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Content Validity of the Illness Perceptions Questionnaire - Revised for People with Type 2  
Diabetes: A Think-Aloud Study

<sup>1</sup>Noleen K. McCorry, <sup>2</sup>Laura Scullion, <sup>3</sup>Claire M. McMurray, <sup>4</sup>Rebecca Houghton and  
<sup>2</sup>Martin Dempster\*

<sup>1</sup>Marie Curie Cancer Care, Marie Curie Hospice Belfast, Northern Ireland

<sup>2</sup>School of Psychology, Queen's University Belfast, Northern Ireland

<sup>3</sup>Praxis Care, Lisburn Road, Belfast, Northern Ireland

<sup>4</sup>Northern Health & Social Care Trust, Northern Ireland

\*Corresponding author:

Martin Dempster

School of Psychology, Queen's University Belfast, University Road, Belfast, Northern  
Ireland, BT7 1NN

Tel: +44 28 90975547

Email: [m.dempster@qub.ac.uk](mailto:m.dempster@qub.ac.uk)

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### **Abstract**

**Objectives:** To access the cognitions of adults with type 2 diabetes whilst completing items on the Illness Perceptions Questionnaire – Revised (IPQ-R). To determine whether these cognitions are congruent with the meaning of items and subscales as interpreted by researchers and clinicians using the IPQ-R and to identify the nature and extent of problems that individuals experience when completing the IPQ-R.

**Design:** Participants (n=36) were recruited from a primary care based diabetes clinic and a hospital based diabetes clinic. They were asked to complete the IPQ-R using a ‘think-aloud’ methodology.

**Main Outcome Measures:** Transcripts were analysed to identify instances where participants expressed problems with item completion, or where there was inconsistency between verbal and written responses.

**Results:** The most problematic items were IPQ-R items 20, 8, 21, 36, 30, and cause item C18. The most problematic subscales were those of ‘personal control’ and ‘consequences’.

**Conclusion:** Generally, participants found the IPQ-R unproblematic. However, there are a small number of IPQ-R items which did consistently cause problems. Specifically, participants had problems with the concept of ‘cure’ and ‘symptoms’ in the context of type 2 diabetes, and with the negative phrasing used in some items. These findings have important implications for the interpretation of IPQ-R scores, particularly when the IPQ-R is used as the basis for individualised interventions among people with type 2 diabetes.

**Keywords:** Illness Perceptions Questionnaire; IPQ-R; Type 2 diabetes; Think-Aloud; Illness Representations

A large body of research has focused on the illness perceptions component of Leventhal's Common Sense Model (Leventhal, Meyer & Nerenz, 1980). The research generally demonstrates that illness perceptions explain a significant proportion of the variance in physical and psychological outcomes in a range of illnesses (Dempster et al., 2011a; Dorrian, Dempster & Adair, 2009; Glattacker, Opitz & Jäckel, 2010; Kaptein et al., 2010). The relationship between illness perceptions and both psychological and physical outcomes has been well established among adults with Type 2 diabetes (French et al., 2008; Lawson, Bundy, Belcher & Harvey, 2010; Searle, Norman, Thompson & Vedhara, 2007a; Searle, Norman, Thompson & Vedhara, 2007b; Searle et al., 2008; Skinner et al., 2006; Skinner et al., 2011; Sultan, Attali, Gilberg, Zenasni & Hartemann, 2011), and the findings of this research have been posited as a basis for interventions to improve well-being among this population.

However, to translate the findings of these modelling studies into an intervention, it is important to understand the meaning behind the questionnaire used to assess illness perceptions. In other words, it is important to know whether the people who complete the questionnaires are interpreting the items on the questionnaire in the same way as they are interpreted by researchers and designers of interventions. For example, research among adults with Type 2 Diabetes has indicated that perceptions of control over diabetes are an important predictor of quality of life (Skinner et al., 2006). Yet, there is no point designing an intervention aimed at modifying individuals' perceptions of control over their diabetes unless we know what individuals understand by the items that purport to measure perceptions of control. It is this element of content validity that is the focus of the present study (see Streiner & Norman, 2001, pp.146-147 for a discussion of content validity).

