THE CLESA PROJECT: CROSS-NATIONAL DETERMINANTS OF QUALITY OF LIFE AND HEALTH SERVICES FOR THE ELDERLY

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INTRODUCTION

Few cross-national data on health status, physical and cognitive functioning among elderly are available. The "Cross national determinants of quality of life and health services for the elderly Project" (CLESA: Comparison of Longitudinal European Study on Aging) was an initiative based on the activities of a panel of researchers recognizing the scientific validity of making the best use of available longitudinal datasets on aging and, therefore, conducting comparative research based on them. It provides information on cross-national and country-specific risk factors for selected health outcomes and differences in health services availability, access and use.

This paper aims to describe the methodology developed to harmonize data available in the original CLESA studies. We will present Common Databases and also some descriptive analyses on selected variables across countries.

METHODS

The CLESA project was supported by the European Community within the fifth framework programme (Key action 6, "The Ageing Population and Disabilities"). The project started in February 2001, ended in June 2004, and aimed to the identification of the determinants of quality of life and health services in older people residing in Tampere (Finland), Israel, Italy, the Netherlands, Leganés (Spain) and Sweden.
Six existing longitudinal studies on aging, carried out in the six countries, were considered with the following objectives:

1. to compare across countries the predictors of mortality, hospitalisation, institutionalisation, functional status in relation to health services use, impact of social network on the health status of older individuals;
2. to develop country-specific evaluations of availability, access and use of health services by the elderly.

Original studies

The six original longitudinal studies considered within the CLESA project were:

- the Tampere Longitudinal Study on Ageing (Tampereen Eläkeikäisten Seurantatutkimus, TamELSA) [1] for Finland. the sample of this study considered 1,390 subjects between 60 and 89 years of age, residing in the city of Tampere, Finland. The first stage was completed in 1979, and the follow-ups in 1989 and 1999.
- the Cross Sectional and Longitudinal Aging Study (CALAS) [2] for Israel. The study considered a sample of 1,820 subjects aged 75 to 94. The baseline was in 1989, and the follow-up was carried out in 1993.
- the Italian Longitudinal Study on Aging (ILSA) [3] for Italy. This study considered a random sample of 5,632 individuals aged 65-84 years; it included a cross-sectional (1992) and two longitudinal components (1996, 2001).
- the Longitudinal Aging Study Amsterdam (LASA) [4], for the Netherlands. This is a longitudinal study on older (55-85 years) persons (the sample was used in two studies: respondents were first interviewed for the NESTOR program; about 10 months later, 3107 of the 3805 respondents to the NESTOR-LSN study took part into the LASA baseline interview). The baseline year for the LASA study is 1992-93, while the follow-ups took place in 1995-96, 1997-98, 2001-02.
- the Ageing In Leganés study (AL) [5,6] for Spain. It focused on a population aged 65 years and over, living at home in Leganés, Spain. In 1993 the baseline was

developed, with a sample of 1564 elderly people; follow-ups were conducted in 1995, 1997 and 1999.

- the Swedish Adoption/Twin Study on Aging (SATSA) [7] for Sweden. It is a longitudinal twin study with a three-year interval between measurement occasions. The baseline population includes the sample of Twins Reared Apart from the Swedish Twin Registry and a control sample of Twins Reared Together. The first occasion began in 1984 with 2584 individuals of all ages.

The Harmonization Process (FIGURE 1)

The first aim of the CLESA projects was the creation of Common Databases based on data from the six original studies. The harmonization process started with the English translation of each study questionnaire; then, the main topics of interest were identified and categorized into six domains:

1. socio-demographic variables;
2. health habits;
3. health status;
4. physical functioning;
5. social network and support;
6. health and social services utilisation.

Each partner analysed the original questions and the corresponding answers relevant for the assigned domain, identified a common denominator and constructed harmonized items. The proposed harmonization process was sometimes simple, when single original variables or a combination of several original variables was considered. However, in the majority of the cases, it implied the creation of algorithms and the application of statistical techniques to verify the degree of internal validity.

During the Harmonization Process the following files were created:

- ⇨ "Harmonization Guidelines", which presented the algorithm used to obtain common variables in a schematic way.
  "Original Files" were created, for each country, with selected original variables that contributed to the definition of the harmonization variables.
  "Baseline Common Database" (BCD) and "Follow-up Common Database" (FCD) were the result of the application of the harmonization guidelines to the original variables.
- ⇨ "Outcome Guidelines" presented the harmonization procedure considered for data on institutionalisation, hospitalisation and mortality.
  "Outcome Database" presented date and cause of hospitalisation (according to Major Diagnostic Categories, MDC code), date and cause of death (according to International Classification of Disease, ICD9 code) and information on institutionalisation.

