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## Multidimensional characteristics of complex chronic patients in emergency services in primary care

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### ABSTRACT

**Background:** In Spain, people between 65 and 74 years old have an average of 2.8 chronic problems or diseases, rising to 3.2 among people aged 75 and older.

**Aims:** We aimed to describe the multidimensional characteristics of complex chronic patients who sought urgent care.

**Design:** We conducted a descriptive, cross-sectional, retrospective study, drawing on a large electronic health record database in primary care in Barcelona, Spain.

**Methods:** We used health record data about subjects' clinical state, functional state, mental health state, social state, nutritional state, and movement. A descriptive analysis was carried out to determine percentages and means, given a standard deviation.

**Finding:** In 2019, 3,732 complex chronic patients sought urgent care at the centres under study. Subjects had a mean age of  $82.5 \pm 9.8$  years, and 58.7% ( $n = 2,189$ ) were women. Frailty was present in 69.3% ( $n = 2,586$ ), and 81.7% ( $n = 3,050$ ) were adherent to therapy. There were 2,470 visits to hospital emergency rooms (66.2%) and 1,651 hospital admissions (44.2%). Malnutrition was evident in 46.5% ( $n = 1,623$ ) and 27.9% ( $n = 1,042$ ) had low risk of social exclusion.

**Discussion:** Having such descriptive information can help health services from all areas and levels of care to use comprehensive, collaborative practices to care for complex chronic patients and their non-institutional caregivers.

**Conclusion:** We noted a high proportion of emergency room visits and hospital admissions among complex chronic patients. Low-level depression and malnutrition were detected. Proactive multidisciplinary interventions could improve the situation of these patients.

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### Summary of relevance

#### Problem

Demographic ageing is a global phenomenon, and all countries face significant challenges in ensuring that their

health and social systems are prepared. A large proportion of older patients have complex chronic conditions, presenting challenges for proper care and placing a strain on health systems.

#### What is already known

People with complex chronic conditions are difficult to describe as a group because of their wide-ranging characteristics.

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Existing research on patients with complex chronic conditions has shown that the best approach is care that is comprehensive, integrated, and person-centred.

#### What this paper adds

As far as we know, there are no published studies describing the characteristics and reasons for seeking care of people with complex chronic conditions who receive nursing care at urgent care services.

Having such descriptive information can help nursing services from all areas and levels of care to use comprehensive, collaborative practices to attend to complex chronic patients and their non-institutional caregivers.

## 1. Introduction

Between 2015 and 2050, the percentage of people over age 60 worldwide will have increased from 12% to 22% (WHO, 2016). This greater proportion and number of older adults will be accompanied by a greater proportion and number of people with chronic health problems and multimorbidity. As a result, health systems will face a major challenge, both in terms of organisational practice and health policy.

Approximately 50 million people in Europe live with multiple chronic diseases, and this number will increase further in the next decade, especially among people who are over 65 and have multimorbidity, among which prevalence rates are estimated to exceed 65% (Rijken et al., 2018). The European Primary Care Research Network (Le Reste et al., 2015) defines multimorbidity as the “combination of a chronic disease with at least one other disease (acute or chronic), a biopsychosocial factor (associated or not) or a risk factor”.

## 2. Literature review

In Spain, people between 65 and 74 years old have an average of 2.8 chronic problems or diseases, rising to 3.2 among people aged 75 and older (Instituto Nacional de Estadística 2014; Ministerio de Sanidad Servicios Sociales e Igualdad 2006). These data are consistent with international publications (Divo et al., 2014), in which comorbidities are found to increase with age and to be more prevalent in individuals over age 65. In recent decades in Catalonia the population has aged considerably. In 2019, the proportion of people over 65 was 18.9%, and that of people over 85 was 17.1% (IDESCAT, 2020). In 2014, 34.3% of the general population had a chronic or long-term illness or health problem (Departament de Salut, 2015). In Catalonia, people with chronic health problems generate 80% of primary care visits and 60% of hospital admissions (MSPMinisterio de Sanidad y Política Social, 2009).

Within the framework of European health policy (WHO, 2020), the European Union adopted guidelines to help health systems address the main challenges related to chronic diseases: investing in health from a broad perspective, empowering citizens, creating health-generating environments and resilient communities, and prioritising public health and person-centred care.

