

# Sensitivity of scales as prognostic indicators and palliative needs in elderly patients with non-oncological diseases

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## Abstract

Palliative care has a multidisciplinary approach that improves the quality of life. Traditionally, palliative care focused on oncology patients; however, it can be applied to in-patients with advanced chronicity, for whom there is a lack of validated instruments to assess and determine palliative care. This study aims to describe the sensitivity of the NECPAL, PROFUND, and Charlson scales for assessing and determining mortality and palliative care in older adults with chronic non-oncologic disease through a narrative review in the BMJ, Elsevier, PubMed, HINARI, and SciELO databases. Original articles, review articles, and clinical trials in Spanish and English published in the last five years were included. The NECPAL tool identifies patients who are candidates for palliative care and measures the prevalence of palliative care needs. The PROFUND index is a multidimensional prognostic score that estimates the risk for one year mortality in patients with advanced chronicity. As a prognostic tool, it assesses 30-day mortality risk. The Charlson comorbidity index, created to predict one year mortality risk after hospitalization, is an excellent predictor in hospitalized patients, does not require laboratory tests, and is applicable in various clinical scenarios.

## Keywords

Palliative Care, Prognosis, Chronic Disease.

## Resumen

Los cuidados paliativos tienen un enfoque multidisciplinario que mejora la calidad de vida. Tradicionalmente se centraron en pacientes oncológicos, sin embargo, pueden usarse en pacientes con cronicidad avanzada, en quienes existe falta de instrumentos validados para evaluar y determinar la atención paliativa. El objetivo de este estudio es describir la sensibilidad de las escalas NECPAL, PROFUND y Charlson para evaluar y determinar la mortalidad, y atención paliativa en adultos mayores con enfermedad crónica no oncológica mediante una revisión narrativa en las bases de datos BMJ, Elsevier, PubMed, HINARI y SciELO. Se incluyeron artículos originales, de revisión y ensayos clínicos en español e inglés, publicados en los últimos cinco años. La escala NECPAL permite identificar a los pacientes candidatos a cuidados paliativos y mide la prevalencia de personas con necesidad paliativa. El índice PROFUND es una puntuación pronóstica multidimensional que estima el riesgo de mortalidad a un año en pacientes con cronicidad avanzada. Como herramienta pronóstica evalúa el riesgo de mortalidad a treinta días. El índice de comorbilidad de Charlson, creado para predecir el riesgo de mortalidad a un año posterior a la hospitalización, es un excelente predictor en pacientes hospitalizados, no requiere pruebas de laboratorio y es aplicable en diversos escenarios clínicos.

## Palabras clave

Cuidados paliativos, pronóstico, enfermedad crónica.

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**Sensibilidad de escalas como pronóstico y necesidades paliativas en adultos mayores con enfermedad no oncológica**

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## Introduction

The World Health Organization defines palliative care as a strategy with an "approach that improves the quality of life of patients and families facing problems associated with advanced chronicity through prevention, relief of suffering, assessment and pain management"<sup>1</sup>. It began in the 19th century, with the care of terminal patients by religious communities, using analgesic drugs and technologies that allowed medical advances for the dying process. However, the suffering of these patients was not taken into account.

It was not until the middle of the 20th century that Cicely Saunders, concerned with creating the conditions for the care of these patients, laid the foundations for the modern palliative and hospice care movement based on pain management and other symptoms<sup>2</sup>.

The term palliative care was first used in 1975, by the surgeon Balfour Mount, as the currently known definition of comprehensive patient care in the different health services areas, which included in-hospital, outpatient and home support, and in the bereavement stage, combined with teaching and research<sup>2</sup>.

Although palliative care alleviates pain, it relieves physical, mental, and spiritual suffering<sup>3</sup> that generates alterations in the patient's quality of life to allow them to maintain an active life, within their possibilities, until the moment of death. In addition, it includes support for the family in coping with the disease and later for bereavement management<sup>4</sup>.

