MEETING OF THE WHO COLLABORATING CENTRES FOR THE FAMILY OF INTERNATIONAL CLASSIFICATIONS

The ICF mountain and a tiny little mouse: a preliminary literature review on how ICF data are collected and statistically analysed.

13 – 19 Oct 2012
Brasilia, Brazil

Laura Rizzi (1), Lucilla Frattura (2), Sara Anzilutti (1), Michela Battauz (1)
(1) University of Udine, Department of Economics and Statistics
(2) Central Health Directorate, Classification Area, Friuli Venezia Giulia Region, IT WHO-FIC CC, Udine

Please insert the document ID here: D0xxp

Abstract In order to discuss how to analyze data aimed at describing functioning and disabilities using ICF, a preliminary study was carried out to review the statistical tools adopted in selected studies in relation to the results, design, and aims of the studies. Despite the great increase of contributions devoted to different ICF issues, the adoption of advanced statistical tools is not widespread.

Introduction

The number of articles relating to ICF is increasing since its release in 2001, both in journals and in books. A systematic literature review on the state of the art has been carried out by Jelsma (2009) [1], who considered 243 papers, and by Cerniauskaite et al. (2011) [2], who considered 672 papers.
This analysis represents a selective literature review, not exhaustive, as it considers only contributions applying some statistical tool on ICF data, and devoted to give special emphasis to the quantitative approaches adopted.
In order to discuss how to design epidemiological studies to describe functioning and disabilities using ICF, a preliminary study has been carried out to analyze the statistical tools adopted in selected studies in relation to the results, design, and aims of the studies.

Methods & Materials

Fifty-one papers were selected on the basis of the presence of some statistical data analysis applied to ICF data.
The papers were from 21 different scientific journals but most of them (42%) were from Disability and Rehabilitation.
Each paper was analyzed in order to describe the statistical methods adopted, considering separately descriptive tools and tests, correlation and heterogeneity measures, multivariate techniques, generalized and mixed models, and finally Rasch analysis.

Results

Most of the papers (33; 64.7%) presented mainly descriptive analyses, sometimes enhanced with parametric or non-parametric tests (12), correlation coefficients (6), or inter-rater agreement measures (2).
They were published between 2003 and 2012 and generally considered cross sectional data (81%).
Five papers (9.8%) introduced multivariate analysis techniques: confirmatory factor analysis to assess a theoretical model relating activities to domains of functions and ICF chapters; cluster analysis to define groups of people with common patterns of person-environment interaction or groups based on disability status to be compared with disease groups; and principal component analysis to derive a sub-component structure under the ICF broader context.
Statistical models were used in 8 papers (15.7%), published from 2005 to 2012, displaying generalized linear models, sometimes extended to hierarchical or longitudinal data or to a non linear covariate effect (Table 1).

The choice of the statistical approach seems to be driven by the data structure ([3], [4], [5]) and not by the sample size (Table 1).

Table 1 - Statistical models applied with respect to the data structures

Statistical Tools Applied	Descriptive statistics - tests - correlation	Multi variate analysis	Statistical models	Rasch model
Min sample size	**17**	**300**	**25**	**25**
Max sample size	**258.187**	**112.601**	**30.175**	**437**
Median sample size	**150,5**	**1.051**	**180,5**	**109**

Finally, 5 papers (9.8%) were analyzed that considered Rasch analysis, together with other exploratory statistical methods, to assess the reliability of an ICF Core Set ([6] and [7]), to evaluate the metric of the qualifier scale, to test its possible use as a measuring tool ([8] and [9]), or to define groups of items according to the ICF framework [10]. The most adopted design study is characterized by cross-sectional datasets (Figure 1), which are generally analyzed through descriptive statistics and tests (65.1%), while longitudinal and panel data required mixed models in order to take account of the complex heterogeneity of observations (Figure 2 and Table 2).