We follow the Catalan Department of Health in defining the complex chronic patient (CCP) as “a person whose clinical management is perceived as especially difficult by their referring professionals. This implies that, in addition to stratification [referring to the Kaiser Permanente risk stratification pyramid] and other factors, complexity is based on clinical judgement” (Pla de Salut 2011-2015). Four percent of Catalonia’s population experiences complex chronicity and receives integrative care. These patients often suffer from fragility “a state of pre-disability” and are “at risk of developing a new disability given their incipient state of functional limitation” (Andradas-Aragonés et al., 2014). Fragility treatment pri-

oritises individualised care oriented toward the outcomes that are important to the patient.

The Catalan Department of Health has agreed upon an evaluative framework for the implementation of a person-centred model of care. This model promotes more individualisation of patient care, facilitates the work and leadership of nurses and encourages collaborative practices in all areas. The model draws on several health plans that have been implemented in Catalonia over recent decades. These efforts dovetail with recent recommendations by the WHO (2020) that Catalonia’s health system promote the participation of citizens, the leadership of nurses, and comprehensive care focused on the person. Additionally, it urged Catalonia to recognise the need for evaluation and innovation.

We follow Sasseville, Chouinard, & Martín, 2018 in stressing the importance of understanding how best to classify multimorbidity to improve the management of chronic disease. The needs of CCP should be analysed from the perspective of ongoing and emergency care by the nurses who attend to them, allowing professionals to provide continuity of care in all areas of health. In doing so, we will be able to improve survival, restore or maintain functionality or stability, and promote well-being and quality of life among people with complex chronic conditions. A pragmatic person-centred model of care will make it possible to respond to the challenges of chronicity, complexity, and the end of life of these patients.

## 3. Participants, ethics and methods

### 3.1. Aims

We aim to describe the multidimensional characteristics of CCPs who sought urgent care in the Vallès Occidental of Barcelona’s northern metropolitan area (Spain).

### 3.2. Design

We conducted a descriptive, cross-sectional, retrospective study of CCPs who used the urgent care centres of the cities of Cerdanyola del Vallès, Ripollet and Sabadell from January to December 2019, drawing on a large electronic health record database.

### 3.3. Setting

In Catalonia, urgent care is provided by two services that are part of the public primary care system: The *Puntos de Asistencia Continuada* (PAC) offer after-hours and holiday urgent care. These centres respond to minor immediate care needs and also make it possible for treatments to continue outside of regular office hours (for example, wound care on the weekend). The *Centros de Urgencias en Atención Primaria* (CUAP) offer 24-hour care for low- and medium-complexity urgent health problems. (Life-threatening emergency care needs, in contrast, are handled at hospital emergency rooms). We conducted a multicentre study encompassing the urgent care centres (PACs and CUAPs) of the cities of Cerdanyola/Ripollet and Sabadell (Vallès Occidental, Catalonia).

### 3.4. Participants

We included all CCPs who sought urgent care at the PACs and CUAPs located in the Vallès Occidental of Barcelona’s northern metropolitan area from January to December 2019. In 2018, there were 8,230 CCPs identified in this health catchment area. Of these, 3,732 visited a PAC or a CUAP during the study period, for a total of 7,470 visits. We excluded CCPs who were receiving palliative care.

### 3.5. Data collection

We received primary care medical records from the shared individualised intervention plan (*plan de intervenció individualizado compartido*) of each CCP in anonymised form, with a numerical code for each patient. The records included information on sociodemographic characteristics, health conditions registered as ICD-10 codes, general practitioners' prescriptions, and other clinical parameters, as well as scores for the instruments listed below. The data was provided by the information managers of Catalonia's public health system, Institut Català de Salut.

### 3.6. Instruments

As part of regular care, the following measures are performed and reviewed annually by the nurse case manager of each CCP, offering solutions and follow-up to these patients with high clinical complexity, dependence, and frailty. We used the scores for these instruments that were recorded in patients' medical files.

Sociodemographic and patient variables: (i) age, (ii) sex, (iii) number of institutionalised CCPs, (iv) number of annual hospital admissions, (v) number of admissions to hospital emergency rooms annually, (vi) type of non-institutional caregiver.