The questionnaire most commonly used to assess illness perceptions is the Illness Perception Questionnaire-Revised (IPQ-R) (Moss-Morris et al., 2002). The IPQ-R is a revised version of the Illness Perception Questionnaire (IPQ) (Weinman, Petrie, Moss-Morris & Horne, 1996). The IPQ assessed 5 illness perceptions: identity (perceptions of symptoms associated with the illness), controllability/curability of the illness, timeline for the illness, consequences of the illness and cause of the illness. The IPQ-R added items designed to assess illness coherence (the person's perceptions of the extent to which they understand the illness) and emotional representations (the extent to which the person's illness makes them experience symptoms of anxiety or depression). The authors of the IPQ-R also divided the timeline dimension into 2 factors (timeline cyclical and timeline acute/chronic) and divided the cure/control dimension into 2 factors (personal control and treatment control). Timeline cyclical refers to the perception of the cyclical nature of the illness across time; timeline acute/chronic is the person's perception about the illness passing quickly or not. Personal control refers to perceptions of the person's ability to control the illness, whereas treatment control refers to perceptions about the effectiveness of any treatment or the effectiveness of medical personnel to control the illness.

Moss-Morris et al. (2002) provide evidence for the validity and reliability of these dimensions when tested among a group of 711 people from 8 different illness populations. Although this evidence is convincing and includes people with diabetes, the evidence for validity (and reliability) is not presented separately for the different illness groups. Therefore, there is no published information about the psychometric properties of the IPQ-R when used among people with Type 2 Diabetes specifically. This is an issue of concern for anyone wishing to use the IPQ-R among people with Type 2 Diabetes, as the interpretation and grouping of items on the IPQ and the IPQ-R has been shown to differ among different illness populations (Cabassa, Lagomasino, Dwight-Johnson, Hansen & Xie, 2008; Chen, Tsai &

Lee, 2008; Hagger & Orbell, 2005; Fleming, Martin, Miles & Atkinson, 2009; Giannousi, Manaras, Georgoulas & Samonis, 2010; Heijmans & de Ridder, 1998; Hirani, Pugsley & Newman, 2006). Furthermore, French and Weinman (2008) have highlighted that some of the items on the IPQ-R might need to be adapted for specific illness populations, such as people with diabetes, and that there is a need to engage in a process of interview-based research to identify which items might require amendment. Clearly, then, it is important that the validity of the IPQ-R is demonstrated at the specific population level.

There are a number of cognitive interview techniques which are useful methods to examine the potential problems with individual items on a questionnaire (see Willis, 2005, for a discussion). One commonly used method in psychology is the 'Think Aloud' method (van Someren, Barnard & Sandberg, 1994), which requires participants to verbalise their thoughts as they undertake a task (completing a questionnaire in this case). Consequently, the Think Aloud method enables researchers to access the cognitive processes underlying a particular action (choosing a response to an item on the questionnaire), and therefore provides some insight into the interpretation of the questionnaire items by the respondent. This method has been used previously to investigate the manner in which people respond to items on questionnaires (Boeije & Janssens, 2004; Darker & French, 2009; French & Hevey, 2008; Westerman et al., 2008), including a think-aloud analysis (van Oort, Schröder & French, 2011) of the brief version of the IPQ (Broadbent, Petrie, Main & Weinman, 2006).

The aim of the present study is to access, using the Think-Aloud method, the cognitions of adults with Type 2 Diabetes whilst completing items on the IPQ-R, to determine whether these cognitions are congruent with the meaning of items / subscales as interpreted by researchers and clinicians using the IPQ-R (as originally conceptualised by authors of the IPQ-R).

## **Methods**

## Participants

Participants were recruited from a primary care based diabetes clinic and a hospital based diabetes clinic. Patients who were scheduled to attend these clinics at the time of data collection, and who met the study inclusion criteria (n=205) were sent information about the study by post. Patients satisfied the inclusion criteria if they were over 18 years of age and had been diagnosed with Type 2 Diabetes at least one year prior to data collection. Those who responded (n = 42) were contacted to arrange a suitable time for participation. Data collection was completed with 36 participants. In four cases participants had significant difficulty in expressing their thought processes verbally, and their data was subsequently excluded from further analyses. Consequently the final study sample consisted of 32 participants (50% male). The mean age of participants was 64.77 years (SD 10.00). Mean time since diagnosis was 7.69 years (SD 6.31). Diabetes treatment was by diet and lifestyle modification alone (n=5; 15.63%), oral medications / lifestyle modification (n=18; 56.25%), and a combination of insulin injections / lifestyle modification / oral medications (n= 9; 28.13%). Participants current mean HbA1c was 7.74% (61mmol/mol), ranging from 5.50% (37mmol/mol) to 10.10% (87mmol/mol). The presence of at least one diabetes-related complication (diabetic neuropathy, diabetic retinopathy, erectile dysfunction) was indicated in the medical notes of seven participants (21.88%).