The implementation of palliative care is usually in the advanced stages of chronic diseases, and due to misinformation and stigma, the idea of implementing palliative care only before death is widespread<sup>5</sup>.

Palliative care in patients involves a social, emotional and physical burden<sup>6</sup> for patients and a high workload for their caregivers<sup>7</sup>; however, integrated palliative care facilitates its provision<sup>8</sup>. Palliative care is adaptive and involves a multidisciplinary team to improve decision-making for patient management<sup>9</sup>. Comprehensive care must be provided to promote quality of life in the phase of deterioration and adaptation to the dying process<sup>10</sup>.

Traditionally, the focus has been on oncology patients; nevertheless, palliative care also encompasses patients with advanced chronicity<sup>11</sup> of various diseases, including cardiovascular disease, cancer, major organ failure, drug-resistant tuberculosis, severe burns, chronic terminal illness,

acute trauma, extreme prematurity at birth or extreme frailty in old age<sup>12</sup>, which constitute a population that requires greater attention to maintain quality of life<sup>13</sup>.

Palliative care is not intended to accelerate or delay death but is based on ethical principles, multidisciplinary work, and shared decision-making<sup>4</sup>. They are recognized in the context of the right to health because they contribute to symptom management and reduce healthcare costs<sup>14</sup>.

According to Voumard *et al.*, seriously ill older adults are a highly vulnerable group that requires multidimensional, sustainable, and relationally autonomy-oriented care<sup>15</sup>. Patients suffering from three or more chronic diseases increase the risk of mortality. Diseases such as diabetes *mellitus* and ischemic heart disease increase mortality up to eight times and can reduce the patient's life expectancy by 15 years<sup>8</sup>.

The aging of the world's population and the increase in noncommunicable diseases have contributed to the growing need for palliative care. It is estimated that about 40 million people require palliative care each year, and only 14 % of patients receive it. Furthermore, approximately 75 % are found in low- and middle-income countries<sup>16</sup>. Generally, in patients with non-cancer chronic diseases, the early initiation of palliative care is delayed because of the overestimation of survival time<sup>17</sup>. This care is similar in patients with and without cancer, treating physical symptoms, psychosocial needs, and family support<sup>18</sup>.

In Latin America, 7.6 % of the population has access to palliative care, according to the Latin American Palliative Care Association. In 2020, there were 3.9 healthcare resources (medical, nursing, psychology) per million people in El Salvador<sup>19</sup>.

There are multiple ways in which the need for palliative care can be identified, including pain with usual activities, dyspnea at rest, and decreased daily skills. Similarly, the surprise question: "Would you be surprised if your patient died in the next 12 months?" has been implemented for the detection of palliative patients, but its contribution is limited; however, when this question is included in the Palliative Needs Scale (NECPAL)<sup>20</sup>, it proves to be a useful tool for detecting patients with advanced chronic disease and palliative needs<sup>21</sup>. However, it is necessary to standardize instruments to identify the need for palliative care, as this is a barrier to its early implementation<sup>22</sup>.

Early initiation of palliative care with a holistic approach improves the quality of life and reduces hospitalizations in patients with advanced chronic disease<sup>23</sup>.

This study was conducted to describe the sensitivity of the NECPAL, PROFUND, and Charlson scales as indicators of the need for palliative care and as predictors of mortality risk in older adults with chronic non-oncologic disease.

This narrative review was prepared by searching the BMJ, Elsevier, PubMed, HINARI, and SciELO databases. The terms: "Palliative care AND mortality/prognosis", "Palliative care AND comorbidity", "NECPAL AND Mortality" "PROFUND index AND mortality", "Charlson comorbidity index AND mortality" were used. The selected literature included original articles, review articles, and clinical trials in Spanish and English, published in the last five years.

