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# Cost of Illness of Pressure Injuries in the Inpatient Area of a Socio-Health Center in Spain

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**ABSTRACT**

**OBJECTIVE:** To estimate the increase in length of stay and cost of illness of pressure injuries (PIs) in the inpatient area of a socio-health center.

**METHODS:** This was a retrospective cohort study that included a consecutive sampling of patients admitted to the inpatient programs of a socio-healthcare center between January 1, 2016, and December 31, 2018. Data were retrospectively extracted from patients' electronic health records.

**RESULTS:** During the study period 4,062 patients were admitted to the different hospitalization programs. The patients' mean age was 75.34 ± 13.69 years, and 51.2% of them were men. Of these, 1,421 patients had PIs, and 318 patients had to prolong their hospital stay due to PIs. These 318 patients were admitted 12,089 days longer (mean of 38.01 ± 41.49 days per patient) than patients without a PI, representing an expense of €1,381,006 (US $1,430,722). The cost of illness in the period under study was estimated at €1,922,049 (US $1,991,212). The average cost of PI treatment per patient was €1,352.60 ± €3,351.43 (US $1,401.29 ± $3,472.08), and the average cost of treatment until complete resolution of a PI was €2,064.65 ± €4,282.48 (US $1,470.79 ± $4,436.65). The cost of treatment ranged from €1,419.68 ± €3,100.47 (US $2,138.98 ± $3,212.09) for stage 1 PIs to €6,299.31 ± €10,000.57 (US $6,526.08 ± $10,360.59) for stage 4 PIs.

**CONCLUSIONS:** This study highlights the significant health and economic impacts of PIs in the inpatient area of a socio-health center. The findings emphasize the necessity of effective prevention strategies to mitigate the occurrence of PIs and their associated costs. By understanding the financial burden of PIs, healthcare providers and policymakers can make informed decisions to improve resource allocation, enhance patient care, and reduce financial strain on the healthcare system.

**KEYWORDS:** chronic wounds, cost of illness, health economics, hospitals, pressure injuries

(*Adv Skin Wound Care* 2025;38: E6–E11)

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ISSN: 1527-7941/25/3802–00E6
DOI: 10.1097/ASW.0000000000000272

## INTRODUCTION

Pressure injuries (PIs) are a significant health issue because of their high prevalence, associated morbidity, and negative impact on patients' quality of life.[1] Old adult patients, those with cognitive or mobility impairments, and individuals with multiple comorbidities are particularly susceptible to PI development.[2,3] Since the first publication of PI incidence data in 1977,[4] numerous studies have highlighted this major health problem.

Globally, an estimated 7.5 million PIs occur annually in developed countries. In the US, 2.5 million PIs are treated each year,[3] with a prevalence of 9.3% across all levels of care. In Canada, prevalence rates are 25.1% in acute care services, 29.9% in conventional hospitalization situations, and 15.1% in primary care.[5] In Europe, prevalence rates range from 4.4% to 54%, depending on the country and care setting.[6–9]

According to data published in the latest national prevalence study in Spain, the problem is still far from being resolved. The prevalence in hospitals among the adult population was 6.7% in 2017,[10] which was similar to the 7.87% prevalence reported in 2014. In socio-health centers, PI prevalence is 13.41%, and among patients in in-home care programs, it is 8.51%.[11]

Pressure injuries impose a significant cost burden on healthcare systems, accounting for 0.4% to 6.6% of total healthcare expenditure, depending on the country.[11] In the UK, treatment costs are estimated at £1.4 billion to £2.1 billion annually, or 4% of the National Health Service budget.[12,13] In the US, costs range from $500 to $40,000 per case, with an annual total of $11 billion.[14] In Australia, the annual cost is AU $1.8 billion, equivalent to 1.9% of the total public hospital expenditure.[15] In a recent study in hospitals with a prevalence of 12.9%, the expenditure for PI treatments over 12 months was estimated to be AU $9.11 billion.[16] In the Netherlands, the estimated expenditure ranges from $362 million to $2.8 billion in the highest estimates. The most conservative estimate is 1% of the total healthcare budget.[17] In Spain, total expenditure on PI treatments amounts to €461 million (US $478 million), which is approximately 5% of the total health system budget.[18]