## Procedure

Before commencing the IPQ-R think-aloud task, each participant was read the following instructions, adapted from a set of 'best practice' instructions for think-aloud studies (Ericsson & Simon, 1993; Green & Gilhooly, 1996):

We are interested in what you think about when completing the questionnaire. In order to do this, I am going to ask you to THINK ALOUD as you work. What I mean by 'think aloud' is that I want you to tell me EVERYTHING you are thinking from

the time you read the instructions and the first item until you reach the end of the questionnaire. I don't want you to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking. If you are silent for any long period of time, I will ask you to talk. Please try to speak as clearly as possible, as I shall be recording you as you speak. Do you understand what I want you to do?

Participants were further familiarised with the think-aloud method using a warm-up task, during which participants responded (using a 5 point Likert scale similar to that used by the IPQ-R) to questions about their dental care. Following the warm-up task, any further questions were clarified before the IPQ-R was administered. Once participants began the task they were not interrupted unless they fell silent for 10 seconds, at which point the researcher prompted them to 'keep talking' or 'tell me what you're thinking', in accordance with think-aloud protocol (Darker & French, 2009; Ericsson & Simon, 1993; Green & Gilhooly, 1996). Data collection sessions lasted between 30 minutes and one hour. The IPQ-R think-aloud session was audio-recorded, and all speech during the task was transcribed verbatim. The IPQ-R version used was the full version adapted for diabetes, as published on the IPQ-R website ([www.uib.no/ipq](http://www.uib.no/ipq)).

### **Analysis**

Analysis of the data followed a content analysis approach. Five transcripts were used to generate a coding framework by the first and second authors. Codes were generated from any discrepancies in verbal and written responses, and verbal difficulties expressed while completing the questionnaire. The coding framework was discussed and revised in consultation with the remaining authors. The first and second authors then independently coded the data from a further five participants and a kappa statistic was calculated to assess the level of agreement between the raters. Inter-rater reliability was found to be high (kappa =



.857,  $p < .001$ ). The coding framework was independently applied by the first and second authors to the entire dataset, and discrepancies were resolved through discussion. The final coding framework consisted of seven codes: 'no problems' (indicating that there were no problems experienced with this item by the participant), 'not applicable' (participants expressed the opinion that the item was not appropriate to their circumstances), 'incongruent response' (where written and verbal responses were clearly incongruent), 'different question' (participants answered a different question to that which was asked), 'confusion' (participants indicated that they did not fully understand the content of the item), 'Missing' (the item was omitted completely), and 'repeated question' (participants repeated or stumbled over the question several times as a result of difficulty in understanding the item as a result of its structure). The final six codes in this list were considered to be 'problematic' for the interpretation of an item. Responses were coded as unproblematic unless there was think-aloud data to the contrary.

## Results

Table 1 provides details of the frequency and nature of problems experienced by participants for individual items of the IPQ-R, where five or more problems were identified. A table displaying the results for all items can be found online.

### Location of Table 1

The most problematic item was 'cause: altered immunity'. Almost 60% ( $n=19$ ) of participants expressed confusion about the meaning of this term:

Altered Immunity. - huh huh...I don't even understand that question ...I suppose if being happy and contented in your life is an altered immunity then I would say yea I agree with that ..but if you were happy and you were content ....that would alter your immunity in life ....as well as probably your diabetes. [P29 endorses 'agree' option]

‘Incongruent responses’ accounted for most of the problems with two of the items. For example, 12 participants (37.5%) indicated in their verbal response to the item ‘my diabetes does not have much effect on my life’ that diabetes did not impact on their life, but would then choose the ‘disagree’ response on paper (or vice versa).

Similarly 11 participants (34.4%) indicated in their verbal response to the item ‘my diabetes does not worry me’ that they did worry about their diabetes, but would then choose the ‘agree’ response on paper (or vice versa).

]

Both of these items use negative phrasing, and some participants appeared to have difficulty with the nature of the wording of these items. The items ‘nothing I do will affect my diabetes’ and ‘my actions will have no effect on the outcome of my diabetes’ also use negative wording and caused problems of incongruent response for 3 (9.4%) and 4 (12.5%) participants respectively.

The items ‘my treatment will be effective in curing my diabetes’ and ‘my symptoms come and go in cycles’ were perceived by some respondents as not being applicable to their own experience of the illness. In response to the item ‘my treatment will be effective in curing my diabetes’, 18 (56.3%) participants did not endorse the concept of a cure for diabetes.

