Validity and reproducibility of the Prime Diet Quality Score (PDQS) against a four-day food diary in adults at risk of cardiovascular disease on the island of Ireland

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Determining the association between diet and non-communicable diseases (NCDs) requires accurate dietary assessment, but standard methodology is burdensome [1], and the American Heart Association has called for widespread adoption of valid, rapid diet screening tools [2]. A significant association between a novel food- based diet quality index, the Prime Diet Quality Score (PDQS) and reduced risk of cardiovascular disease (CVD) has been demonstrated in a US population [3] but evidence on use of this diet screening tool in European populations is lacking. In this study, we aimed to amend the PDQS for a UK/Irish population and determine its validity and reliability in a population at risk of CVD. Participants at risk of CVD i.e., who were 45 years and over and either overweight, had a history of hypertension, hypercholesterolaemia or a current smoker, were recruited at Queen's University Belfast and University College Dublin. The PDQS was amended for a UK/Irish population and participants were asked to complete both the test (PDQS) and reference (4-day food diary) measures at months 0 and 3. Total PDQS score was calculated directly from PDQS and indirectly from food diaries by coding PDQS-relevant food groups, converting weight (g) consumed to portion/servings based on published portion size guidance and converting to equivalent PDQS frequency categories. Validity was determined using Spearman correlation coefficients and intraclass correlation coefficients (ICCs) for PDQS scores obtained from the PDQS and food diaries, and weighted kappa to determine the ability of the PDQS to categorise participants into equal thirds of PDQS score from food diary data. Reliability was determined using Spearman correlation coefficients (r), ICCs, weighted kappa and coefficient of variation for PDQS scores obtained at both timepoints. In total, n = 120 participants were recruited. Mean age of participants was 59.0 years (SD: 9.7), 78.3% were female, 38.3% were overweight, 51.3% obese, 43.5% reported hypertension, 40.9% reported hypercholesterolaemia and 15.7% smoked. Spearman correlation coefficients indicated that total PDQS score from PDQS was statistically significantly correlated with total PDQS score from food diaries at months 0 ($r = 0.59$, $p < 0.01$) and 3 ($r = 0.65$, $p < 0.01$), with similar associations observed via ICCs at months 0 (0.70 (0.49–0.81)) and 3 (0.73 (0.41–0.86)). Weighted kappa indicated moderate agreement between measures at both timepoints [4]. Spearman correlation coefficients indicated that total PDQS score at month 0 was statistically significantly correlated with total PDQS score at month 3 ($r = 0.78$, $p < 0.01$), with similar associations observed via ICCs (0.88 (0.82-0.92)). Weighted kappa indicated moderate agreement (4). The coefficient of variation for total PDQS score at months 0 and 3 was 0.11. Results are comparable with other dietary questionnaire validation and reliability studies and indicate that the amended PDQS is a valid and reliable tool to determine diet quality in a UK/Irish population at risk of CVD.

References

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