## Discussion

### Description of the NECPAL, PRO-FUND, and Charlson scales as tools for establishing palliative care

The increase in the number of patients with advanced chronic diseases has generated the need for palliative care as a priority in health services, and the early initiation of palliative care produces benefits for both the patients and their families<sup>24</sup>. Not only does it consist solely of symptom management, but rather continues curative care in an integrated manner and modifies it as the patient's disease progresses<sup>24</sup>.

The importance of timely identification of the need for palliative care has generated the analysis of different instruments that allow prognosis and identify the patients at the last stage of their life. Three tools that have proven significant detection of increased mortality are the NECPAL, PROFUND, and Charlson scales.

The NECPAL (Palliative Needs) tool was developed by the WHO Collaborating Centre for Public Health Palliative Care Programs at the Catalan Institute of Oncology to identify the need for palliative care, especially in the areas of general primary care services and conventional hospital services, measuring its prevalence and allowing the application of palliative care<sup>25</sup>. It is useful in patients with advanced chronicity, highlighting the need for health support, palliative care, symptom control, nutritional, functional, and frailty markers<sup>24</sup>.

The PROFUND index (functional prope-diction developed for pluripathological patients) was developed by a working group of pluripathological patients. It consists of a score to establish an objective multidimensional prognosis that estimates

the risk of mortality in one year in patients with advanced chronicity; however, Méndez *et al.* demonstrated its usefulness as a prognostic tool through the evaluation of the risk of mortality in 30 days<sup>26</sup>.

The Charlson comorbidity index was created to evaluate the risk of death due to comorbidities and is used as a predictor of prognosis and long-term survival. Kuswardhani *et al.* demonstrated that each point increase in the Charlson index indicates a 16 % increase in the risk of mortality<sup>27</sup>, while Fuchs *et al.* determined that this instrument is an excellent predictor of mortality in hospitalized patients, does not require laboratory tests and is applicable in various clinical scenarios<sup>28</sup>.

Timely palliative care ensures that the patient's wishes, needs, and expectations are met because it has a positive impact on the quality of life of those involved, on the response to stress, on the confidence to make informed decisions and on the search for emotional and spiritual satisfaction of the patient and their families<sup>29</sup>.

### Sensitivity of NECPAL as a predictor of mortality and need for palliative care

The NECPAL tool is applied in patients with advanced chronicity with the aim of detecting palliative needs. First, the professional's perception related to the risk of death must be evaluated; if the surprise question is negative, indicators related to the request for palliative care by the patient or family members, and general clinical indicators of severity and progression. Finally, specific clinical indicators of the severity and progression of the diseases must be evaluated<sup>30</sup>.

This instrument has been proven to be helpful for detecting the population with palliative needs among the general population. Also, it shows the predictive capacity for mortality with an area under the curve of 0.81 that allows planning actions aimed at preserving the patient's well-being<sup>30</sup>. In combination with the surprise question, it has better prognostic potential for estimating mortality in patients with advanced chronicity and need for palliative care<sup>31</sup>. The tool used could be extended to patients with a life expectancy of more than one year if the answer to the surprise question focuses on palliative care rather than on the need to establish them<sup>32</sup>.

Furthermore, this assessment can be a mortality predictor in patients with advanced chronicity and infection by COVID-19 and patients with two or more

chronic pathologies with poor prognoses<sup>34</sup>. NECPAL is a useful and feasible tool, which adds a prognostic criterion to the palliative approach<sup>35</sup> and considers predictive assessment as a determining factor in identifying patients with these needs<sup>36</sup>.

### **Sensitivity of the PROFUND index as an indicator of onset of palliative needs**

The PROFUND index is an objective multi-dimensional prognostic score that predicts one year mortality in patients with multiple pathologies after hospital discharge; it has nine variables, defines the risk of death, and promotes the design of a therapeutic plan according to the characteristics of each patient<sup>37</sup>. Almagro *et al.* highlight the validation of the PROFUND index for predicting one year mortality in patients with advanced chronicity<sup>38</sup>. Martin *et al.* demonstrated that this is a useful tool in the short term, allowing the detection of mortality 30 days, and at three months after hospital discharge<sup>39</sup>. Méndez *et al.* also described its usefulness as a prognostic tool for short-term mortality and its ability to guide decisions in palliative care<sup>40</sup>.

