



Hospital readmissions within 30 days: contribution of nursing diagnoses to health empowerment

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ARTICLE INFO

Received 25 June 2026

Accepted 7 July 2026

Keywords:

patient readmission
hospitals
nursing records
patient education

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DOI: 10.62741/ahrj.v3i3.236

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ABSTRACT

Introduction: Hospital readmissions within 30 days are an indicator of the quality of care and are a multifactorial phenomenon. Nursing interventions focused on empowering patients to self-manage their condition have been linked to a reduction in readmissions.

Objectives: To characterize 30-day hospital readmissions and analyze nursing diagnoses in the domain of health empowerment.

Methodology: An exploratory, retrospective, descriptive and correlational study based on the analysis of clinical data from a teaching hospital. The study included readmission episodes among adults over a 2-year period and identified nursing diagnoses related to health empowerment.

Results: A total of 1,985 initial admissions, each followed by at least one 30-day readmission, generated 2,457 readmission episodes. Readmissions ranged from 1 to 10 episodes, and 23.7% of initial admissions were followed by multiple readmissions. 55.5% of patients were aged ≥65 years, and the sex distribution was balanced (50.1% male). A positive correlation between age and length of stay was observed for the initial admission (R0) and the first two readmission episodes (R1 and R2). Most readmissions originated from the Accident and Emergency Department and were primarily associated with injuries and poisonings, neoplasms, and diseases of the circulatory system. A total of 3,207 nursing diagnoses were identified, of which 1,696 showed a documented positive status change. Overall, 87.87% of nursing diagnoses were recorded during the first readmission, and empowerment processes were predominantly person-centered (79.01%), focusing on perioperative care and the prevention of adverse events such as falls.

Conclusion: Readmissions within 30 days reflect high clinical complexity, and are not always related to preventable events. Nursing diagnoses in the training domain point to a practice oriented toward acute care, with less focus on self-care and the family/carer, highlighting opportunities for improvement.

Contributions: Conceptualization: ML, SV, SSS, and SR; Data curation: ML, SV, SSS, and SR; Formal Analysis: ML, SV, SSS, and SR; Funding acquisition: Not applicable; Investigation: ML, SV, SSS, and SR; Methodology: ML, SV, SSS, SR, NA, and VSP; Project administration: ML, SV, SSS, SR, NA, and RCP; Resources: ML, SSS, and SR; Software: ML, SV, SSS, SR, NA, and VSP; Supervision: ML, SV, SSS, SR, VSP, and JAPS; Validation: ML, SV, SSS, SR, NA, VSP, and RCP; Visualization: ML, SV, SSS, SR, NA, VSP, JAPS, and RCP; Writing – original draft: ML, SV, SSS, and SR; Writing – review & editing: ML, SV, SSS, SR, NA, VSP, JAPS, and RCP.

Please cite this article as: Lopes M, Valente S, Sousa SS, Ribeiro S, Abreu N, Pinto VS, Silva JAP, Pereira RC. Hospital readmissions within 30 days: contribution of nursing diagnoses to health empowerment. *Athena Health & Research Journal*. 2026; 3(2). doi: 10.62741/ahrj.v3i3.236

INFORMAÇÃO DO ARTIGO

Recebido 25 junho 2026
Aceite 7 julho 2026

Palavras-chave:

readmissão do paciente
hospitais
registos de enfermagem
educação do paciente

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DOI: 10.62741/ahrj.v3i3.236

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RESUMO

Introdução: Os reinternamentos hospitalares a 30 dias constituem um indicador da qualidade dos cuidados sendo um fenómeno multifatorial. Intervenções de enfermagem centradas na capacitação para a autogestão da doença têm sido associadas à redução dos reinternamentos.

Objetivos: Caracterizar os reinternamentos hospitalares a 30 dias e analisar os diagnósticos de enfermagem no domínio da capacitação em saúde.