- a Clinical variables: (i) Frailty is an indicator of changes in the multidimensional state of the CCP's health and, as such, is the best predictor of disability and dependence (Amblàs-Novellas et al., 2018). It was measured through the Frail-VIG Index ("VIG" is the Spanish/Catalan abbreviation for Comprehensive Geriatric Assessment), a useful instrument for assessing frail older adults. The Frail-VIX Index contains 22 simple questions that assess 25 different deficits. (ii) Therapeutic adherence according to the WHO (2003) is "the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider". It was measured using the Morisky-Green Test (Morisky & Green & Levine, 1986), which consists of a series of four dichotomous questions, whose answers reflect the patient's degree of compliance. The Spanish version was validated by Val-Jiménez et al. (1992). (iii) Morbidity was measured through the Adjusted Morbidity Groups. They are categorised into six morbidity groups, divided in turn into five levels of complexity, plus a healthy population group (Monterde et al., 2016). (iv) Active clinical diagnoses and the most prevalent reasons for visits to urgent care by CCPs.
- b Functional variables: (i) Level of functioning was measured through the Lawton and Brody Scale (Lawton & Brody, 1969), which collects dichotomous information on eight indicators of the degree of functioning in the instrumental activities of daily living. The Spanish version was validated by Vergara et al. (2012). (ii) Level of independence was measured using the Barthel Index (Mahoney & Barthel, 1965), which evaluates independence in 10 basic activities of daily living. The patient is scored between a minimum of 1 and a maximum of 100. The Spanish version was validated by Baztán et al. (1993).
- c Mental health variables: (i) Cognitive level was measured using the Pfeiffer Questionnaire (Pfeiffer, 1975) which includes 10 dichotomous questions. The patient is scored between a minimum of 0 and maximum of 10 points. The questionnaire explores temporal-spatial orientation, recent and remote memory, information on recent events, ability to concentrate, and ability to perform simple arithmetic. The Spanish version was validated by Martínez de la Iglesia et al. (2001). (ii) Depression level was measured through the Geriatric Depression Scale (5-GDS) (Sheikh & Yesavage, 1986), a reduced form of the 15-item

version, consisting of items 1, 3, 4, 6, and 15. The Spanish version was validated by Ortega-Orcos et al. (2007).

- d Social variables: (i) Risk of social exclusion was measured through the Escala d'Indicadors de Risc Social, which evaluates the person's social risk (Cabrera et al., 1999). It consists of six dichotomous questions and makes it possible to identify persons in need of intervention.
- e Nutrition variables: (i) Risk of malnutrition was measured through the Mini Nutritional Assessment Scale (MNA) (), which was specifically developed to assess the risk of malnutrition in the frail elderly. The Spanish version was validated by Salvá et al. (1996).
- f Movement variables: (i) Pain level was measured through the Visual Analog Scale for Pain (VAS) (Huskisson, 1982). The Spanish version was validated by Lázaro et al. (2003). (ii) According to the (WHO, 2021), falls are "unintended events that cause you to lose your balance and hit the ground or another firm surface to stop you". The total number of falls experienced annually by the PCCs was collected. (iii) Mobility level was measured using the timed Up & Go Test (Podsiadlo & Richardson, 1991), which makes it possible to quantify the mobility and functional capacity of older patients. The Spanish version was validated by Navarro et al. (2001).

### 3.7. Data analysis

A descriptive analysis was carried out. For all dimensions, number and percentage were provided for categorical variables, and mean and standard deviation (SD) for continuous variables. The calculations were performed using the statistical programme SPSS v. 25.0.

### 3.8. Ethical considerations

The study was approved by the Clinical Research Ethics Committee of the Institut Universitari d'Investigació en Atenció Primària Jordi Gol (20/096-P: 26 August 2020) and was carried out in accordance with the Declaration of Helsinki.

## 4. Results

### 4.1. Primary outcomes

The study examined the records of 3,732 CCPs. Their mean age of 82.5±9.8 years, 58.7% (n = 2,189) were women, 98% (n = 3,659) were non-institutionalised, and 35.2% (n = 1,315) were receiving home care.