Because most PIs are considered to be preventable, nosocomial PIs are used as an indicator of the quality of care provided.[2,19] For example, the occurrence of a PI after patient admission is associated with malpractice and leads to many extra costs related to treatment and prolonged hospital stays[20] and sometimes requires the payment of financial compensation to patients and their families.[2] Beckrich and Aronovitch[21] estimated these costs at $2 billion to $3.6 billion. Further, Dealey et al[22] estimated that nosocomial PIs accounted for 3,000 to 4,800 extra stays in the UK at a cost of £3.36 million per year. In Australia, the costs are estimated at AU $285 million for an average length of stay (LOS) of 4.31 days,[23] whereas according to a study by Nghiem et al,[16] the total expenditure generated in public hospitals for overstays was AU $3.6 billion over a 12-month period.

In general, economic analyses of PIs come from Anglo-Saxon countries such as the US, the UK, Canada, and Australia. In Spain, the economic data differ significantly from those of Anglo-Saxon countries. Further, the literature related to the costs derived from care in socio-health centers is practically nonexistent, hence the relevance of the present study. Most of the literature cited and the comparisons given refer to costs in hospitals; however, regardless of the level of care at which these studies were carried out, comparison and extrapolation are difficult due to the substantial difference in professional salaries. In Spain, the salaries are lower than in most European or North American countries, which may result in significantly lower costs. Based on the aforementioned aspects, this study is necessary to address these differences. Therefore, the present study was carried out to estimate the increase in LOS and cost of illness of PIs in the inpatient area of a socio-health center in Spain.

## METHODS

In this retrospective cohort study, researchers conducted a consecutive sampling of patients admitted to the inpatient programs of a socio-healthcare center from January 1, 2016, to December 31, 2018. This socio-health center is a medium-to long-stay hospital, staffed by specialized health professionals with the necessary structure to provide care for people who, because of serious health problems or functional limitations and/or risk of social exclusion, need simultaneous health and social care, in a coordinated and stable manner. The medium- and long-stay health programs include palliative care (PC), prolonged care without rehabilitation, prolonged care with rehabilitation (PC&R), reversible brain injury, chronic severe brain injury, and neurologic processes.

Two nurses who were members of the research team manually reviewed patients' records and extracted data. Data collection for establishing PI prevalence and incidence relied on the Pressure Ulcer Prevalence Collection Sheet.[24] The study design adhered to international standards, and the content validity was confirmed using the CHEERS (Consolidated Health Economic Evaluation Reporting Standards) checklist.[25] All data were stored securely on the hospital server in compliance with national regulations. To calculate the cost of illness, all patients who had at least one PI at the time of admission or during their hospital stay were considered.

### Calculation and Application of Costs

Both the direct costs of treatment and the costs of overstays (opportunity costs) were used to calculate the cost of illness due to PIs. The overstay costs were applied only to hospital programs with the goal of cure or improvement (eg, PC&R, chronic severe brain injury); this assumes, therefore, that the PIs were responsible for the delay in the patient's discharge from hospital.

The pharmacy service provided unit prices per dose for systemic antibiotics, nutrition supplements, topical medicines, and all medical devices used in the treatments. In the case of multidose packs, the average number of doses or applications of each product or drug was estimated in advance, based on the experience of experts, to establish the estimated cost of a dose or application. Similarly, in the case of packs of nutrition supplements that are not single doses, the quantity of the pack was divided in accordance with usual medical guidelines to estimate the unit cost of each dose.

The Human Resources Department provided the hourly costs (salary and social security) of nurses (€19.93 [US $20.65]), auxiliary nursing care technicians (€13.67 [US $14.16]), and physicians (€35.82 [US $37.11]), applied to the nursing time used in each treatment described in the study by Soldevilla et al,[18] and the cost of the surgical material used. Likewise, it was estimated that for all patients, the participation of a nursing assistant was necessary to help with patient repositioning, and 10 minutes of the physician's time was added for each culture request. The Laboratory Service provided the cost of culturing a chronic wound exudate (€6.04 [US $6.26] per culture).

