symptom levels of anxiety and depression, and sleep impairment among patients with NeP. METHODS: Participants in an observational, prospective and multicentre study in Spain (DONEGA study) with NeP of different etiologies, completed the Short Form-McGill Pain Questionnaire (SF-MPQ), the Mini Mental State Examination (MMSE), the COVI Anxiety Scale, the RASKIN Depression Rating Scale, and the MOS Sleep Scale (MOS-S) at baseline. RESULTS: A total of 1519 patients above 18 years [mean ± SD: 56.0 ± 13.7 years old (58.8% female)] with NeP were enrolled in the study. Peripheral NeP was presented in >95.0% subjects. Patients had NeP for 1.1 ± 2.8 years, and 83.3% were on any type of analgesic treatment at baseline: oral analogues (51.2%), topical analogues (26.9%), NSAID’s (11.1%), antiepileptics (7.3%), and psychoanalptics (3.5%). Average Pain scores were 13.1 ± 8.2, 10.0 ± 5.8, and 3.1 ± 3.3, for total scale (range 0–45), sensory domain (range 0–33), and affective domain (range 0–12), respectively. Present pain intensity was 2.8 ± 1.0 (range 0–5) and mean pain past week on a VAS scale was 71.2 ± 18.9, mm. Pain slightly interfered with patient mental functioning (average MMSE score: 27.2 ± 3.6, 18.0% of patients with MMSE score ≤ 24 pts). Pain interfered with all sleep attributes, obtaining high scoring in composite measures; SLp6; 45.3 ± 21.8, and SLp9; 46.8 ± 21.1. The 24.4% and 15.6% of patients had moderate to severe symptoms levels of anxiety and depression (RASKIN and COVI scores ≥ 9 on 3–15 scale), with an average depression and anxiety scores of 6.3 ± 3.3 pts and 5.4 ± 2.8, respectively. CONCLUSIONS: NeP decreases patient mental functioning as assessed by MMSE, while increasing anxiety and depression symptoms and sleep problems. These findings substantially deteriorated with pain severity.

NEUROLOGICAL DISORDERS (Migraine, Alzheimer’s, Dementia)

NEUROLOGICAL DISORDERS (Migraine, Alzheimer’s, Dementia)—Methods and Concepts

PNL24 COMPARING CLASSIFICATION AND REGRESSION TREE ANALYSIS WITH MULTIPLE REGRESSION FOR TRANSLATING A CLINICAL PARKINSON’S DISEASE SCALE INTO UTILITIES

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OBJECTIVES: Utilities for Parkinson’s Disease (PD) are needed for cost-utility analyses of antiparkinsonian treatments but are not always available from PD studies. We compared the performance of classification and regression tree (CART) analysis with multiple regression for mapping the Unified Parkinson’s Disease Rating Scale (UPDRS) to utilities. METHODS: We used data from an ongoing prospective cost study of the German Competence Network for Parkinson Syndromes. Single UPDRS items were used as predictors for utilities assessed with EuroQol (EQ-5D). First, we developed a multiple regression model using forward selection based on likelihood ratio testing (p < 0.05). Second, we developed a CART model using t-test statistics as selection criteria and adjusting p-values for non-dichotomous variables by the Miller & Siegmund method. The resulting mutual exclusive and exhausting groups were used as predictors in a multiple linear regression model. The performance (goodness-of-fit) of both approaches was compared using explained variance (adjusted R-square statistic). RESULTS: The final multiple regression model included a linear combination of three UPDRS subscore variables (i.e., parts II–IV) and yielded an adjusted R-square of 0.55. The final CART model had three levels with four variables partitioning the sample into five subgroups. These variables were level of rigidity (UPDRS item 22), problems arising from a chair (item 27), posture (item 28), and unpredictable fluctuations (item 36). The mean (median) utility in the 5 subgroups was 0.90 (0.89), 0.81 (0.89), 0.68 (0.70), 0.66 (0.70), and 0.32 (0.29). The CART model had adjusted R-square of 0.50. CONCLUSIONS: Multiple regression performed slightly better than CART when used to predict utilities based on clinical characteristics of PD patients. Both models were based on feasible and parsimonious prediction rules with only three and four variables, respectively. Whereas multiple regression modeling is the more widely used statistical approach, CART-based prediction models may be easier to interpret for physicians.