Metodologia: Estudo exploratório, retrospectivo, descritivo e correlacional, baseado na análise de informação clínica de um hospital universitário. Incluíram-se episódios de reinternamento, em adultos, ocorridos num período de 2 anos, com identificação de diagnósticos de enfermagem no âmbito da capacitação.

Resultados: Registaram-se 1.985 admissões iniciais, cada uma seguida por pelo menos uma re-admissão em 30 dias, originando 2.457 episódios de readmissão. As readmissões variaram entre 1 e 10 episódios, e 23,7% das admissões iniciais foram seguidas por múltiplas readmissões. No total, 55,5% dos doentes tinham idade ≥ 65 anos e a distribuição por sexo foi equilibrada (50,1% do sexo masculino). Observou-se uma correlação positiva entre a idade e o tempo de internamento na admissão inicial (R0) e nos dois primeiros episódios de readmissão (R1 e R2). A maioria das readmissões teve origem no Serviço de Urgência e esteve principalmente associada a lesões e envenenamentos, neoplasias e doenças do aparelho circulatório. Foram identificados 3.207 diagnósticos de enfermagem, dos quais 1.696 apresentaram uma mudança positiva de estado documentada. Globalmente, 87,87% dos diagnósticos de enfermagem foram registados durante a primeira readmissão, e os processos de capacitação foram predominantemente centrados na pessoa (79,01%), incidindo nos cuidados perioperatórios e na prevenção de eventos adversos, como as quedas.

Conclusões: Os reinternamentos a 30 dias refletem uma elevada complexidade clínica, nem sempre relacionados a eventos evitáveis. Os diagnósticos de enfermagem no domínio da capacitação apontam para uma prática orientada para a gestão aguda, com menor enfoque para o autocuidado e para o familiar/cuidador, evidenciando oportunidades de melhoria.

Introduction

Hospital readmissions (HR) are new admissions following a previous hospital stay, with those occurring within 30 days widely used as an indicator of the quality of hospital care. These events are associated with a significant increase in mortality, morbidity, and healthcare costs.¹ From the patient's perspective, a new HR negatively impacts their experience of healthcare,² and may reflect difficulty in self-managing their health condition or the perception that the course of the disease requires care that exceeds their capacity for self-care.³

Readmission rates show high variability, influenced by factors such as geographical location, hospital type and clinical condition. A multinational study involving 21 hospitals in the United States, the United Kingdom, Australia, and several European countries analyzed more than 822,000 admissions related to chronic diseases and revealed significant regional variations, with an overall average readmission rate of 10.6%. Among clinical conditions, chronic obstructive pulmonary disease had the highest rates (18.4%), followed by anemia (18.1%) and heart failure (16.7%).⁴ In specific clinical contexts, these figures may be substantially higher, reflecting increased levels of complexity and patient vulnerability. In oncology, for example, 30-day readmission rates can reach 21.3%,⁵ while in contexts of chronic kidney disease and hemodialysis, they can reach around 28.8%.⁶

Readmissions may result from preventable and non-preventable factors, which act independently or cumulatively in the occurrence of a new admission.¹ A Dutch hospital estimated that around 11% of its readmissions were potentially preventable, with this figure remaining unchanged and not statistically different across clinical areas. Furthermore, in approximately 30% of cases, the reason for readmission was not directly related to the diagnosis at the time of the initial admission. These data suggest that no single patient profile is at risk of avoidable readmission, reinforcing the multifactorial nature and complexity of this phenomenon.⁷

There are indeed several risk factors for frailty that go beyond the clinical condition alone. A systematic review of the literature, focusing on a geriatric population and non-surgical settings, has shown that these factors include socio-economic factors, individual health characteristics and patterns of healthcare service use. Among these, factors associated with frailty syndrome stand out, such as malnutrition, reduced mobility, risk of falls, fatigue, and functional dependence, which are potentially modifiable conditions and therefore relevant to clinical assessment, treatment planning, and preparation for discharge.⁸ Furthermore, in a surgical context, multivariate analyses identify dementia, end-stage renal disease and metastatic cancer as strong predictors of RH. Infection emerges as the main cause of readmission, followed by complications such as hemorrhage, thrombosis/embolism, and intestinal obstruction.⁹ In cancer patients, factors such as difficulty in recovery, persistent symptoms, the absence of a carer after discharge, and failure to attend post-discharge appointments were significantly associated with a higher risk of RH.¹⁰