Figure 1 - Distribution of the 51 papers by study design

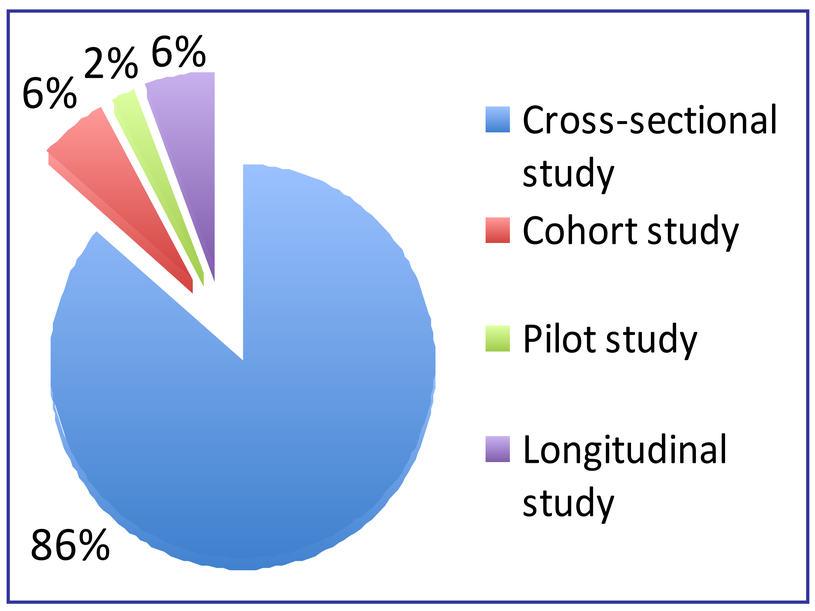
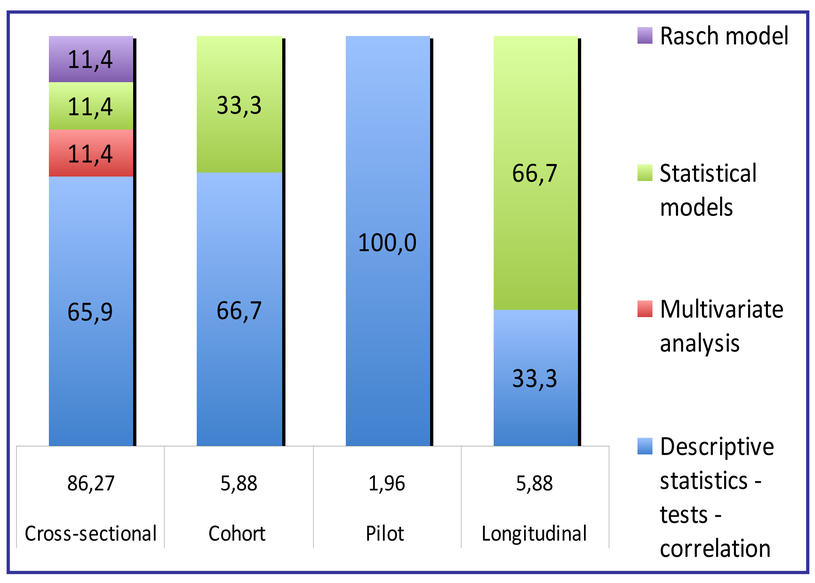


Figure 2 - Distribution of the 51 papers by study design and statistical tools



The five papers using Rasch analysis to explore reliability of the ICF as a tool to measure clinical conditions had a sample size ranging from 25 to 437 and performed also descriptive statistics and tests, sometimes together with PCA. Papers applying statistical models defined the approach on the basis of dataset structure as pointed out in Table 2.

Table 2 - Statistical models applied with respect to the data structure

Data structure		Statistical models applied
Simple	**cross-sectional**	logistic model
		multinomial logistic model
		linear regression with non linear coefficients
Complex	**longitudinal**	hierarchical linear and log-linear/multilevel regression models
	cohort	logistic model

All the contributions presenting advanced statistical approaches, displayed descriptive statistics and tests at an exploratory level.

Conclusions

Despite the great increase of contributions devoted to different ICF issues, the adoption of advanced statistical tools is not widespread. The lack of use of statistical models seems not to be due to a reduced sample dimension (the mean sample size results significantly smaller in studies displaying some advanced statistical model or Rasch analysis) but seems mainly related to the aims pursued and to the context of the analysis. When statistical models were used, the choice of the statistical approach was driven by the data structure.

References

1. Jelsma J. Use of the International classification of functioning, disability and health: a literature survey. J Rehabil Med, 2009; 41:1-12.
2. Cerniauskaite M, Quintas R, Boldt C, Raggi A, et al. Systematic literature review on ICF from 2001 to 2009: its use, implementation and operationalisation. Disabil Rehabil., 2011; 33(4):281-309.
3. Sanchez-Moreno J. et al. The role and impact of contextual factors on functioning in patients with bipolar disorder. Disabil Rehabil., 2010;32 Suppl 1:S94-S104.
4. Cieza A. et al. Explaining functioning outcomes across musculoskeletal conditions: a multilevel modelling approach. Disabil Rehabil. 2010;32 Suppl 1:S85-93.
5. Grill E. et al. Assessing observer agreement when describing and classifying functioning with the International Classification of Functioning, Disability and Health. J Rehabil Med. 2007 Jan;39:71-76.
6. Uhlig T. et al. Reliability of the ICF Core Set for rheumatoid arthritis. Ann Rheum Dis 2007 Aug;66(8):1078-84.
7. Kurtaiş Y. et al. Reliability, construct validity and measurement potential of the ICF comprehensive core set for osteoarthritis. BMC Musculoskeletal Disorders 2011, 12:255.
8. Røe C. et al. Construct dimensionality and properties of the categories in the ICF Core Set for low back pain. J Rehabil Med. 2009 May;41(6):429-37.
9. Cieza A. et al. The International Classification of Functioning, Disability and Health could be used to measure functioning. J Clin Epidemiol. 2009 Sep;62(9):899-911.
10. Nilsson M.H. et al. Uncovering Indicators of the International Classification of Functioning, Disability, and Health from the 39-Item Parkinson's Disease Questionnaire. Parkinsons Dis. 2010.