Similarly whilst some individuals produced a low score on the item ‘my symptoms come and go in cycles’ because they didn’t perceive their symptoms to be cyclical in nature (believing them to be more stable and chronic), 8 participants (25%) produced a low score because they believed that they did not have any symptoms.

Two other IPQ-R items which mention ‘symptoms’ (‘the symptoms of my condition are puzzling to me’, and ‘the symptoms of my diabetes change a great deal from day to day’) also produced problems of this nature for 4 (12.5%) participants.

The think-aloud data also revealed some interesting examples of how responses to IPQ-R items were sometimes considered in relation to the individual's appraisal of their own coping responses. This was particularly common in response to consequence items. For example low scores in response to the 'consequences' item 'my diabetes strongly affects the way others see me' were found to reflect two distinct beliefs. The first of these, represented in the quote below, considers diabetes to be a common illness with little associated stigma which therefore does not impact on other people's perception of the individual.

It's a normal thing now, years ago it was a bit taboo being diabetic, it was more stricter years ago but now there's more research into it and people accept it ... it's not as taboo a subject as it was years ago. [P24 endorses 'disagree' option]

The second response type which also results in a low 'consequences' score represents the belief that diabetes will have little effect on others' perceptions of the individual because the participant has chosen to withhold this information from others (reflecting their coping response). It is sometimes clear that the individual has chosen this coping response *because* they believe their health status will affect how others see them.

A lot of people don't know. My employers don't know I have it... they'd have you straight off the job ... Well a lot of firms and companies would say that they are not prejudiced against this here, but you wouldn't be there two months before they'll find some reason to get you out [P23 endorses 'disagree' option]

Similarly, there are quite distinct profiles of beliefs in relation to the consequences of diabetes represented by low scores on the item 'my diabetes is a serious condition'. Some participants produced low scores on these 'consequence' items because they did not perceive their illness to be a serious or life-threatening, whilst others produced low scores because they had appraised the impact of diabetes in relation to their own efforts at behavioural management (a coping response).

My diabetes is mild... and it doesn't affect my eyes or kidneys or anything. I think I'll probably die of something else. I'm overweight and I have angina... [P42 endorses 'disagree' option]

My diabetes is a serious condition, illness - well yes and no. I've had it that long I'm working at it, so no I don't look on it as a serious condition, but maybe I should but because it's under control I know it doesn't have to be serious. So ...em...strongly disagree ...oh maybe. Whether to agree or disagree because in a way it's controlled so it doesn't have to be [P25 endorses 'disagree' option]

Whilst both response types are consistent with the belief that diabetes will have less severe consequences on the individual, and were not coded as problems, they do represent quite distinct patient profiles.

A similar phenomenon was observed in response to the 'timeline acute / chronic' item 'my diabetes will improve in time', with some participants making reference to the effect of their own efforts or treatment effects on their experience of the illness over time.

it's down to me if it gets better, my behaviour, taking medication, doing what I'm told...symptoms can improve... it's not the diabetes that's improved [P40 endorses the 'agree' option]

Hence the above participant produced a low score on this 'timeline acute/chronic' item (representing a belief that diabetes has an acute timeline) because they considered the consequences of their own coping efforts in improving their experience of the illness, whilst still endorsing the chronic nature of diabetes in their verbal response.

## Discussion

French and Weinman (2008) predicted that items on the IPQ-R that addressed the concepts of symptoms and cure could be problematic when the questionnaire was used among people with diabetes. The present study empirically supports these assertions. Over half of participants thought that reference to the effect of treatment in curing diabetes was not relevant or appropriate to their experience of the illness or its management. However, frequently these participants explicitly endorsed the concept of treatment control in type 2 diabetes, resulting in contradictory scores on individual items within this ‘treatment control / cure’ subscale. The current findings suggest that the concepts of cure and control be at least measured separately for populations with type 2 diabetes. In fact, perceptions of ‘treatment control’ may be even more multi-faceted among people with diabetes, incorporating beliefs about the effectiveness of treatment to control diabetes and the effectiveness of treatment to prevent complications – beliefs which are represented by distinct factors within the Diabetes Illness Representations Questionnaire (DIRQ; Skinner et al., 2003).