Once the unit costs of those associated variables had been obtained, the number of times each variable was recorded was multiplied by the unit cost and subsequently added to find the total cost of each variable for each PI treatment.

The cost of overstays was calculated by multiplying the cost of each stay per program[26] by the difference in days of admission of the patient with a PI compared with the average LOS in days of a patient without a PI in each program, provided that the reason for discharge was "cure or improvement." The admission service codes the reason for discharge as "cure or improvement" when the patient's state of health does not require further inpatient health intervention, or when this care can be provided at home without the need to be admitted. In these cases, the patient's stay in the center is terminated.

All prices and costs used are those in effect in November 2018. The OANDA Rates calculation tool was used for currency conversion.[27]

### Data Analysis

Period prevalence (PP) and cumulative incidence were used as epidemiologic measures to determine the extent of the disease.[28] Statistical analyses were performed using SPSS Statistics for Windows, version 26.0 (IBM Corp).

Descriptive statistics were carried out using absolute and relative frequency tables for qualitative variables, and measures of central tendency and dispersion were calculated for quantitative variables. For the comparative study between variables, inferential statistics were carried out. To compare the mean of a quantitative variable in different categories, researchers used the Student *t* test for independent samples (two groups) and the analysis of variance test (more than two groups), based on the results of normal distribution and homoscedasticity, which were assessed using the Kolmogorov-Smirnov test and the Levene test, respectively. The differences found in the inferential statistics were considered statistically significant at a value of $P < .05$.

### Ethical Aspects

The present research project was approved by the accredited Clinical Research Ethics Committee. The recommendations of the latest update of the Declaration of Helsinki and Tokyo of the World Medical Association were followed. Moreover, the investigators adhered to the *Conferencia de Rectores de las Universidades Españolas* (Conference of Rectors of Spanish Universities) declaration on good research practice at the university.

All information related to the study was treated as strictly confidential and in accordance with the European Regulation 2016/679 of April 27, 2016, and the Spanish Organic Law 3/2018 of December 5, 2018, on personal data protection and guarantee of digital rights and Biomedical Research Law 14/2007 and its 2016 update.

## RESULTS

During the study period, 4,062 patients were admitted to the various hospitalization programs; they had a mean age of 75.34 ± 13.69 years, and 51.2% were men (Table 1). The mean LOS for all hospitalization programs was 64.60 ± 186.85 days, and the mean LOS for patients with PIs in all programs was 64.11 ± 147.68 days. Of the patients admitted, 1,421 patients (746 men, 656 women) had PIs (Table 1), presenting a PP of 34.98% with a cumulative incidence of 2.63%. Regarding the age of the patients, the group with the highest frequency of PIs was patients between 80 and 90 years of age.

Within the subgroup of patients with PIs, 836 had more than one PI within the study period. The hospitalization program with

**TABLE 1.** PATIENTS ADMITTED AND DISTRIBUTION OF PATIENTS WITH A PI BY HOSPITALIZATION PROGRAM

| Hospitalization Program | Patients Admitted (N = 4,062), n (%) | Patients with a PI (n = 1,421), n (%) | Patients with PIs within Each Hospitalization Program, % |
|---|---|---|---|
| Palliative care | 1,601 (39.41) | 522 (32.60) | 12.85 |
| Prolonged care without rehabilitation | 552 (13.59) | 381 (69.02) | 9.38 |
| Prolonged care with rehabilitation | 1,498 (36.88) | 375 (25.03) | 9.23 |
| Reversible brain injury | 50 (1.23) | 30 (60) | 0.74 |
| Chronic severe brain injury | 193 (4.75) | 40 (20.73) | 0.98 |
| Neurologic processes | 168 (4.14) | 73 (43.45) | 1.80 |
| Total | 4,062 (100) | 1,421 (34.98) | 34.98 |

Abbreviation: PI, pressure injury.

the highest number of patients with multiple PIs was the PC&R unit with 292 and a PP of 52.89% (Table 2). The LOS for these patients was 82.42 ± 32.15 days compared with 61.75 ± 35.00 days ($P < .0001$) for all inpatients (n = 4,062).