Common Databases

BCD file included 11,557 records and 111 variables on socio-demographic characteristics, health habits, health status, physical functioning, social networks and support, health and social services utilisation. FCD contains 11,557 records and 63 common variables on socio-demographic characteristics, health status, physical functioning, and health and social services utilization.

The age-classes considered in the BCD were: for Tampere, Leganés and Sweden 65-89 years; for Israel 75-89 years; for Italy and The Netherlands 65-84 years.

The construction of harmonized common variables within the socio-demographic domain was quite simple, with the exception of *lifetime occupation* for which some countries had to re-code all original occupations according to a cross-nationally acceptable occupational classification format.
Original data on *depressive symptoms* were collected considering different instruments across studies (CES-D scale [8] for Israel, the Netherlands, Leganés and Sweden; GDS [9] for Italy); a harmonized variable for depressive symptoms was constructed re-proportioning the total score to the number of answered items, and then defining the final score as a proportion of the maximum score.
Also for *cognitive measure*, different instruments were adopted: Folstein-MMSE [10] for Italy, the Netherlands and Sweden, Katzman-MMSE for Israel [11], while the Leganés study used a test that included items from the Short Portable Mental Status and the East Boston naming and memory tests [12]. Within each scale, the harmonized total score was constructed as a proportion of the maximum score, dividing the total score by the maximum reachable score.
Diseases (heart disease, hypertension, diabetes, stroke, Parkinson's disease, dementia, cancer, respiratory diseases, musculoskeletal diseases) were harmonized as self-reported variables.
In relation to *Activities of Daily Living* (ADL) assessment, a four-item scale was constructed considering bathing, dressing, transferring and toileting ability items. The original items were dichotomised into "help needed: yes vs no", and the scores were summed. For two countries, toileting items was extrapolated combining the items dressing and transferring [13].
Three variables on *Instrumental Activities of Daily Living* (IADL), in relation to preparing meals, shopping and doing light housework, were harmonized and dichotomised into "able to perform the activity without assistance vs inability/need of help" [14].
The harmonization of *Social networks and support* variables was quite complicated, because the comprehensiveness of information was diverse across studies (and some studies, like ILSA, did not collect data on this topic) and also since this domain is very influenced by country-specific cultural aspects.

Statistical Analysis
We will present analysis for the common age class 75-84 years, and in relation to a sub-sample of constructed common variables.
For continuous variables, the comparison of country specific mean values was made considering the General Linear Model procedure (GLM), adjusting for sex and testing for heteroschedasticity with the Levine test. For categorical variables, the association with countries was tested through the Cochran-Mantel-Haenszel statistics, adjusting for sex. Data were age-standardized considering the European Standard Population 1991 as a reference [15].
All analyses were performed using release 8.02 SAS statistical software [16].

RESULTS

The sample size for the common age class was: 196 for Tampere, 886 for Israel, 2,811 for Italy, 1,135 for the Netherlands, 477 for Leganés and 233 for Sweden.

TABLE 1 presents age-standardized distribution of selected variables from socio-demographic (sex, age, marital status, educational level, living arrangements, lifetime occupation), while TABLE 2 considers health habits (smoking habits, drug assumption, mean number of drug among users), health status (self-reported heart disease,

hypertension, diabetes, stroke, Parkinson's, cancer, respiratory diseases, musculoskeletal diseases), depression and cognitive functioning variables.

We found a significant association among all socio-demographic characteristics and the CLESA countries, with the only exception for age (but this was expected since we age-standardized data). For marital status, the highest percentage of married/cohabiting subjects was found in Israel (52.1) and the lowest in Tampere (45.3). In relation to education, Leganés had the highest percentage of elderly with elementary school or less (87.6) while the Netherlands had the lowest (54.8). Considering living arrangements among non-institutionalised elderly, we found the highest percentage of subjects living alone for Sweden (47.6%), the Netherlands (43%) and Tampere (43%), while the lowest could be observed for two of the three Mediterranean countries (Italy and Leganés, with 18.5% and 14.8% of alone, respectively).
The highest mean number of drugs among users can be observed for Tampere subjects (4.2), while the Italian population had the lowest (1.9). As far as the self-reported diseases are concerned (heart diseases, hypertension, diabetes, stroke, Parkinson's, cancer, respiratory diseases, musculoskeletal diseases) we found a significant association for all conditions.

The four-items ADL harmonized measure indicates that the Dutch population had the higher percentage (91.9) of subjects independent in all ADL (bathing, dressing, toileting, transferring), while Italy and Leganés had the lower percentages (65.0 and 66.2, respectively).

The measure of depression symptomatology is comparable among Israel, the Netherlands, Leganés and Sweden, as all used the Center for Epidemiologic Studies Depression (CES-D) scale; within the harmonized 0-1 scale, higher scores indicate an increasing depressive symptomatology . The Dutch population had the lowest mean score in the 0-1 scale (0.15±0.10), while the Swedish population had the highest (0.29±0.12).