During 2019, there were 2,470 visits to hospital emergency rooms (66.2%) and 1,651 hospital admissions (44.2%). The most prevalent reasons for consultation were respiratory problems 21.4% (n = 1,600), traumatological issues 20% (n = 1,493) and digestive problems (8.9% = 665).

Of the 2,878 CCPs who had non-institutional caregivers, the most common relationships of the non-institutional caregiver to the CCP were their children (39.1%, n = 1,458) and partner (24.7%, n = 923), accounting for over 60%.

### 4.2. Secondary outcomes

- a Clinical dimension: Frailty was present in 69.3% (n = 2,586), with a therapeutic adherence of 81.7% (n = 3,050). Of the CCPs, 71.4% (n = 2,665) presented an Adjusted Morbidity Groups score of level 4 (chronic disease affecting two or three bodily systems; Table 1).

**Table 1**  
Clinical dimension 2019.

|   | Questionnaire                            | Item                        | n             | Mean ± SD | Total n                    |
|---|--|-----------------------------|---------------|-----------|----------------------------|
| Clinical dimension:                       | Comprehensive Geriatric Assessment (CGA) | Yes (Frailty)               | 2,586 (69.3%) |           | 3,732 (100%)               |
|   |  | No (Frailty)                | 1,146 (30.7%) |           |                            |
|   | Adjusted Morbidity Groups (AMG)          | GMA-2 (acute pathology)     | 48 (1.3%)     | 3.7±0.4   | <sup>c</sup> 3,405 (91.2%) |
| GMA-3 (chronic illness in one system)     |  | 692 (18.5%)                 |               |           |                            |
| GMA-4 (chronic illness in 2 or 3 systems) |  | 2,665 (71.4%)               |               |           |                            |
| Morisky-Green Test                        |  |                             |               |           |                            |
|   | Morisky-Green Test                       | Yes (therapeutic adherence) | 3,050 (81.7%) |           | 3,732 (100%)               |
|   |  | No (therapeutic adherence)  | 682 (18.3%)   |           |                            |
|   | Main active diagnosis                    | Hypertension                | 2,971 (3.2%)  | 21.4±4.4  | <sup>a</sup> 91,813 (100%) |
|   |  | Urinary incontinence        | 1,881 (2%)    |           |                            |
|   |  | Type 2 Diabetes Mellitus    | 1,539 (1.6%)  |           |                            |
|   |  | Other diagnosis             | 85,422 (93%)  |           |                            |
|   | Main reason for visit                    | Respiratory                 | 1,600 (21.4%) |           | <sup>b</sup> 7,457 (100%)  |
|   |  | Traumatological             | 1,493 (20%)   |           |                            |
|   |  | Digestive                   | 665 (8.9%)    |           |                            |
|   |  | Other                       | 3,699 (49.7%) |           |                            |

Source: compiled by author.

<sup>a</sup> Total number of main active diagnosis.<sup>b</sup> Total number of main reasons for visit.<sup>c</sup> The total does not reach 100% because not all patient records had been updated at the time of the study.**Table 2**  
Functional dimension 2019.<sup>b</sup>

|                      | Questionnaire                 | Item                           | n             | Mean ± SD   | Total n                    |
|----------------------|-------------------------------|--------------------------------|---------------|-------------|----------------------------|
| Functional dimension | Lawton and Brody scale (IADL) | Total independence (8)         | 159 (4.3%)    | 3.3 ± 2.5   | (50.7%)                    |
|                      |                               | Slight dependence (6 a 7)      | 247 (6.6%)    |             |                            |
|                      |                               | Moderate dependence (4 a 5)    | 417 (11.2%)   |             |                            |
|                      |                               | Severe dependence (2 to 3)     | 493 (13.2%)   |             |                            |
|                      |                               | Total dependence (0 a 1)       | 576 (15.4%)   |             |                            |
|                      | Barthel Index (ADL)           | Total independence (> 60)      | 1,926 (51.6%) | 68.8 ± 27.3 | <sup>a</sup> 2,777 (74.4%) |
|                      |                               | Moderate dependence (40 to 55) | 442 (11.8%)   |             |                            |
|                      |                               | Severe dependence (20 to 35)   | 222 (5.9%)    |             |                            |
|                      |                               | Total dependence (<20)         | 187 (5.0%)    |             |                            |

Source: compiled by author.