According to the classification established by the National Pressure Injury Advisory Panel,[29] stage 2 PIs were the most frequent (n = 1,167), and stage 4 PIs were the least frequent (n = 496; Table 3).

During the study period, 271 nutrition supplements were prescribed, the most frequent being hypercaloric-hyperproteic in a 200-mL bottle. Of the 879 PIs that healed completely, 117 were in patients who were treated with nutrition supplements. The mean duration of PI treatment for these patients was 38.18 ± 60.59 days. Likewise, in the treatment of PIs in the study population, 25 medical devices/drugs for local application were used: 12 dressings with different indications (exudate control, ulcer bed protection, bacteriostatic), 3 products with debridement action, 3 for treatment and/or protection of the perilesional skin, 3 antibiotics with local action, 2 antiseptic solutions, 1 healing accelerator, and 1 antifungal. In general, the most frequently used products were hydropolymer dressings, hydrogel, collagenase, hyperoxygenated fatty acids in oil, and zinc oxide ointment. The most frequently used local treatments by PI category were oil-based hyperoxygenated fatty acids in stage 1 PIs, hydrogel in stage 2 PIs, and collagenase in stage 3 and 4 PIs. In stages 1 to 3, the most frequently used dressing type was nonadhesive hydropolymer; in stage 4, it was adhesive hydropolymer.

**TABLE 2.** PATIENTS WITH SEVERAL PIS BY HOSPITALIZATION PROGRAM (N = 4,062)

| Hospitalization Program | Patients with Several PIs, n | Inpatients, n | Program PP, % |
|---|---|---|---|
| Palliative care | 278 | 1,601 | 17.36 |
| Prolonged care without rehabilitation | 292 | 552 | 52.89 |
| Prolonged care with rehabilitation | 193 | 1,497 | 12.89 |
| Reversible brain injury | 17 | 50 | 34.00 |
| Chronic severe brain injury | 16 | 193 | 8.29 |
| Neurologic processes | 40 | 169 | 23.66 |
| Total | 836 | 4,062 | 20.58 |

Abbreviations: PI, pressure injury; PP, period prevalence.

**TABLE 3.** PI HEALING RATES BY CATEGORY (N = 2,691)

| PI Stage | PIs Treated, n | PIs Resolved, n | Resolution Rate, % |
|---|---|---|---|
| Stage 1 | 546 | 226 | 41.39 |
| Stage 2 | 1,167 | 433 | 37.10 |
| Stage 3 | 482 | 130 | 26.97 |
| Stage 4 | 496 | 90 | 18.15 |
| Total | 2,691 | 879 | 32.66 |

Abbreviation: PI, pressure injury.

During the study period, 32.66% of the PIs healed (n = 879). The mean duration of treatment to achieve complete PI resolution was 32.98 ± 39.84 days. Statistically significant differences were found between the different categories and resolution times (Table 4).

Of the 1,421 patients with PIs, 318 patients had prolonged hospital stays due to PIs. These 318 patients were admitted 12,089 days longer in comparison with patients without PIs. The mean LOS per patient was 38.01 ± 41.49 days. The cost of illness in the period under study was €1,916,049 (US $ 1,985,026.55), an average of €640,683 (US $663,748) per year. By item, the total cost was divided into €235,719.90 (US $244,205.82) corresponding to human resources, €299,323.10 (US $310,098.73) for treatment, and €1,381,006 (US $1,430,722) attributable to overstays.

