

## Processing the data collected over time improved the knowledge discovery in the case of a QoL questionnaire

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### Abstract

The objective of this study was to evaluate if linguistically-translated Norfolk Quality of Life for Diabetic Neuropathy questionnaire (QoL-DN) can predict mortality in patients with diabetes mellitus. A subset of 2,083 patients with diabetes mellitus was followed for 4 years, patients from 51 Romanian Diabetes Centers included in a 2012 epidemiological study. Patient were divided in two groups, the first one containing 481 patients from one center from Cluj-Napoca used to compose the risk mortality questionnaire and the second one containing 1,602 patients outside the Cluj center (the country group) used to confirm the predictive value of it. High scores for 27 questions had the power of discrimination between subjects who died and those who survived in Cluj group ( $p < 0.05$ ). We therefore propose a Norfolk QoL mortality risk score (MRS): the sum of the significant statistically questions (for mortality) with response Yes (1) / No (0) or with Likert scale response from 0 (Not at all) / 1 (A little) / 2 (Somewhat) / 3 (Moderately) to 4 (Severely). The MRS ranged from -4 to 72 was significantly greater in those who died compared with survivors ( $25.84 \pm 3.02$  vs.  $14.99 \pm 0.62$ ,  $p < 0.001$ ) in Cluj group. The cut-off for the MRS was obtained using ROC (receiver operating characteristics): 11.5 (Sensitivity=83.9, Specificity=46.7, area under the curve (AUC)=0.699,  $p < 0.001$ ). When comparing deceased and survivors in the country group we found the same results for MRS ( $26.34 \pm 1.06$  vs.  $15.12 \pm 0.39$ , OR (odds ratio)=1.04, 95%CI 1.03 to 1.06,  $p < 0.001$ ). The cut-off 11.5 for the MRS obtained previously was analyzed: Sensitivity=80.8, 95%CI 74.8 to 85.9; Specificity=50.9, 95%CI 48.3 to 53.6,  $p < 0.001$ . We propose here a composite of items derived from the Norfolk QoL-DN questionnaire as a novel "Mortality Risk Score" that can prospectively identify patients with a mortality risk over a period of 4 years.

### Keywords:

Knowledge Discovery; Diabetic Neuropathy; Quality of Life; Receiver Operating Curve (ROC); Mortality