<sup>a</sup> The total does not reach 100% because not all patient records had been updated at the time of the study.<sup>b</sup> The total does not reach 100% because this questionnaire is not necessary for all CCPs.

The main clinical diagnoses of CCPs were hypertension (3.2%, n = 2,971), urinary incontinence (2%, n = 1,881) and type II diabetes mellitus (1.6%, n = 1,539; [Table 1](#)).

a Functional dimension: On the Lawton and Brody Scale, 15.4% (n = 576) of the CCPs showed low functioning for the instrumental activities of daily living. In contrast, on the Barthel Index, 5% (n = 187) were totally dependent in activities of daily living, while 51.6% (n = 1,926) were totally independent ([Table 2](#)).

b Mental health dimension: Of the CCPs, 8.5% (n = 318) showed severe impairment, 10.8% (n = 403) moderate impairment and 12% (n = 446) mild impairment, in contrast to 40.1% (n = 1,495) who did not present cognitive impairment. Regarding the Geriatric Depression Scale (5-GDS), 11.2% (n = 420) had initial depression ([Table 3](#)).

c Social dimension: Of the CCPs, 27.9% (n = 1,042) had low risk of social exclusion and 33.4% (n = 1,246) had no risk of social exclusion ([Table 4](#)).

d Nutritional dimension: Malnutrition was evident in 46.5% (n = 1,623) of the CCPs ([Table 4](#)).

e Movement dimension: Pain was mild in 15.5% (n = 579) of CCPs, moderate in 5% (n = 187) and severe in 1.1% (n = 40) ([Table 5](#)). Regarding falls, 15.4% (n = 574) had experienced falls, with 8.4% (n = 312) falling once a year, 3.6% (n = 133) falling

twice a year and 3.4% (n = 129) falling more than twice a year ([Table 5](#)). Regarding the timed Up & Go Test, 3.4% (n = 221) presented low risk of falling, 8% (n = 298) moderate risk of falling and 15.8% (n = 609) high risk of falling. ([Table 5](#)).

## 5. Discussion

The results allow us to identify the profile of CCP that seeks treatment at our urgent care services, enabling urgent care nurses to provide care aligned with the characteristics and needs of CCPs and serving as a baseline for future studies. The multidimensional characteristics of the CCPs that seek treatment in urgent care services are most likely to be women (58.7%), of advanced age (mean age of 82.47 years), who are not institutionalised (98%) and highly adherent to prescribed therapies (81.7%). The CCPs also had a high degree of morbidity (71.4%) and frailty (69.3%).

The situational diagnosis of PCCs requires a broad view of the different dimensions: clinical, functional, mental health, social, nutritional, and movement. Beginning with the clinical dimension, 30% of people over age 60 take five or more drugs, a trend that has increased in recent years ([Payne, 2016](#)). In this line, older patients in our study took more medications and had better therapeutic adherence. Several authors argue that polypharmacy causes more harm than good ([Sevilla-Sánchez et al., 2017](#); [Espauella-Panicot et al., 2017](#)). Side effects and adherence prob-

**Table 3**  
Mental health dimension 2019.

|                         | Questionnaire   | Item                         | n             | Mean ± SD | Total n        |
|-------------------------|---|------------------------------|---------------|-----------|----------------|
| Mental health dimension | Pfeiffer questionnaire (Cognitive impairment)             | No impairment (0 to 2)       | 1,495 (40.1%) | 2.9 ± 3.1 | ª2,662 (71.3%) |
|                         |   | Mild impairment (3 to 4)     | 446 (12%)     |           |                |
|                         |   | Moderate impairment (5 to 7) | 403 (10.8%)   |           |                |
|                         | Geriatric Depression Scale (5-GDS) (emotional impairment) | No depression (0 to 1)       | 786 (21%)     | 1.5 ± 1.3 | (35.9%)        |
|                         |   | Initial depression (2 to 3)  | 420 (11.2%)   |           |                |
|                         |   | Moderate depression (4)      | 108 (2.9%)    |           |                |
|                         |   | Severe depression (5)        | 25 (0.7%)     |           |                |

Source: compiled by author.

