Social Inequalities in Multimorbidity Patterns in Southern Spain: Findings from the DEMMOCAD survey

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Abstract

Objectives *We designed a questionnaire to detect multimorbidity patterns using LCA in people over 50 in the province of Cadiz and to associate these patterns with possible social inequalities.*
Methods *This was an observational study conducted through a telephone interview. The sample size was 1592 individuals with multimorbidity. We use LCA to detect patterns. In the first stage, we found the appropriate number of classes. In the second phase, the socio-demographic covariates were introduced in the model.*
Results *Preliminary analyses derived five patterns (entropy = 0.727): "Relative Healthy", "Cardiovascular", "Musculoskeletal", "Musculoskeletal and Mental" and "Complex Multimorbidity". We found some differences between the first pattern and the others by sex, age, education and some districts of Jerez de la Frontera.*
Conclusions *Our initial findings provide an adjusted characterization of the population of Cadiz, highlighting some social inequalities in multimorbidity at the local level that should be addressed*

Background

Spain is one of the countries with the highest life expectancy in Europe, and the ageing of the population is increasing. This growth is causing the accumulation of chronic diseases, which leads to the emergence of **multimorbidity, one of the main challenges facing global governments [1]**. This condition is associated with reduced quality of life, increased health care utilisation, complex treatment, and increased mortality.

We need to apply new ways of addressing this complex problem (for example, to detect specific conditions patterns) due to the inability of current clinical guidelines to meet the identified needs. In addition, socio-economic differences influence non-communicable diseases [2], **but the association of conditions patterns and their determinants is not so well defined.** There are some relations with specific determinants: mental patterns in younger women with high socio-economic status, musculoskeletal patterns among men of low socio-economic status, or patterns with complex aetiology in older age groups.

The studies on this topic in Spain have been conducted in northern regions and have not considered differences by districts. **This research aims to detect the most common multimorbidity patterns in the province of Cadiz, to study their association with social inequalities, and to analyse the prevalence of the patterns according to the districts.**

Methods

Design and Setting: This is an observational study carried out by telephone interviews with people over 50 in the province of Cádiz, which has a universal and free health system but significant socio-economic inequalities. The sampling was conducted considering the six regions of the province and the bigger city, Jerez de la Frontera.

Measures: The questionnaire was mainly based on items from the European Health Survey conducted in Spain, with these variables of interest: 33 chronic conditions of the respondent, socio-economic determinants (gender, age, living area, income, educational level...), and lifestyle variables (fruits, vegetables, alcohol and tobacco consumption, physical activity,...). From the initial sample of 2200, we selected only 1592 with two or more conditions (72.4%).

Data Analysis: We used latent class analysis (LCA) to identify multimorbidity patterns. In the selection stage, we established the number of classes considering four criteria: model fit indices, enough participants in each class, the probability of individuals belonging to each class and clinical interpretability. After that, we introduce the covariates into the model with a three-step approach to adjust for potential bias.

Results and Discussion

The model chosen in LCA was the five-pattern model. **It had the best ABIC, good clinical interpretation, and entropy of 0.727**. We can see the final model in figure 1.

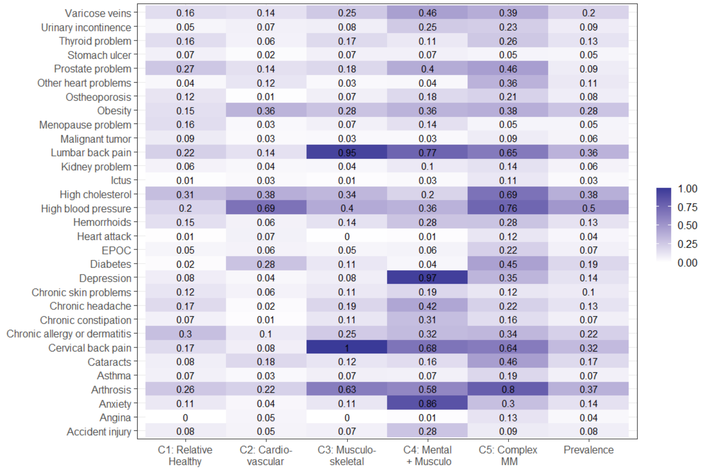

Figure 1. Chronic conditions distribution in five classes and overall prevalence

The five patterns obtained are consistent with other studies [3]. **Particularly interesting** for their complexity are **"Musculoskeletal and Mental"** class, dominated by mental conditions and motor health problems, and **"Complex Multimorbidity"** class, with a high prevalence of various conditions, and an average of 9.80 conditions per person.

Table 1 shows the significant associations we found in the multinomial regression, using as a reference pattern the class with fewer conditions ("Relative Healthy"). We can characterise the social determinants that generate the patterns with these relationships. Additionally, our study has **located explicitly in Jerez de la Frontera that the "Cardiovascular" pattern is more prevalent in the southern area of the city**, one of the most depressed areas of the city and with more inequalities. This helps us to better characterise patterns of conditions at the group level.

Determinants	C2 - Cardio-vascular	C3 - Musculo-skeletal	C4 - Musculoske-letal and mental	C5 - Complex MM
Age (60-69)	2.027***	1.451	0.777	2.844**
Age (>69)	3.275***	1.555	0.987	7.934***
Gender (Male)	2.992***	1.194	1.226	1.128
Education (Secondary)	0.844	1.045	1.092	0.356***
Education (University)	0.824	0.817	1.324	0.313***
Physical Activity	1.063	0.772	0.394**	0.849
Alcohol Consumption	1.020	0.768	0.383*	0.455*
Smoke (>10 cigarettes)	1.043	2.066*	0.872	2.349*
Income (>1200€)	0.862	0.756	0.157**	0.757
SF-12 (Physical)	0.977	0.947*	0.947*	0.890***
SF-12 (Mental)	0.984	0.971*	0.907***	0.909***
Primary Attention	1.217	1.667*	2.073*	1.998*
Emergencies	1.029	1.250	1.179	1.643*

Table 1. Odds Ratios of the associations between Social Inequalities and Patterns. Asterisks indicate p-values.

Conclusions

One of the fundamental tasks in the current challenge posed by multimorbidity is to obtain **elements that allow for interventions based on prevention in the most disadvantaged groups.** To this end, it is necessary to detect inequalities to act upon within the multimorbidity patterns from the context as close as possible to the people.

In addition to providing an adjusted characterisation of the population of the geographic area, **the findings highlight the social inequalities in multimorbidity patterns at the local level.** These determinants that show a relation with patterns may be essential in future interventions by health services, with the aim of preventing the onset of multimorbidity with age, increasing the efficiency of the health system and reducing the costs that the accumulation of chronic diseases may entail.

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