diabetes, complications of diabetes and dispelling some of myths and misconceptions surrounding diabetes and the Asian community. Unfortunately, like many other educational resources designed specifically for the high-risk communities in the past, these videos have never been evaluated for their effectiveness locally or nationally.

These videos are unique as they all feature actors representing each of the five South Asian communities, emphasising the importance of family involvement through a soap-opera style and addressing the needs through cultural awareness and sensitivity of the uniqueness of each community such as customs, food, religious aspects, myths and misconceptions (Dixit, 2003, p.22). For example, often the belief is that most Punjabi-speaking men wearing turbans are devout, vegetarian people; that the diet of a Bangladeshi person mostly consists of fish and rice; and that most Urdu-speaking individuals are from the Pakistani community.

After the video, each participant was asked to complete the SADK again. Data from each participant were coded to ensure anonymity, and stored separately from consent forms (Cormack, 2000, p.57). Pre- and post-test SADK questionnaires were colour coded to prevent inadvertently mixing up the two sets of data.

Data analysis

The responses of the 22 participants to each of the 24 statements of the SADK generated data through the quantitative paradigm. Both sets of results were analysed and presented in a series of tables that demonstrated the findings through the processes of evaluation and description using the quasi-experimental design. Table 2 illustrates this in relation to statement 1 of the SADK, which showed that before the intervention 80% ($n = 20$) of the participants gave the wrong answer; 10% ($n = 1$) of the group were not sure of the answer; and only 10% ($n = 1$) stated the correct answer. However, post intervention, 86.4% ($n = 19$) of the participants gave the correct answer and 13.6% ($n = 3$) of the Urdu-speaking participants still required further diabetes

Table 2 Results for each of the five groups for statement 1 of the SADK

Group	Pre result: R = right; W = wrong; NS = not sure	Post result: R = right; W = wrong; NS = not sure	Change occurred? Y = yes; N = no	Knowledge increased? Y = yes; N = no	Further input? Y = yes; N = no
Hindi ×5	W = 4; NS = 1	R = 5	Y = 5	Y = 5	N = 5
Punjabi ×4	W = 3; R = 1	R = 4	Y = 4	Y = 4	N = 4
Bengali ×4	W = 4	R = 4	Y = 4	Y = 4	N = 4
Urdu ×6	W = 6	R = 3; W = 3	Y = 3; N = 3	Y = 3; N = 3	Y = 3; N = 3
Gujarati ×3	W = 3	R = 3	Y = 3	Y = 3	N = 3
Total = 22	R = 1; W = 20; NS = 1	R = 19; W = 3	Y = 19; N = 3	Y = 19; N = 3	Y = 3; N = 19

input, due to answering incorrectly before and after intervention. In conclusion, post intervention, 86.4% ($n = 19$) of the participants showed improvement in their understanding and knowledge of diabetes.

Issues in conducting the project

A number of issues arose in conducting the project. First, the participants were all recruited from the researcher's current caseload working as a community diabetes specialist nurse, in a local primary care trust. More participants were anticipated but this was not possible due to time and workload constraints. Generally, South Asian people do not participate in research because of communication barriers due to language differences and inability to speak and/or understand English (Hussain-Gambles et al, 2004, p.9).

Second, the assumptions held or often perceived by researchers can also hinder research participation of this community, such as assumptions about poverty and poor education. Issues such as extended family involvement might mean not one but two or more people turning up with the study participant, which can often lead to confusion about 'who's answering'. Cultural views such as dignity and modesty may also hinder participation; for example, women may not talk openly in front of men, and/or even family members (Hussian-Gambles 2004a, p.9). This study had 12 female and 10 male participants. Despite having an option to attend single-sex groups, all of the participants decided upon a mixed group, and found no problems in voicing their viewpoints.