Participants also expressed difficulties with the concept of ‘symptoms’ encompassed within several of the IPQ-R items, and many could not relate to the experience of diabetic ‘symptoms’ at all. This resulted in scores, particularly on the ‘timeline cyclical’ subscale which were not representative of respondents’ illness representations in relation to timeline. The understanding and experience of symptoms within the context of diabetes may be more complex than is the case for other chronic illnesses. After diagnosis and initiation of treatment people with diabetes are less likely to experience overt symptoms of the illness, especially in the absence of any diabetes-related complications. In addition, where respondents within the current study did verbalise their thoughts in relation to symptoms, these were often symptoms of treatment (rather than the illness per se), such as hypoglycaemia. The perceived symptoms of treatment may be an important aspect of illness representations to be measured among people with diabetes as it is likely to impact

particularly on treatment adherence behaviours, as well as perceptions of control and psychological wellbeing. Whilst these representations about the impact / symptoms of treatment may be captured to some extent by items within the ‘consequences’ scale of the IPQ-R, consideration should be given to the distinction between both the consequences and symptoms *of the illness*, and the consequences and symptoms *of treatment* for people with diabetes.

Whilst the problems described above may be specific to populations with diabetes, two other more generic issues of understanding were noted in the think-aloud data, which are likely to have more universal implications. Firstly, participants appeared to experience problems with items that used negative phrasing. Consequently, incongruent verbal and written responses were observed with these items, where participants’ written responses were opposite to their actual (verbally expressed) illness representation. The inclusion of negatively worded items in a questionnaire might be considered good practice, in an effort to address problems such as response sets, and thereby minimise systematic error. However, agreeing, and especially disagreeing with negatively worded items adds a degree of cognitive complexity to the task of responding to a questionnaire, and performance on negatively worded items has been found to be related to verbal ability (Marsh, 1996). On balance, it appears that negatively worded items might lead to more problems than they solve and so should probably be avoided in the construction of questionnaires (Roszkowski & Soven, 2010).

In addition, the concept of ‘altered immunity’ was not widely understood by our participants, with two thirds of the sample expressing difficulty with this cause item. An analysis of response patterns in existing research data sets would help to identify whether other populations also have difficulty with this item, as respondents may be more likely to

endorse the middle option (neither agree nor disagree) for items that they find problematic (Darker & French, 2009).

Some interesting variability was observed in participants' verbal responses, particularly to 'consequence' items, such that the same score on items could reflect very different profiles of illness representation, dependent on whether the respondent reflected on their own ability to cope (with the potential consequences of the illness) before endorsing their response to these items. Dempster & McCorry (2012) suggest that the items on the consequences factor represent the outcomes of an appraisal process, i.e. perception of the consequences after a consideration of the resources available to cope with these consequences. This observation may help to explain why the majority of research in this area has found no mediating role for coping in the explanation of psychological wellbeing (Hagger & Orbell, 2003; Dempster et al., 2011b). Further work is needed to elucidate the extent and impact of this response type.

It is important to note that the success of the think-aloud method is dependent upon participants' ability to verbalise their cognitions, and not all participants did this consistently throughout the task (as is common in think-aloud research). Hence, problems with the IPQ-R may be underestimated in this study because responses were coded as unproblematic unless there was think-aloud data to the contrary. In addition the coding of problems was more conservative than the approach taken in other research (e.g. van Oort et al., 2011) in that simply stumbling or re-reading an item was not coded as a problem. The 'repeat question' code was only applied where there was clear evidence that the participant had difficulty understanding the question.

Given that approximately 20% of those approached agreed to participate there is a potential bias in the sample. Perhaps the participants were more likely to engage with healthcare services and therefore may have been a particularly well-informed group with a

different profile of illness representations than non-participants. However, the characteristics of the sample appear representative of the population of people with type 2 diabetes in the UK, in terms of age, gender and treatment profile (Diabetes UK, 2011).

This study has highlighted some issues with the IPQ-R when used among people with type 2 diabetes, although for the majority of items on the IPQ-R, no problems were identified. Nevertheless the issues identified have important implications for the interpretation of scores by researchers and clinicians, particularly when the IPQ-R is used as the basis for individualised interventions among people with type 2 diabetes.



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Table 1: Frequency and nature of problems experienced by participants for individual items and sub-scales of the IPQ-R

	No Problems	Not Applicable	Incongruent Response	Different Question	Confusion	Missed	Repeated/ Stumbled	Total
My diabetes will last a short time		0	2	0	2	0	0	4
My diabetes is likely to be permanent rather than temporary		0	3	0	0	0	0	3
My diabetes will last a long time		0	1	0	0	0	0	1
This diabetes will pass quickly		0	2	0	1	0	0	3
I expect to have this diabetes for the rest of my life		0	1	0	0	0	0	1
My diabetes will improve in time		0	2	0	0	1	0	3
<b>Timeline (acute/chronic)</b>		<b>0</b>	<b>11</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>15</b>
		0	1	0	0	0	0	1

My diabetes is a serious condition.