The use of this tool with other scales generates a greater association with mortality. It also has a greater predictive capacity than the biomarkers: C-reactive protein, albumin and erythrocyte distribution width, according to Moretti *et al.*<sup>41</sup>. When PROFUND is combined with the Subjective Global Assessment, an increase in its prognostic capacity is obtained, where the area under the curve at 12 months was: 0.747 (95 % CI, 0.65 - 0.83); 0.733 (95 % CI, 0.65 - 0.81) and when combining the two variables: 0.78 (95 % CI, 0.70 - 0.87)<sup>42</sup>.

Research by Bernabeu *et al.* has shown that the PROFUND index maintains its accuracy as a predictor of mortality in multi-pathological patients over a four year follow-up period. This index is important in decision-making and therapeutic interventions for multi-pathological patients<sup>43</sup>.

### **Sensitivity of Charlson comorbidity index as a predictor of mortality**

The Charlson comorbidity index is characterized by its simplicity. When combined with other predictive scales (such as SOFA and APACHE II), it has been proven to detect mortality in patients with candidemia and advanced chronicity 30 days after hospital discharge<sup>44</sup>. It was created in 1987<sup>45</sup>. There are multiple studies with more than 30 000

patients that validate its usefulness<sup>45</sup>. Hautamäk *et al.* combined this index with the GRACE scale for clinical assessment and prognosis in coronary artery disease, which allowed it to be validated as a support for the management of patients with advanced chronicity<sup>46</sup>. However, Enriquez *et al.* mention that the results may vary due to population diversity among countries<sup>47</sup>.

The modified Charlson scale, which includes ten comorbidities, is a functional tool for detecting advanced chronicity in cases of stroke or other pathologies in which access to all data is not possible<sup>48</sup>.

The higher the score obtained on this scale, the longer the hospital stay in patients with advanced chronicity<sup>49</sup>. Patients with low Charlson index scores had better survival rates compared to patients with high scores (p-value for the classification test = 0.0265). In contrast, other authors have reported that a score of zero to one is associated with a nearly twofold increased probability of death<sup>50</sup>. It leads to poor post-surgical outcomes in advanced chronicity ( $r = -0.20$ )<sup>51</sup> and influences prognostic prediction due to increased risk for comorbidities, which prevent early rehabilitation<sup>52</sup>.

Although its use has been limited to studies to detect mortality and survival<sup>52</sup>, it is considered one of the most widely used scales to assess survival<sup>53</sup>. Kim *et al.* mention that the variables contained in the Charlson comorbidity index associated with mortality are valid in the short term<sup>54</sup>. Poses *et al.* described a lower reliability related to mortality than with the Apache II scale; however, the latter requires the availability of clinical and laboratory data on the patient during 24 hours of hospitalization, so they deduced that the Charlson index is a feasible method of risk adjustment for the different health services<sup>55</sup>. On the other hand, Bona *et al.* combined the Charlson indices with the surgical risk scale, which allowed the detection of patients at low risk of death. This combination constituted a useful tool for auditing operative outcomes<sup>45</sup>.

## **Conclusion**

The NECPAL, PROFUND, and Charlson scales have proven to be extremely effective in determining the need for palliative care in older adults with chronic non-oncologic disease and in predicting the risk of mortality in older adults with chronic non-oncologic disease. The NECPAL tool and the surprise question are valuable instruments, easy to apply, and useful in identifying palliative patients with limited life prognoses. The PROFUND index allows the prediction of

one year mortality. The Charlson comorbidity index has a prognostic value associated with mortality with an increase of 16 % with each point, and combined with other scales increases its prognostic advantageous. The three instruments investigated are significantly related to mortality and the need for palliative care; therefore, they must be used more frequently to highlight the need for palliative care.

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