

# Diabetes: development and preliminary psychometric testing of an instrument to evaluate the effectiveness of patient education

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**INTRODUCTION:** According to the American Diabetes Association, approximately 18.3% (8.6 million) of Americans age 60 and older deal with diabetes. An estimated 50% of all diabetes occurs in patients aged 55 and older. Diabetes is a long-term chronic condition that is complex to manage. The majority of diabetes management is executed by patients outside the clinical setting (self-management). Effective self-management requires (1) knowledge/skills, (2) an adequate level of self-efficacy, and (3) the ability to make decisions and daily choices about treatment and lifestyle. Preparing patients with these self-management skills is a challenge. It is widely accepted that structured education is an integral part of the management of diabetes. Education involves an inter-professional approach with a team of qualified health care professionals, and supports the patient by using positive feedback and motivational strategies. A rigorously constructed and psychometrically validated instrument can be used to assess the effect of education in diabetes patients. The aim of this study was to develop a valid and reliable instrument to evaluate the effectiveness of education on (1) patients' knowledge (2) self-efficacy, and (3) self-care.

**METHODS AND MATERIALS:** A prospective psychometric instrument validation study was performed. An extensive literature review was performed to develop a (1) knowledge, (2) self-efficacy and (3) self-care assessment instrument for patients concerning their diabetes management. Face and content validity of the instruments were evaluated in a double Delphi procedure by a panel of 14 endocrinologists, general practitioners, podiatrists, dieticians and nurses with an extensive experience in diabetes care and education. A convenience sample of 188 diabetes patients from Belgium participated to evaluate construct validity and internal consistency of the instruments. Additionally, the item difficulty and discriminating index of the multiple-choice test items of the knowledge instrument were evaluated.

**RESULTS:** A 21-item multiple-choice knowledge instrument, reflecting knowledge about (1) 'glycemic control' and (2) 'medico-social management aspects', was developed. The self-efficacy instrument included 32 statements, reflecting the themes (1) 'treatment and compliance' and (2) 'general lifestyle'. The self-care instrument included 30 items reflecting the themes (1) 'nutrition', (2) 'treatment', and (3) 'lifestyle'. The content validity of the instruments was excellent [Content Validity Index (CVI) =0.79-0.88]. Group knowledge scores of Type I diabetes patients (mean=0.80, SD=0.15) were found to be statistically significantly higher than those of Type II diabetes patients (mean=0.60, SD=0.21) ( $P<0.001$ ). The item difficulty index of the items in the knowledge instrument ranged between 0.54 and 0.89, while values for item discrimination ranged from 0.26 to 0.68. The internal consistency reliability (Cronbach's alpha) of the instruments were between 0.79 and 0.86.

**CONCLUSION:** Preliminary psychometric testing suggests that the instruments are reliable and valid. Replication of this study with a larger sample is indicated to determine relationships between the scores on the different instruments and to determine the stability of the instruments. Further research should include testing the instrument in clinical settings to explore the relation between clinical parameters (eg. blood glucose and Hgb A1c) and instrument scores. Currently, the instrument can be applied in patient educational settings and research to evaluate the effectiveness of diabetes education on an individual patient basis.