Interventions aimed at reducing readmissions have prioritized strategies focused on monitoring and managing symptoms in the post-discharge period, education on self-management of the condition, seeking social support, and care coordination—areas directly linked to nursing practice.¹¹ The evidence points to the decisive role of nursing care in reducing these events, as well as in decreasing visits to Accident and Emergency departments (A&E), mortality and healthcare costs, while simultaneously improving these patient's quality of life.¹²

The quality of discharge guidance is statistically linked to reduced readmission rates.³ Although the education of the patient and the carer is a responsibility shared by the healthcare team, nursing plays a central role in these processes, taking on the assessment of readiness for discharge, as well as the understanding and capacity of the patient and the family carer to ensure adequate care in the post-acute period and in the management of chronic disease.¹³ Structured educational interventions led by nurses demonstrate a significant impact on improving clinical outcomes, greater adherence to treatment and dietary regimens, enhanced social support, better symptom control, and a significant reduction in readmissions.¹⁴

These findings are consistent with the broader concept of transitional care, which comprises coordinated interventions designed to ensure continuity of care as patients move across healthcare settings, particularly during the high-risk period following hospital discharge. Evidence from a recent systematic review and network meta-analysis of 126 randomized trials involving more than 97,000 participants demonstrated that transitional care interventions, especially those of low to moderate complexity, significantly reduced the likelihood of hospital readmission at both 30 and 180 days compared with usual care.¹⁵ Within this context, health empowerment has emerged as a fundamental mechanism through which nursing care may improve patients' capacity for self-management and reduce potentially avoidable readmissions. By fostering the knowledge, skills and confidence required for individuals and family caregivers to manage health-related needs, empowerment strengthens continuity of care beyond hospital discharge.¹⁶ This perspective is consistent with Meleis' Transitions Theory, which identifies mastery of the knowledge, behaviors and skills necessary to adapt to a new health condition as a central indicator of a successful transition.¹⁷ Accordingly, the present study conceptualizes nursing diagnoses related to empowerment as indicators of the individual's or family caregiver's capacity to develop effective self-management during the transition from hospital to home.

Given the relevance of 30-day readmissions as an indicator of the quality and efficiency of healthcare systems, and the role of nurses in empowering patients and carers, it is important to deepen our understanding of this phenomenon from a nursing care-centered perspective. In this context, the present study aims to characterize 30-day hospital readmissions and analyze nursing diagnoses within the framework of health empowerment for readmitted patients.

Methodology

This is a quantitative, retrospective, descriptive and correlational exploratory study based on data from clinical records relating to readmissions within 30 days at a university hospital within a Local Health Unit (ULS) in northern Portugal.

The inclusion criteria were defined as readmission episodes lasting longer than 24 hours, involving individuals aged over 18, occurring within a period of 30 days or less between 1 June 2021 and 1 June 2023, with nursing diagnoses identified in relation to the empowerment of the individual and/or the carer in at least one of the readmissions. The initial admission episode (Ro) corresponded to the first hospital admission and was considered the starting point for the analysis of subsequent readmissions. Whenever the interval between readmissions exceeded 30 days, these episodes were excluded.

Demographic data such as age and sex, and clinical data such as the reason for admission and nursing diagnoses, were collected from the clinical records. Management data such as the number of readmissions and length of hospital stay, provided by the institution's Information and Management Systems Department, were also collected.

Descriptive and inferential statistical analysis was performed using IBM SPSS® version 30.0, employing frequencies for categorical variables and measures of central tendency and dispersion for numerical variables. A 95% confidence interval and a significance level of $p < 0.05$ were adopted. Comparison of means between groups was performed using analysis of variance (ANOVA), and the association between categorical variables was assessed using the chi-square test.