The PIs developing after patient admission cost €141,894.58 (US $147,002.78). The average cost of treating a patient with multiple PIs was €1,635 ± €3,822.71 (US $1,694 ± $3.960); in contrast, the average cost of treating a patient with a single PI was €1,015.01 ± €2,629.45 (US $1,051.55 ± $2,724.11) (Table 5). The average cost of treatment by PI category ranged from €857.66 ± €2,399.44 (US $888,54 ± $2,485.82) for stage 1 PIs to €3,379.77 ± €6,016.99 (US $3,501.44 ± $6,233.60) for stage 4 PIs. The mean cost of treatment until complete resolution of the PI was €2,064.65 ± €4,282.48 (US $2,138.98 ± $4,436.65) for stages 1 to 4 (Table 6).

## DISCUSSION

For a better contextualization and interpretation of the economic results obtained, it was considered appropriate to include the Euro value equivalent for the figures expressed in the currency of origin.

In the present study, the mean LOS for all hospitalization programs was 64.60 ± 186.85 days, whereas the mean LOS for patients with PIs across all programs was 64.11 ± 147.68 days. The fact that LOS did not significantly differ between patients with and without PIs when considering all programs is attributable to the inclusion of

**TABLE 4.** TREATMENT TIME TO HEALING OF PIS IN DAYS (N = 879)

| PI Stage | n | Mean ± SD, d | *P* |
|---|---|---|---|
| Stage 1 | 226 | 18.55 ± 23.88 | <.0001 |
| Stage 2 | 433 | 26.03 ± 28.12 | |
| Stage 3 | 130 | 45.98 ± 37.28 | |
| Stage 4 | 90 | 83.84 ± 68.85 | |
| Total | 879 | 32.98 ± 39.84 | |

Abbreviation: PI, pressure injury.

**TABLE 5.** AVERAGE TREATMENT COSTS PER PATIENT ACCORDING TO THE PI APPEARANCE (N = 1,421)

| PI Development | Cost per Patient, Mean ± SD, € [US $] | n | Total Cost, € [US $] |
|---|---|---|---|
| Before hospital admission | 1,354.75 ± 3,391.33 [1,403.52 ± 3,513.42] | 1,314 | 1,780,154.42 [1,844,239.98] |
| After hospital admission | 1,326.11 ± 2,829.19 [1,373.85 ± 2,931.04] | 107 | 141,894.58 [147,002.78] |
| Patient with multiple PIs | 1,635.60 ± 3,382.71 [1,694.48 ± 3,504.49] | 773 | 1,264,322.33 [1,309,837.93] |
| Patient with one PI | 1,015.60 ± 2,629.45 [1,052.16 ± 2,724.11] | 648 | 657,726.67 [681,404.83] |
| Total cost for patients with PIs | 1,352.60 ± 3,351.43 [1,401.29 ± 3,472.08] | 1,421 | 1,922,049.00 [1,991,242.76] |

Abbreviation: PI, pressure injury.

patients in PC. These patients have a high prevalence of PIs but do not typically experience extended stays because the primary focus of their treatment is not on resolving PIs. However, for patients with potentially reversible brain damage, high-intensity rehabilitation therapies are applied. When these patients have one or more PIs (with reversible brain injury seeing the highest number of patients with multiple PIs), the intensity of rehabilitation therapies has to be significantly reduced because these patients cannot tolerate rigorous treatment. Depending on the location of the PI, prolonged sitting, standing, or walking may be severely restricted. This means patients require more time for rehabilitation, and in most cases, the PIs need to improve before high-intensity rehabilitation therapies can be implemented. This inevitably leads to longer hospital stays.

In addition, the present data indicate that of 1,421 patients with PIs, 318 experienced an average of 38.01 extra days of hospitalization due to PIs, representing a 59.2% increase in their LOS. Similar studies support these findings. In a German university hospital, patients with a PI had an average of 2.6 extra days, a 13.68% increase over the standard 19 days.[30] In Washington State hospitals, patients with a PI had an average of 10.8 extra days of stay.[31] In US hospitals, patients with PIs stayed an average of 11.1 days compared with 4.6 days for those without PIs. In Sichuan, China, PIs resulted in an average of 31 extra days in hospital.[32] In their study of a population of patients admitted to a functional rehabilitation unit, who had very similar characteristics to the present sample in the PC&R hospitalization program, Corrales-Pérez et al[33] found a difference of 22 days on average between the LOS of patients with versus without PIs. Moreover, Alito et al[34] observed that the presence of a PI extended patient stays in neurorehabilitation units to 51 days versus 36 days among patients without PIs ($P < .01$).