Third, Indians, Pakistanis and Bangladeshis may speak different languages depending on the area they come from. For example, Sikh people mostly speak Punjabi but may also speak Hindi; Hindu people mostly speak Hindi but also Punjabi; people from Bangladesh and Pakistan mostly speak Urdu. Islamic followers with their roots back in India may also speak a mixture of Punjabi and Urdu. It is imperative to be aware that individual groups originating from rural areas may speak a local dialect as their first language, rather than their national language. For example, Sylheti is spoken by most Bangladeshi people originating from the rural region of Sylhet in Bangladesh, rather than the national language Bengali.

Findings

Data analysis showed that education is essential and should be part of the treatment of diabetes, in order to empower people to take control of the diabetes. Using appropriate resources can further enhance knowledge and understanding. This was evident in the findings of the SADK post-intervention results, showing that learning had occurred. Table 3 illustrates the pre and post results of the 24 statements of the SADK questionnaire collectively. The first column refers to the SADK statements; the second column shows how many got the correct answers to the statements; for example, for statement 2, 12 of the participants stated correctly, i.e. 54.54% as illustrated in the third column. The fourth column highlights the percentage of participants who got that statement wrong; for example, 86.36% got statement 9 wrong before the intervention. The fifth column refers to how many participants got the correct answer post intervention; for example, only 20 participants stated the answer correctly, accounting for 90.90% of the group (sixth column). The seventh and eighth columns both relate to those participants who required further input; for example, for statement 9, 9.09% ($n = 2$) needed further input.

These findings indicate that 22 out of 24 statements of the SADK demonstrated improvement and increased awareness of diabetes in 100% ($n = 22$) of the participants. The SADK results highlighted that education is vital but it can only be effective if it is tailor-made for those people with limited literacy levels, and available in the appropriate formats. According to Pawa (2000, p.6), language differences lead to barriers to empowerment. According to the researcher, empowered people empower others; hence the important concept of word of mouth is often mightier than the ability to read or write.

Out of the 22 participants, 36.4% ($n = 8$) were illiterate. Prerecorded scripts in their preferred languages were offered, providing patient information on the study and the consent form. All of the participants chose to utilise this option to help them understand more about the study details. However, although recording equipment was provided, all of the participants chose to sign their consent forms. A prerecorded SADK in each language was provided for all.

Ninety percent ($n = 21$) of the participants used the audiocassette in their preferred language to help them complete the SADK. Although recording equipment was provided, 59% ($n = 13$) of the participants self-completed the SADK, whereas 41% ($n = 9$) of the participants required help to complete their SADK from either their relatives or carers, due to illiteracy and poor eyesight. It could also have been due to embarrassment, fear or failing memory.

Conclusion

In conclusion, South Asian people with type 2 diabetes need tailored education to increase understanding of their diabetes, enabling them to self-manage effectively. Providing information is not enough. Professionals must develop ways of checking understanding and identify learning needs. Tools such as the SADK offer

Table 3 Pre and post results of the 24 SADK statements

1st SADK statements	2nd Correctly answered pre results (n)	3rd Correctly answered pre results (%)	4th Incorrectly answered pre results (%)	5th Correctly answered post results (n)	6th Correctly answered post results (%)	7th % change occurred	8th Required further input n (%)
1	1	4.5	95.45	19	86.36	81.81	3 (13.63)
2	12	54.54	45.45	21	95.45	40.90	1 (4.5)
3	1	4.5	95.45	21	95.45	90.90	1 (4.5)
4	3	13.63	86.36	22	100	86.36	0
5	19	86.36	13.63	22	100	13.63	0
6	18	81.81	18.18	22	100	18.18	0
7	16	72.72	27.27	22	100	27.27	0
8	18	81.81	18.18	22	100	18.18	0
9	3	13.63	86.36	20	90.90	77.27	2 (9.09)
10	6	27.27	72.72	22	100	72.72	0
11	13	59.09	40.90	22	100	40.90	0
12	13	59.09	40.90	22	100	40.90	0
13	6	27.27	72.72	22	100	72.72	0
14	12	54.54	45.45	22	100	45.45	0
15	22	100	0	22	100	0	0
16	19	86.36	13.63	22	100	13.63	0
17	16	72.72	27.27	22	100	27.27	0
18	15	68.18	31.81	22	100	31.81	0
19	22	100	0	22	100	0	0
20	16	72.72	27.27	22	100	27.27	0
21	2	9.09	90.90	22	100	90.90	0
22	4	18.18	81.81	22	100	81.81	0
23	14	63.63	36.36	22	100	36.36	0
24	3	13.63	86.36	21	95.45	81.81	1 (4.5)

the assessment of understanding and help to clarify the need for further explanation. However, more educational research studies utilising the SADK tool are required to further support its validity and reliability in the assessment of learning in South Asian people with type 2 diabetes.