The measure of cognitive status is comparable between Italy, the Netherlands and Sweden, as all used Folstein MMSE. Lower scores in the 0-1 harmonized scale indicate increasing cognitive impairment. Elderly living in the Netherlands and Italy had the lowest mean score in the scale (0.86±0.08), while the Swedish population had the highest scores (0.90±0.07).

CONCLUSIONS
CLESA Common Databases are available for the study of the aging process in some European countries and Israel. These data provide an important opportunity to identify common risk factors and also differences in age-related changes in various cultural groups.

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FIGURE 1. The Harmonization Process in a schematic way. The CLESA project.

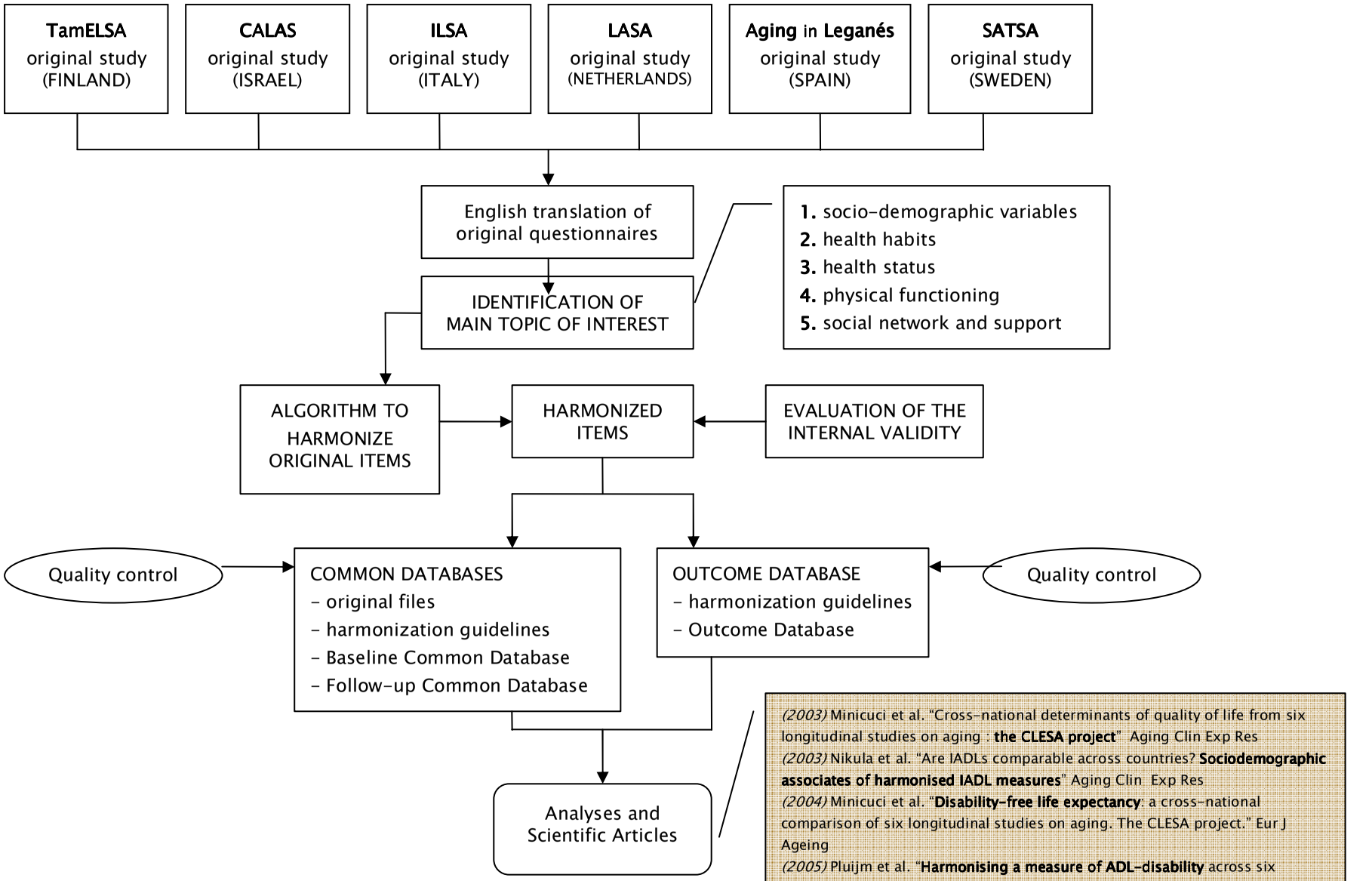

TABLE 1: 75-84 years, age-standardized prevalence ratios and mean values, selected SOCIO-DEMOGRAPHIC VARIABLES. The CLESA project.