Bennett et al[12] estimated the cost of treating PIs in the English population. Using prices from 2000, the mean estimated cost for each PI category per patient per day for a PI that heals without complications was £38 (US $47.04), £42 (US $52.00), £50 (US $61.90), and £50 (US $61.90) for stages 1 to 4, respectively. The mean estimated cost of healing PIs was £1,064 (US $1,317.28), £3,948 (US $4,877.82), £6,350 (US $7,861.61), and £7,750 (US $9,594.88) per patient for stages 1 to 4, respectively. The estimated cost rose to £24,214 (US $29,978.11) for PIs with complications such as osteomyelitis.

Years later, in a publication on the cost-effectiveness of preventive measures, the costs of the initial work by Bennett et al[12] were reproduced for all PIs, both those with a normal course and those with a torpid course due to associated complications, taking 2008 prices as a reference and applying inflation indices. The cost per treatment per patient for stage 1 PIs remained the same, whereas stage 4 PIs cost £10,551 (US $13,062.61).[35]

Some of the authors of the Bennett et al[12] article later updated the data using 2011 prices. The estimated costs of PI treatment per patient were then £1,213 (US $1,501.75), £4,398 (US $5,444.95), £7,232 (US $8,953.58), and £8,782 (US $10,872.51) for stages 1 to 4, respectively.[13] Another UK study estimated an average cost of £2,644 (US $3,273.41) per patient for all categories.[36] In the US, costs per patient for stage 4 PIs range from $11,749.81 to $16,220[37,38] and up to €20,957 (US $21,855.77) for surgical treatments in the Netherlands.[39] In addition, the incremental costs to hospitals in the US related to the treatment of hospital-acquired PIs are approximately $10,708 per patient, totaling $26.8 billion annually.[40]

Bauer et al[41] estimated the total costs of hospitalized patients with PIs to be $36,500 on average per patient, slightly more than twice as high as those without PIs. In an analysis of the cost of illness at different levels of care for PIs in the Netherlands, the most conservative estimates for the cost of treatment per day in nursing homes were $9.18, $29.77, $58.29, and $117.15 for stages 1 to 4, respectively.[42] Dale et al[43] estimated the cost of treating stage 4 PIs at £56.77 (US $58.81) per patient per day in a community setting. Demarré et al[44] pooled costs of PI disease published by different authors at different levels of care in a systematic review. The costs per patient per day reported in studies on populations similar to the present sample ranged from €1.86 to €2.16 (US $US $1.93-$2.24) for stage 1 PIs, €3.88 to €68.61 (US $4.02-$71.08) for stage 2 PIs, €7.14 to €117.81 (US $7.40-$122.05) for stage 3 PIs, and €7.07 to €170.43 (US $7.32-$176.56) for stage 4 PIs. Other international studies show that average costs for PI treatment are between $1,890 and $70,000.[45–48]

**TABLE 6.** AVERAGE COSTS OF PI TREATMENT BY PI CATEGORY

| PI Stage, Total PIs Treated (n = 1,421) | Mean ± SD, € [US $] | PI Stage, PIs Treated Until Healed (n = 879) | Mean ± SD, € [US $] |
|---|---|---|---|
| Stage 1 | 857.66 ± 2,399.44 [888.54 ± 2,485.82] | Stage 1 | 1,419.68 ± 3,100.47 [1,470.79 ± 3,212.09] |
| Stage 2 | 869.53 ± 2,336.12 [900.83 ± 2,420.22] | Stage 2 | 1,622.99 ± 2,992.13 [1,681.42 ± 2,993.17] |
| Stage 3 | 1,593.05 ± 2,876.00 [1,650.40 ± 2,979.54] | Stage 3 | 2,381.23 ± 3,269.91 [2,466.95 ± 3,387.63] |
| Stage 4 | 3,379.77 ± 6,016.99 [3,501.44 ± 6,233.60] | Stage 4 | 6,299.31 ± 10,000.57 [6,526.08 ± 10,360.59] |
| Total | 1,362.37 ± 3,365.13 [1,411.42 ± 3,486.27] | Total | 2,064.65 ± 4,282.48 [2,138.98 ± 4,436.65] |

Abbreviation: PI, pressure injury.

