Translation and validation of the CLEO tool to assess the relevance of clinical pharmacists? interventions

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**Background** At Swiss hospitals, it is common practice to document pharmaceutical interventions (PIs) with a classification system. Adding the French evaluation system CLEO would allow clinical pharmacists to assess the potential relevance of a pharmaceutical intervention in three independent dimensions (CLinical, Economic, and Organisational).

**Purpose** Our objectives were to translate CLEO into German, to validate the German version and to demonstrate the first use within a sample of study patients.

**Method** We translated CLEO according to the ISPOR principles of good practice for the translation and cultural adaption process for patient reported outcome measures. During 13 days, PIs performed in routine clinical pharmacy services at three Swiss hospitals were evaluated to demonstrate interpretability. Ten clinical pharmacists who had worked with CLEO, filled a 19-item questionnaire to assess user?fs agreement on appropriateness, acceptability, feasibility, and precision (7-point Likert scale; 1: entirely disagree, 4: neutral, 7: entirely agree). To assess interrater (Intraclass correlation coefficient ICCA, 1) and test-retest reliability (mean Spearman rank correlation coefficient ?), mean ICCA, 1 = 0.63; economical (0.65), and poor for the organisational dimension (0.30). Test-retest correlation (?) was strong for all three dimensions with excellent to fair reliability (clinical: ICCA, 1 = 0.76; economical: 0.85; organisational: 0.53). The tool was applied to all pharmaceutical interventions performed in a sample of 110 study patients.

**Findings** CLEO was translated into the German version CLEO. This version was used by 10 clinical pharmacists to estimate the potential relevance of 324 performed PIs, creating a data set of identified drug related problems, performed interventions, and potential relevance. The reported time was less than one minute per PI. To use CLEO as a tool to evaluate PIs was reported to be appropriate (mean user?fs agreement = 5.45 ± 0.76), acceptable (4.43 ± 1.28), feasible (5.2 ± 1.44), and precise (5.90 ± 1.16). Interrater reliability was good for the dimensions clinical (ICCA, 1 = 0.63) and economical (0.65), and poor for the organisational dimension (0.30). Test-retest correlation (?) was strong for all three dimensions with excellent to fair reliability (clinical: ICCA, 1 = 0.76; economical: 0.85; organisational: 0.53). The tool was applied to all pharmaceutical interventions performed in a sample of 110 study patients.

**Conclusion** We successfully translated the French evaluation system CLEO into the German version CLEO. We demonstrated interpretability, appropriateness, acceptability, feasibility, precision and reliability. Reliability of the organisational dimension should be improved. CLEO could be combined with existing classification systems for drug-related problems to add qualitative value to quantitative information about PIs.