	TAMPERE (n=196)	ISRAEL (n=886)	ITALY (n=2811)	THE NETHERLANDS (n=1135)	LEGANÉS (n=477)	SWEDEN (n=233)	p-value
Sex (%)							***
males	42.6	52.5	49.9	50.8	50.9	33.0	
females	57.4	47.5	50.1	49.2	49.1	67.0	
Mean age ± SD	78.4±2.4	78.7±1.6	78.5±1.9	78.8±1.9	78.7±2.2	78.5±2.5	ns
Marital status (%)							***
single or never married	11.8	1.7	8.6	6.5	3.4	6.6	
married/cohabiting	45.3	52.1	50.6	49.1	51.1	46.8	
widowed	39.3	42.4	40.1	40.4	44.5	42.3	
divorced/separated	3.6	3.8	0.7	4.0	1.0	4.3	
School degree (%)							***
elementary school not completed	15.5	41.1	47.5	13.7	80.1	0.0	
elementary school completed	72.0	14.9	28.6	41.1	17.5	93.9	
vocational education/general secondary education	8.5	29.6	11.8	35.1	2.1	3.3	
college or university education	4.0	14.4	12.1	10.1	0.3	2.8	
Living arrangements (non-institutionalised subjects) (%)							***
alone	43.0	35.0	18.5	43.0	14.8	47.6	
with spouse only	40.4	45.7	35.0	49.3	38.7	39.1	
with others (spouse included)	16.6	19.3	46.5	7.7	46.5	13.3	
Lifetime occupation (%)							***
higher and lower non-manual	39.1	34.7	20.1	32.2	9.1	11.8	
specialized/ (semi-)skilled manual	34.3	31.2	19.6	30.0	31.8	10.6	
non-specialized/non-skilled manual	13.7	5.1	13.5	16.5	19.6	31.9	
farmer	5.3	7.2	26.3	8.1	15.4	9.4	
housewife	7.6	21.8	20.5	13.2	24.1	36.3	

*= p<0.01; **=p<0.001; ***=p<0.0001

TABLE 2: 75-84 years, age-standardized prevalence ratios and mean values, selected HEALTH HABITS AND HEALTH STATUS VARIABLES. The CLESA project.

	TAMPERE (n=196)	ISRAEL (n=886)	ITALY (n=2811)	THE NETHERLANDS (n=1135)	LEGANÉS (n=477)	SWEDEN (n=233)	p-value
Smoking habits (%)							***
smoker	4.6	10.8	10.9	21.3	10.8	10.5	
non-smoker	66.6	58.1	55.4	35.3	59.0	87.7	
ex-smoker	28.8	31.1	33.7	43.4	30.2	1.8	
Drugs assumption (%)	91.9	84.1	84.9	76.8	82.9	50.4	***
Mean number of drugs, among drug users ± SD	4.2±2.4	3.4±1.4	1.9±0.9	3.0±1.2	3.4±1.7	2.8±1.5	***
Heart diseases (%)	45.7	36.9	17.7	27.5	23.8	31.3	***
Hypertension (%)	20.4	35.5	43.8	10.6	45.9	25.0	***
Diabetes (%)	11.0	19.9	17.0	11.6	20.9	10.9	***
Stroke (%)	8.4	6.2	11.2	9.5	9.5	5.8	*
Parkinson (%)	1.5	3.2	3.6	1.7	6.0	1.6	*
Cancer (%)	7.0	4.8	6.3	11.0	7.4	5.2	*
Respiratory diseases (%)	11.3	19.5	37.2	15.1	34.3	16.0	***
Musculoskeletal diseases (%)	40.9	40.5	59.1	37.3	65.6	57.1	***
ADL disability, four items scale[§] (%)							***
independent	81.9	80.6	65.0	91.9	66.2	82.4	
impairments in 1 item	9.5	8.1	17.5	6.1	22.8	11.0	
impairments in 2 items	3.1	3.3	6.3	0.6	5.0	1.8	
impairments in 3 items	0.0	2.3	3.2	0.7	3.0	2.2	
impairments in 4 items	5.5	5.7	8.0	0.7	3.1	2.6	
Depression mean score ± SD	0.25±0.16	0.24±0.09	0.34±0.16	0.15±0.10	0.25±0.10	0.29±0.12	***
Cognitive mean score ± SD	*N.A.*	0.73±0.17	0.86±0.08	0.86±0.08	0.70±0.22	0.90±0.07	***

N.A.: Not Available in the original study

*= p<0.01; **=p<0.001; ***=p<0.0001

[§]: based on bathing, dressing, transferring and toileting items