My diabetes has major consequences on my life.	0	0	0	1	0	0	1
My diabetes does not have much affect on my life.	0	10	0	0	0	2	12
My diabetes strongly affects how others see me.	5	1	0	0	0	0	6
My diabetes has serious financial consequences.	0	4	0	1	0	0	5
My diabetes causes difficulties for those who are close to me.	0	1	0	1	0	0	2
<b>Consequences</b>	<b>5</b>	<b>17</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>27</b>
	1	0	1	0	0	0	2
There is a lot which I can do to control my symptoms.							
What I do can determine whether my diabetes gets better or worse.	0	2	0	0	0	5	7
The course of my diabetes depends on me	0	1	0	0	1	0	2



Nothing I do will affect my diabetes.	0	3	0	2	1	2	8
I have the power to influence my diabetes.	0	1	0	4	0	1	6
My actions will have no affect on the outcome of my diabetes.	0	4	0	2	0	1	7
<b>Personal control</b>	<b>1</b>	<b>11</b>	<b>1</b>	<b>8</b>	<b>2</b>	<b>9</b>	<b>32</b>
There is very little that can be done to improve my diabetes.	1	2	0	3	0	1	7
My treatment will be effective in curing my diabetes.	18	0	0	0	0	0	18
The negative effects of my diabetes can be prevented (avoided) by my treatment	1	1	0	9	0	0	11
My treatment can control my diabetes.	0	3	0	1	0	0	4
There is nothing which can help my diabetes.	0	1	0	1	0	1	3
<b>Treatment control</b>	<b>20</b>	<b>7</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>2</b>	<b>43</b>
The symptoms of my diabetes are puzzling	4	1	0	1	0	0	6

to me

My diabetes is a mystery to me.	0	1	0	0	0	0	1
I don't understand my diabetes.	0	2	0	1	0	0	3
My diabetes doesn't make sense to me.	0	1	0	2	0	0	3
I have a clear picture or understanding of my diabetes.	0	4	0	0	0	0	4
<b>Illness coherence</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>17</b>
The symptoms of my diabetes change a great deal from day to day.	4	1	0	2	0	0	7
My symptoms come and go in cycles.	8	0	0	1	0	0	9
My diabetes is very unpredictable.	1	0	0	1	0	0	2
I go through cycles in which my diabetes gets better and worse.	1	1	0	0	0	0	2
<b>Timeline (cyclical)</b>	<b>14</b>	<b>2</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>20</b>
I get depressed when I think about my	0	0	0	0	0	0	0

diabetes

When I think about my diabetes I get upset.	0	0	0	0	0	0	0
My diabetes makes me feel angry.	0	0	0	1	0	0	1
My diabetes does not worry me.	0	8	0	1	0	2	11
Having this diabetes makes me feel anxious.	0	1	0	0	0	0	1
My diabetes makes me feel afraid.	0	1	0	0	0	0	1
<b>Emotional Representation</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>14</b>
Stress or worry	0	1	2	0	0	0	3
Hereditary – it runs in our family	0	1	0	1	0	0	2
A germ or virus	0	1	0	1	0	0	2
Diet or eating habits	0	2	0	0	0	0	2
Chance or bad luck	0	3	0	1	0	0	4
Poor medical care in my past	0	1	0	0	0	0	1
Pollution in the environment	0	2	0	0	0	0	2
My own behaviour	0	0	2	0	0	0	2

My mental attitude, eg. thinking about life negatively	0	0	4	0	0	0	4
Family problems or worries	0	1	6	0	0	0	7
Overwork	0	0	0	0	1	1	2
My emotional state e.g. feeling down, lonely, anxious, empty	0	0	0	0	0	0	0
Ageing	0	1	0	0	0	0	1
Alcohol	0	1	2	0	0	0	3
Smoking	0	0	2	0	0	0	2
Accident or injury	0	0	2	1	0	0	3
My personality	0	0	2	0	0	0	2
Altered immunity	0	1	0	19	0	0	20
<b>Cause</b>	<b>0</b>	<b>15</b>	<b>22</b>	<b>23</b>	<b>1</b>	<b>1</b>	<b>62</b>