In Spain, a publication analyzed the costs related to PIs in a hospital for patients with paraplegia. A retrospective review of medical records between 2008 and 2011 in the plastic surgery activity register estimated the cost of treating 245 patients with an average LOS of 144.20 ± 119.14 days. These costs ranged from an average of €57,196.29 (US $59,255.36) for ischial PIs to €112,012.96 (US $116,045.43) for sacral PIs. The average cost for all locations was €84,437.33 (US $87,477.07).[49] The significant difference between these costs and those estimated in the present study is mainly due to two factors that were responsible for the increased expenditure. The first is the cost of the restorative surgery that all patients underwent (each patient underwent an average of 2.49 operations), and the second, more significantly, is the high cost of stay, which was approximately four times higher than the cost of stay in the present study.

In a cost analysis based on epidemiologic data from the second national study of PI prevalence in Spain, total average costs were estimated for primary care, hospital care, and socio-healthcare (taking into consideration overstays and possible infections). For socio-healthcare, the estimated costs for €43 (US $44.55) for stage 1 PIs, €1,767 (US $1,831) for stage 2 PIs, €3,282 (US $3,400) for stage 3 PIs, and €4,935 (US $5,113) for stage 4 PIs.[18] These estimates differed from the present study, where the direct plus opportunity costs of PIs until resolution were higher.

The present results demonstrate that PIs are a health problem with enormous cost implications. Knowing these implications will enable facilities to manage resources more efficiently and reinforce the implementation of preventive policies. The impact of these data on health systems has not lessened in the time that has elapsed between the study period and the present day. They also demonstrate the need for investment in preventive measures, which are always less expensive than the cost of treatment. Fortunately, related studies are beginning to be published on the implementation of preventive measures for PIs, which, although representing a high economic investment, pay off in the long term. Eichhober et al[50] demonstrated that, despite the higher total outlay of costs associated with a powered hybrid mattress system, the long-term savings potential showed a significant cost advantage per year for the center. However, much more progress still needs to be made in this area.

## Limitations

Any study based on retrospective data collection entails an information bias that may affect internal validity. In this respect, the present study is no exception. Because the researchers did not have data on associated comorbidity, they cannot rule out the possibility that part of the calculated overstays is due to this cause and not exclusively to PIs. In addition, among the items attributable to the cost of PI treatment, no account was taken of aspects such as administering drugs related to the symptomatology derived from PIs or professionals' time required to reposition patients. Thus, the estimated costs are deliberately conservative. Further, the economic data of the different studies consulted are presented without considering inflation data, so there could be small differences in the comparison with the economic data of the present study.

## CONCLUSIONS

This study reveals significant findings regarding the cost of illness associated with PIs in the inpatient area of a socio-health center in Spain. With a PP of 34.98%, the estimated overall cost of illness amounts to €1,922,049 (US $1,991,243) for the period studied. Annually, the average cost of illness is estimated at €640,683 (US $663,748). Notably, PIs resulted in an extra 12,089 days of hospitalization, incurring an additional estimated cost of €1,387,006 (US $1,436,938). These results underscore the substantial economic burden posed by PIs within the healthcare system. The prevalence of PIs highlights the importance of implementing effective prevention strategies to reduce their occurrence and associated costs. By identifying the financial impact of PIs, healthcare providers and policymakers can make informed decisions to allocate resources efficiently and implement targeted interventions to enhance patient care and reduce the financial strain on the healthcare system.

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