ª The total does not reach 100% because this questionnaire is not necessary for all CCPs.

**Table 4**  
Social and nutritional dimensions 2019.

|                       | Questionnaire                      | Item                                     | n             | Mean ± SD | Total n        |
|-----------------------|------------------------------------|--|---------------|-----------|----------------|
| Social dimension      | Escala d'Indicadors de Risc Social | No risk of social exclusion (0)          | 1,246 (33.4%) | 0.9 ± 1.2 | ª2,528 (67.7%) |
|                       |                                    | Low risk of social exclusion (1 to 2)    | 1,042 (27.9%) |           |                |
|                       |                                    | Medium risk of social exclusion (3 to 4) | 197 (5.3%)    |           |                |
|                       |                                    | High risk of social exclusion (5 to 6)   | 43 (1.1%)     |           |                |
|                       |                                    |  |               |           |                |
| Nutritional dimension | Mini Nutritional Assessment (MNA)  | No (impairment)                          | 2,110 (56.5%) |           | 3,732 (100%)   |
|                       |                                    | Yes (impairment)                         | 1,623 (43.5%) |           |                |

Source: compiled by author.

ª The total does not reach 100% because this questionnaire is not necessary for all CCPs.

**Table 5**  
Movement dimension 2019.

|                    | Questionnaire                      | Item                                     | N             | Mean ± SD   | Total n        |
|--------------------|------------------------------------|--|---------------|-------------|----------------|
| Movement dimension | Visual Analog Scale for Pain (EVA) | Mild pain (< 3)                          | 579 (15.5%)   | 2.3 ± 2.5   | ª806 (21.6%)   |
|                    |                                    | Moderate pain (4 to 7)                   | 187 (5%)      |             |                |
|                    |                                    | Severe pain (8 to 10)                    | 40 (1.1%)     |             |                |
|                    | Number of Annual Falls             | 0 falls                                  | 3,158 (84.6%) | 0.8 ± 1.5   | 3,158 (84.6%)  |
|                    |                                    | 1 fall                                   | 312 (8.4%)    |             |                |
|                    |                                    | 2 falls                                  | 133 (3.6%)    |             |                |
|                    |                                    | > 2 falls                                | 129 (3.4%)    |             |                |
|                    | Timed Up & Go Test                 | < 10 seconds: low risk of falls          | 221 (3.4%)    | 33.3 ± 27.3 | ª1,128 (30.2%) |
|                    |                                    | 11 to 20 seconds: moderate risk of falls | 298 (8%)      |             |                |
|                    |                                    | >20 seconds: high risk of falls          | 609 (15.8%)   |             |                |

Source: compiled by author.

ª The total does not reach 100% because this questionnaire is not necessary for all CCPs.

lems are two of the main problems associated with chronic patients.

Our results show a close relationship between being frail and having a complex chronic condition: usually the frailest individuals have multimorbidity, although not all people with multimorbidity have frailty. This is also confirmed in a systematic review by [Vetrano et al. \(2019\)](#).

In terms of active diagnoses, the three main ones among the PCCs in this study were hypertension, urinary incontinence, and diabetes mellitus II, coinciding with a report by the WHO (2015). Heart disease, cancer, respiratory diseases, and diabetes are the main causes of death around the world (63% of annual deaths). On the other hand, the most persistent reasons for consultation were respiratory, traumatological and digestive problems. These problems cause increased fragility and greater dependence, which are also linked to increasing age.

Health systems have often been focused on responding to imbalances or acute problems rather than addressing chronic health problems proactively. It is estimated that more than 50% of Catalan health resources are dedicated to the treatment of chronic diseases or associated imbalances ([González et al., 2016](#)). This coincides with the results of this study, in which the PCCs accounted

for 44.2% of hospital admissions and 66.2% of hospital emergency room visits, representing a major use of health resources.

