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Author Block: [1]Department of Diabetes and Endocrinology, Nottingham University Hospitals NHS Trust, Nottingham, UK, [2]Department of Psychology, Durham University, Durham, UK, [3]Department of Diabetes, Kings College Hospital, London, UK, [4]School of Health Sciences, University of Surrey, Guildford, UK, [5]School of Health Sciences, University of Nottingham, Nottingham, UK.

Abstract:

Background and aims: There is a need for a brief measure to assess diabetes-related emotional distress in people with type 1 diabetes (T1D) and also responsiveness following interventions aimed at reducing such distress. The 20-item Problem Areas in Diabetes (PAID-20) questionnaire is lengthy for routine use in clinical settings. We analysed PAID data to determine whether a shortened form could be derived without loss of reliability, validity and sensitivity to change in a large cohort of people with T1D.

Materials and methods: Information was extracted from a research database covering 10 UK centres, including PAID data collected before and one year after participants with T1D had attended a DAFNE (Dose Adjustment For Normal Eating) diabetes structured education course. Exploratory factor analysis (EFA) with a principal axis factoring method was conducted on the baseline (pre-intervention) data to determine whether a shorter PAID scale would retain the psychometric properties of the original scale. Confirmatory factor analysis (CFA) was conducted on 1-year post-intervention data to check the reliability of the initial factor solution.

Results: Of 2496 people taking the DAFNE course, baseline PAID-20 data were available for 1772, (mean age 48 (SD 14) years, duration of diabetes 24 (14) years and 51% female). One year follow-up data were complete in 1096 with HbA1c 8.67 (1.54)% (71.3 (16.9) mmol/mol) before and 8.37 (1.46)% (68.0 (15.1) mmol/mol) 12 months after DAFNE (P<0.001) and corresponding PAID-20 scores 27.9 (19.6) and 20.2 (17.4) (P<0.001). We successively removed from PAID-20: a) one question with a factor loading less than 0.50, b) 5 questions with mean scores below 1.0 (indicating floor effects) to create PAID-14 and finally, c) the 3 questions with the lowest reliability (convergence with both PAID-14 and PAID-20 < 0.65) to formulate an 11-item PAID. PAID-11 has high internal (Cronbach's α = .96) and test-retest (r = .61) reliability. For the post-DAFNE confirmatory analysis, the same 11 questions in PAID showed the highest factor loadings. The area under the curve analysis showed the optimal cut-off score for detecting significant diabetes related distress (equivalent to PAID-20 score of 33) was 16.5 in PAID-11. For the 1034 participants with complete,

paired data, the PAID-11 score fell from 14.1 (10.1) at baseline to 11.0 (9.1) after DAFNE ($P<0.001$).

Conclusion: There is apparent redundancy in the PAID-20 questionnaire as applied to people with T1DM as an 11-item version of the questionnaire can be used without loss of sensitivity or specificity, and shows a similar responsiveness to change after an intervention. The PAID-11 questionnaire therefore appears suitable both to determine diabetes related distress in people with T1D and responsiveness to a relevant intervention. Its relative brevity may enhance its usefulness in everyday clinical practice.