PNL25 INTERNAL, EXTERNAL, AND CROSS-MODEL VALIDATION OF A MULTI-OVERSE DECISION MODEL FOR PARKINSON’S DISEASE

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OBJECTIVES: We have recently reported on a generic, multi-outcome decision model for Parkinson’s disease (PD). Now we present first results of internal, external and cross-model validation. METHODS: Our lifetime PD Markov model simulates a hypothetical cohort of patients moving through health states reflecting patient characteristics that would be observed in the absence of treatment (Hoehn&Yahr “off” states [HYoff]). We used HYoff I-V and death as Markov states. The model is designed to simultaneously predict multiple outcomes, e.g., time in Hoehn&Yahr “on” states (HYon) observed under treatment, quality-adjusted life expectancy (QALE), or complication rates. As internal validation, we compared time in HYoff stages predicted by our model to results reported in the progression study used to derive our input parameters. As external validation, we compared model results of mean times in HYoff and HYon states with external literature data not used in our model. Finally, we cross-validated our model comparing QALE under levodopa treatment with QALE of other published models reporting this outcome. RESULTS: Internal validation of HYoff input data showed a 97.4–99.9% accuracy. Although external validation of average HYoff progression rates overestimated external population data from Hoehn & Yahr (1967) by 19%, the mean HYon progression rate predicted by our model (0.42 HY stages/year) matched well with estimates reported in the literature (0.40 HY stages/year). After restricting our model to a 5-year time horizon, discounted QALYs exceeded those from 2 other published models by 24% and 35%. This differences were mostly attributable to different Markov state-specific utilities. As other Markov models for drug treatment did not evaluate QALE, we could not cross-validate for this outcome. CONCLUSIONS: Our PD model is internal valid and closely reproduces external data for progression under standard treatment. Variability in QALE are due to a combination of different model design, state-specific utilities, and underlying study populations.

PNL26 A NEW SCREENING TOOL FOR MIGRAINE IN THE GENERAL POPULATION: THE MIGRAINE-SCREEN-Q (MS-Q)

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OBJECTIVES: Assess the clinimetric properties of the MIGRAINE-SCREEN-Q (MS-Q) questionnaire for the screening of patients with migraine in the general population.

METHODS: A 16-item tool was developed from the International Headache Criteria (IHS) of Migraine and a review of the literature by a panel of 6 experts in neurology, occupational medicine, clinimetrics, and methodology. The MS-Q instrument was mailed and filled in by the employees working for at least 3 months at the Pfizer company (Step I) and self-administered to patients of a Neurological Clinic (Step II and III) in Spain. All subjects were subsequently referred for an independent diagnosis by a neurologist, blinded of MS-Q results. The diagnosis was assigned according to IHS criteria. Statistical methods included logistic regression, ROC curves analysis and determination of sensitivity, specificity, and positive and negative predictive values with its 95% confidence interval. RESULTS: In all, 415 employees (Step I) and 30 patients (Step II) were recruited. Of them, 325 subjects were evaluable and diagnosed as having migraine (n = 85), other headaches (n = 80) and non-headache subjects (n = 160). A further 140 patients were recruited in a Neurological Clinic and analysed independently to get a sample of 70 migraine and 70 non-migraine patients (Step III). A five-item subset (headache frequency and severity, 4 hours to 3 days’ duration, nausea, sensitivity to light/noise and disability) out of 16 preliminary items was derived by logistic regression analyses. A cutoff of 4 or more points provided a sensitivity of 0.93 (95% CI, 0.87–0.99), specificity of 0.81 (0.72–0.91), a positive predictive value of 0.83 (0.75–0.91) and a negative predictive value of 0.92 (0.85–0.99). The reliability Cronbach Alpha coefficient was 0.82. CONCLUSIONS: The 5-item MIGRAINE SCREEN-Q instrument was found to be a valid and reliable screening tool for migraine headaches. Further studies are warranted to test its applicability in the general population.

CENTERED REGRESSION FUNCTIONS AS A TECHNIQUE TO IMPROVE FLEXIBILITY AND TRANSFERABILITY OF MARKOV MODELS

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OBJECTIVES: The development of Markov decision models for chronic diseases is often time-consuming and sophisticated. Therefore, generic and flexible models have advantages. We present a method that allows to externally adjust decision models for context-specific variables such as epidemiologic, clinical, or economic parameters. METHODS: To allow transfer of decision models across populations or countries with correct adjustment for context-specific parameters, we used centered regression equations instead of fixed values as model parameters. Clinical event probabilities, utilities, and costs were defined as functions of context-specific predictors. Centering the predictors on their means allows to interpret intercepts as grand means and regression coefficients as relative modifiers. We applied this approach to the Parkinson’s Disease Model (PDM) using 1-year follow-up data of target outcomes (clinical events, utilities [EQ-5D], and costs) from the German Parkinson’s Disease Competence Network Study (n = 145). We validated the centered regression approach by comparing model results to those from models with model parameters based on non-centered regression and fixed parameters values. RESULTS: Target outcomes of PDM were defined by 1) centered regression equations; 2) intercepts representing grand means of 1-year target outcomes (anchor value); 3) distribution of disease severity stages; and 4) regression coefficients for each stage representing additive (utilities) or multi-plicative (events, costs) modifiers for the anchor value. Assuming constant modifiers, the model can be transferred if data on mean outcomes and severity stage distribution of the target country are available. Sensitivity analyses were facilitated, as changes in overall event risk, utilities, or costs were achieved by simply changing intercepts. Validation of the centered regression-based PDM with non-centered regression equations or using fixed values in the model led to identical results. CONCLUSIONS: The implementation of centered regression-based equations in a decision model enhances model flexibility with respect to sensitivity analyses and transferability to another population or health care context.

ESTIMATING THE COST OF ILLNESS IN EUROPE—A MODEL WITH MULTIPLE SCLEROSIS AS AN EXAMPLE

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OBJECTIVES: Estimating the cost of a disease for Europe is a methodological challenge due to differences in epidemiology,