Second, turning to the functional dimension, we see a contrast between the total dependence measured by the Lawton and Brody Scale and the decrease in autonomy measured by the Barthel Index. These patients have more difficulty in carrying out tasks in which they interact on their own with their environment outside the hospital than in carrying out simple self-care tasks with the help of another person. Assessing the functional dimension is fundamental in the analysis of CCPs, since the loss of functionality is the prelude to dependence and, hence, the loss of autonomy in basic activities of daily living ([Esteban-Pérez et al., 2018](#)). [Martín-Lesende et al. \(2020\)](#) show that functional assessment allows health professionals to predict the transition to severe/total dependence in basic activities of daily living, institutionalisation, or death in patients with pluripathology.

Third, within the mental health dimension, the patients who presented cognitive impairment were most likely to have mild cognitive impairment. Likewise, of patients presenting depression, they were mostly likely to have initial depression. According to [Kingston et al. \(2018\)](#), the number of people with four or more chronic health problems will double by 2035, and two-thirds of

these people will have mental problems (cognitive impairment, dementia, and/or depression).

Fourth, in the dimensions of risk of social exclusion, the patients in our study showed low social risk but troubling signs of malnutrition. For this reason, it is important for nurses and other health professionals to be alert to the likelihood of nutritional problems in CCPs. Nutrition can be affected by depression and dementia and, additionally, social risk can lead to an inadequate diet. Researchers have described the importance of nutrition in patients with multimorbidity, showing that malnutrition and weight loss in older adults are risk factors for frailty (Gomes et al., 2018; Muñoz-Díaz et al., 2018).

Finally, within the movement dimension, we must highlight the risk of falls presented by the CCPs that performed the timed Up & Go Test. This test has proven to have predictive value for the deterioration of health status and the loss of autonomy in activities of daily living (Shimada et al., 2010), reflected in the falls of CCPs in our study, with 1,526 annual falls.

We have described the profile of CCPs in all their multidimensional diversity, demonstrating the need to carry out proactive screening of people with multimorbidity; assess their frailty; develop individualised multidimensional care plans congruent with their values, preferences, and objectives; review their pharmacological regimen and adherence; and finally, promote the coordination of care between services (Yarnall et al., 2017), in line with the UK's National Institute for Health and Care Excellence's guide on multimorbidity (NICE, 2016). Our study provides information that can help nurses improve care to CCPs, thus decreasing the number of hospitalisations and therefore the cost of care.

### 5.1. Strengths and limitations

The main strengths of this study are the situational diagnosis of the different dimensions of the CCP and the fact that it covered the entire study population. A limitation is that at the time of data collection not all of the CCPs' medical records had been fully updated, meaning that some scales and questionnaires were missing for some dimensions for 2019.

## 6. Conclusions

We noted a high proportion of emergency room visits and hospital admissions among CCPs. Low-level depression and malnutrition were detected. Proactively identifying complex care needs is essential as a starting point for creating tailored care plans for patients. Care plans must be evaluated on an ongoing basis by nursing staff, depending on the needs of the person, the family, and the caregiver.

Individualised care plans are necessary, in the context of shared decision-making between nurses and CCPs, to establish care objectives with adequate therapeutic intensity and ensure that care actions are appropriate to the clinical situation and the patient's desires.

Future lines of research should aim to establish specific nursing interventions through person-centred care that contemplates complexity in clinical, functional, mental health, social, nutritional and movement dimensions of PCCs, and their non-institutional caregivers. Such research-based interventions could bring about a decrease in hospital admissions and the incidence of fragility, an increase in therapeutic adherence, and an improvement in nutrition scores among patients.

### Author contributions

Esther Rubio Fernández: Conceptualisation, Methodology, Writing – Original Draft. Aurora Rosino Bosch: Investigation, Data

Curation, Visualisation. Sergio Alonso Fernández: Software, Formal analysis. Marina Ruiz Rosino: Investigation, Data Curation, Visualisation. Rosa María García Sierra: Software, Formal analysis. Lúcia Benito Aracil: Supervision, Writing – Review & Editing. María Antonia Martínez Momblan: Funding acquisition, Supervision, Writing – Review & Editing. All authors made substantial contributions to the completion of the study and the manuscript.

### Ethical statement

The study was approved by the Clinical Research Ethics Committee of the Institut Universitari d'Investigació en Atenció Primària Jordi Gol (20/096-P: 26 August, 2020) and was carried out in accordance with the Declaration of Helsinki.

### Conflict of interest

None

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