

# DEVELOPMENT AND VALIDATION OF AN AUSTRALIAN DIABETES KNOWLEDGE QUESTIONNAIRE

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## INTRODUCTION

The 2007 Australian National Consensus Position on Outcomes and Indicators for Diabetes Patient Education (O&I) identified knowledge and understanding, self-management, self-determination and psychological adjustment as the four key outcomes of diabetes education interventions, with knowledge and understanding as the outcome most directly affected by diabetes patient education<sup>1</sup>.

Although knowledge acquisition does not translate into behaviour change, a myriad of studies acknowledge the need to assess knowledge as an important measure of effectiveness of educational interventions and as a prerequisite for informed health decision making<sup>1</sup>.

Australia does currently not have a consistent and agreed instrument for assessing diabetes knowledge and understanding.

A subsequent literature review and consultation with international experts identified only three validated diabetes knowledge questionnaires/scales, however these were either outdated or not suitable for the Australian context<sup>2</sup>.

## AIM

We aimed to develop, pilot and validate a generic, brief Diabetes Knowledge Questionnaire (DKQ) suitable for the Australian context and applicable to type 1 and 2 diabetes.

## METHODS

### Development of the questionnaire:

1. Conducted two rounds of a Delphi survey of 52 purpose selected key opinion leaders to establish the most important topics and phrasing of the questions for inclusion in the questionnaire.
2. Draft pilot questionnaire presented to consultation workshop with ADEA members (n=181) during the ADEA national conference in Christchurch, 2007.
3. Revised draft pilot questionnaire

### Pilot testing

4. Small pilot on people with diabetes (n=6) to obtain feedback with regard to ambiguity, clarity and burden of the draft DKQ.
5. Slight revision of pilot questionnaire
6. Large scale pilot testing on people with type 1 and 2 diabetes (n=129) recruited from three diabetes education centres in NSW and participants of group education programs held at Diabetes Australia-NSW (DA-NSW).
7. The same pilot questionnaire was sent to 57 people with type 1 and 2 diabetes randomly selected from the DA-NSW membership database. Invited members were asked to complete the pilot DKQ on two occasions 2-3 weeks apart via a postal mail out.

### Psychometric analysis

8. Internal consistency was assessed using Cronbach's alpha.
9. Test-retest reliability was assessed using Pearson's Product Moment correlation co-efficient and paired t-tests to examine consistency and stability of responses.

### Delphi Survey

The Delphi technique was chosen as a feasible approach to gaining a consensus among a panel of geographically dispersed stakeholders involved in diabetes education and/or care. A purposive sample of 52 stakeholders including diabetes educators, dietitians, endocrinologists, paediatric endocrinologist, podiatrists, psychologists, primary care physicians/academics, and research/academics were invited to participate in an email Delphi survey.

In the first round of the survey participants were asked "How important do you think is it that ALL people with diabetes know (ie correctly answer) the following questions about diabetes?" Participants could rate their opinion with "very important/somewhat important/not very important/not at all important or don't know" to a list of topics headed under the domains of: what is diabetes, self-management, medical care and psychological issues. They were also asked to indicate other domains not already listed that they believed were "very important" for a person with diabetes to have adequate knowledge of. The second round of the Delphi survey was based on the domains that were answered as 'very important' by  $\geq 60\%$  of survey respondents in the first



Consultation workshop with ADEA members, Christchurch, 2007.



Diabetes Australia-NSW group education program participant completing the Diabetes Knowledge Questionnaire.

round. Additional domains identified by respondents were only included if they were listed by  $\geq 15\%$  of respondents.

The second round of Delphi survey was sent out to the 37 respondents of the first round and consisted of a set of 20 multiple choice draft questions. Participants were asked to indicate their opinion to each question to whether it should be included in the final questionnaire, whether the question should be modified and what priority ranking they would allocate to the particular question.

## RESULTS:

### Delphi Survey

The response rate from the first round of the Delphi survey was 71% (n=37) and 62% for round two (n=23).

The final questionnaire contains 15 diabetes knowledge questions and seven demographic questions.

The 15 knowledge questions include:

- 12 multiple choice questions common to type 1 and 2 diabetes including the following topics:
  - normal blood glucose levels and HbA1c
  - diet
  - exercise
  - complications
  - self monitoring of blood glucose levels
  - sick-day management
  - annual checkups
  - National Diabetes Services Scheme

- Two questions to be completed by people on oral medication and/or insulin only consisting of one question on diabetes medication and one question on hypoglycaemia

- One question to be completed by people with type 1 diabetes only regarding sick-day management

The seven demographic questions include:

Age, gender, duration and type of diabetes, type of medication (if any) and previous visit to a diabetes educator and dietitian.

The Flesch test readability score for the total questionnaire was 66.5 with a Flesch-Kincaid Grade of level 6.2. (This is based on American students, and is the grade at which the average student could read at least 50% of the content. Thus, this equates to a reading age of 11.)

### Internal consistency

Analysis of the 129 completed large scale pilot test showed a good internal consistency with a Cronbach's Alpha of 0.73 for the first twelve questions, common to all individuals.

With the additional question for type 1 diabetes regarding sick-day management, the internal consistency is slightly better Alpha=0.79. Similarly, Alpha is slightly better at 0.76 with the two additional questions regarding medication and hypoglycaemia (which are answered by people on medication and/or insulin only).

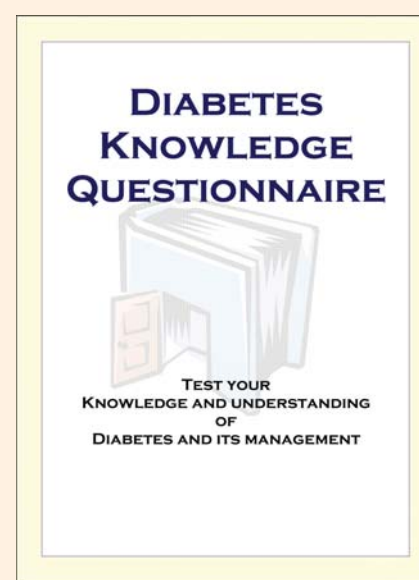
No question seemed to particularly adversely affect the overall consistency of the questionnaire.

### Test-retest reliability:

Comparing first and second of the 57 completed pilots, total scores show good reliability with no evidence of change over time  $t=1.73; df=56; p<0.05$ , with a test re-test correlation of 0.62.

### Conclusion:

The Diabetes Knowledge questionnaire has undergone rigorous validation. Psychometric analysis has shown good reliability and internal consistency. The questionnaire is now ready to use as a tool for evaluating diabetes education interventions, provided all the questions are adequately covered and explained during an education session.



### References

1. Eigenmann C. & Colagiuri R. Outcomes and Indicators for Diabetes Education A National Consensus Position. Diabetes Australia, Canberra, 2007
2. Eigenmann C, Colagiuri R, Skinner TC, Trevena L. Are current psychometric tools suitable for measuring outcomes of diabetes education? Diabetic Medicine, 26:425-436