Another issue is that more people from the South Asian community must be encouraged to participate in research trials, if the healthcare services are to be improved, and to ensure the demands of the high-risk communities are met. Socio-economic factors and assumptions surrounding misconceptions about different sex groups, language or culture should not hinder participation. Perhaps providing localised research centres, catering for different sexes, and appropriate interpreting services may encourage research participation by this particular group of people.

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CONFLICTS OF INTEREST

ADDRESS FOR CORRESPONDENCE

Please seek authorisation to use the SADK questionnaire, or for further information contact: Harbinder Sunsoa (Diabetes Specialist Nurse), 3rd Floor, Lyng Centre, Frank Fisher Way, West Bromwich, West Midlands, B70 7AW, UK. Tel: +44 (0)121 612 2424; fax: +44 (0)121 612 2401; email: harbinder.sunsoa@nhs.net

Appendix 1: Diabetes Knowledge Questionnaire (DKQ) by Garcia *et al* (2001b, p.972), in English and Spanish

Item number	Preguntas / Questions	Sí / Yes	No / No	No sé / I don't know
1	El comer mucha azúcar y otras comidas dulces es una causa de la diabetes.		✓	
1	Eating too much sugar and other sweet foods is a cause of diabetes.		✓	
2	La causa común de la diabetes es la falta de insulina efectiva en el cuerpo.	✓		
2	The usual cause of diabetes is lack of effective insulin in the body.	✓		
3	La diabetes es causada porque los riñones no pueden mantener el azúcar fuera de la orina.		✓	
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.		✓	
4	Los riñones producen la insulina.		✓	
4	Kidneys produce insulin.		✓	
5	En la diabetes que no se está tratando, la cantidad de azúcar en la sangre usualmente sube.	✓		
5	In untreated diabetes, the amount of sugar in the blood usually increases.	✓		
6	Si yo soy diabético, mis hijos tendrán más riesgo de ser diabéticos.	✓		
6	If I am diabetic, my children have a higher chance of being diabetic.	✓		
7	Se puede curar la diabetes.		✓	
7	Diabetes can be cured.		✓	
8	Un nivel de azúcar de 210 mg/dl en prueba de sangre hecha en ayunas es muy alto.	✓		
8	A fasting blood sugar level of 210 mg/dl is too high.	✓		
9	La mejor manera de checar mi diabetes es haciendo pruebas de orina.		✓	
9	The best way to check my diabetes is by testing my urine.		✓	
10	El ejercicio regular aumentará la necesidad de insulina o otro medicamento para la diabetes.		✓	
10	Regular exercise will increase the need for insulin or other diabetic medication.		✓	
11	Hay dos tipos principales de diabetes: tipo 1 (dependiente de insulina) y tipo 2 (no-dependiente de insulina).	✓		
11	There are two main types of diabetes: type 1 (insulin-dependent) and type 2 (non-insulin dependent).	✓		
12	Una reacción de insulina es causada por mucha comida.		✓	
12	An insulin reaction is caused by too much food.		✓	
13	La medicina es más importante que la dieta y el ejercicio para controlar mi diabetes.		✓	
13	Medication is more important than diet and exercise to control my diabetes.		✓	
14	La diabetes frecuentemente causa mala circulación.	✓		
14	Diabetes often causes poor circulation.	✓		

Appendix 1: Continued

Item number	Preguntas Questions	Sí Yes	No No	No sé I don't know
15	Cortaduras y rasguños cicatrizan más despacio en diabéticos.	✓		
15	Cuts and abrasions on diabetics heal more slowly.	✓		
16	Los diabéticos deberían poner cuidado extra al cortarse las uñas de los dedos de los pies.	✓		
16	Diabetics should take extra care when cutting their toenails.	✓		
17	Una persona con diabetes debería limpiar una cortadura con yodo y alcohol.		✓	
17	A person with diabetes should cleanse a cut with iodine and alcohol.		✓	
18	La manera en que preparo mi comida es igual de importante que las comidas que como.	✓		
18	The way I prepare my food is as important as the foods I eat.	✓		
19	La diabetes puede dañar mis riñones.	✓		
19	Diabetes can damage my kidneys.	✓		
20	La diabetes puede causar que no sienta en mis manos, dedos y pies.	✓		
20	Diabetes can cause loss of feeling in my hands, fingers, and feet.	✓		
21	El tremblar y sudar son señales de azúcar alta en la sangre.		✓	
21	Shaking and sweating are signs of high blood sugar.		✓	
22	El orinar seguido y la sed son señales de azúcar baja en la sangre.		✓	
22	Frequent urination and thirst are signs of low blood sugar.		✓	
23	Los calcetines y las medias elásticas apretadas no son malos para los diabéticos.		✓	
23	Tight elastic hose or socks are not bad for diabetics.		✓	
24	Una dieta diabética consiste principalmente de comidas especiales.		✓	
24	A diabetic diet consists mostly of special foods.		✓	

✓ = correct answer

Appendix 2: Statements to Assess Diabetes Knowledge (SADK)

SADK is a tool to assess the knowledge of South Asian people with type 2 diabetes, available in five South Asian languages as well as in English, and available in audio format for those people that have literacy problems.

Please read or listen to the statements and answer all with either 1 = Yes, 2 = No or 3 = Don't know.

Patient ID: _____   Date of birth _____

Patient's spoken or preferred language? _____

Interpreter required? Yes or No

If Yes, which language? _____

Statement number	Statements	1 = Yes	2 = No	3 = Don't know
1	Eating too much sugar and other sweet foods is a cause of diabetes.		✓	
2	The usual cause of diabetes is lack of insulin in the body.	✓		
3	Sugar in the urine is better than having sugar in the blood.		✓	
4	Kidneys produce insulin.		✓	
5	In untreated diabetes, the amount of sugar in the blood goes higher.	✓		
6	If I am diabetic, my children have a bigger chance of becoming diabetics.	✓		
7	We cannot get rid of diabetes, but we can control it.		✓	
8	A fasting blood sugar level of 12 mmol/l is too high.	✓		
9	The best way to check my diabetes is by testing my urine.		✓	
10	Regular exercise will increase the need for insulin or other diabetic medicine.		✓	
11	There are two main types of diabetes: type 1 and type 2.	✓		
12	Eating too much food can make your blood sugars very high.		✓	
13	Medication is more important than diet and exercise to control my diabetes.		✓	
14	Diabetes can cause poor circulation.	✓		
15	Cuts and injuries take time to get better in people with diabetes.	✓		
16	People with diabetes should take extra care when cutting their toenails.	✓		
17	A person with diabetes should clean a cut with alcohol swabs.		✓	
18	The way I prepare my food is as important as the food I eat.	✓		
19	Diabetes can damage my kidneys.	✓		
20	Diabetes can cause loss of feeling in my hands, fingers, and feet.	✓		
21	Shaking and sweating are signs of high blood sugars.		✓	
22	Passing too much urine and feeling thirsty are signs of low blood sugars.		✓	
23	Tight elastic socks and shoes are bad for people with diabetes.		✓	
24	Diabetic diets mostly consist of special foods.		✓	

✓ = correct answer

Thank you very much for your time

Please seek authorisation to use the SADK questionnaire, or for further information contact: Harbinder Sunsoa (Diabetes Specialist Nurse), 3rd Floor, Lyng Centre, Frank Fisher Way, West Bromwich, West Midlands, B70 7AW, UK. Tel: +44 (0)121 612 2424.