The data analysis included the variables of source, inpatient service and destination after discharge. Source refers to the manner in which the person was admitted to the hospital, categorized as follows: outpatient consultation, emergency department, and other sources. This last category encompasses people coming from another hospital, from an inpatient service, from home hospitalization and from a day hospital.

Inpatient services were classified according to the specific nature of healthcare needs, comprising the following categories: Cardiology, Surgery, Vascular Surgery, Intensive Care, Endocrinology, Gastroenterology, Gynecology, Hematology, Infectious Diseases, Nephrology, Neurosurgery, Neurology, Medicine, Physical Medicine and Rehabilitation, Obstetrics, Orthopedics, Otorhinolaryngology, Other Surgical Services, Other Medical Services and Urology. The category "Other Surgical Services" comprises the fields of Maxillofacial Surgery, Plastic Surgery and Ophthalmology, while "Other Medical Services" includes the specialties of Oncology, Pulmonology, and Dermatology. Admission medical diagnoses were grouped according to the categories defined by the International Classification of Diseases (ICD-10).^{3,4}

The nursing care needs analyzed in this study focused on diagnoses relating to the empowerment of the individual and the family member/carer. For analytical purposes, these diagnoses were grouped according to the domains

defined by the Nursing Ontology: self-care, with a distinction made here for self-management of the therapeutic regimen; event or episode, behavioral problem, cardiorespiratory process, gastrointestinal system process, regulatory system process, reproductive system process, or secretory process, integumentary system process, urinary system process, mental process, and neuromuscular process.¹⁸

Nursing diagnosis outcomes were assessed using the documented outcome status recorded in the electronic clinical documentation system. A documented positive status change was defined as the attainment of the expected nursing outcome, indicating that an individual or family member/caregiver initially identified as having the potential to improve knowledge or capability had subsequently acquired that knowledge or capability.

Discharge outcomes were categorized as follows: discharge against medical advice or abandonment, discharge to the home, specialized care, and death. Discharge to the home covers cases of administrative or clinical discharge, as well as individuals not referred or referred to a health center, outpatient consultation and/or home care. In turn, specialized care encompasses integrated long-term care, admission to another hospital (whether or not part of the National Health Service), home hospitalization and day hospital treatment.

Throughout the study, ethical standards and participants' rights were respected, in accordance with the principles underlying the Declaration of Helsinki and the Oviedo Convention. Authorization was obtained from the Board of Directors and the Ethics Committee of the ULS. To ensure the anonymity of participants, demographic and clinical data were anonymized, coded, entered and analyzed using computer software.

This study was conducted and reported in accordance with the STROBE Statement guidelines, ensuring methodological rigor.

Results

Of the 2,959 episodes identified, 1,985 were included, and 974 were excluded as they did not meet the inclusion and exclusion criteria, namely the pediatric population and hospital stays of less than 24 hours.

With regard to gender, men accounted for 50.1% and women for 49.9% of the study population. The ages of the participants ranged from 19 to 105 years, with a total mean age of 63.8 years. Male participants had a higher mean age (66.9 ± 15.3 years) than female participants (60.8 ± 22.4 years). Among those aged over 65, 61.5% were male.

The number of readmissions ranged from 1 (R1) to 10 (R10), with a total of 2,457 readmissions, of which 23.7% of episodes involved cases with more than one readmission. The mean length of stay was similar between the initial episode (Ro) and the first readmission (R1). Variations in length of stay were observed in subsequent episodes. Despite these fluctuations, statistical analysis revealed no significant differences in length of stay between the episodes analyzed (ANOVA, $p \geq 0.05$). As for the time interval

between readmission episodes, the average was approximately 12 days, with the longest interval (18.6 days) occurring between R5 and R6. The relationship between the variables age and length of stay was also analyzed. For the initial admission (R0) and the first two HR episodes (R1 and R2), a statistically significant association was found between age and length of stay, with increasing age positively correlating with a longer length of stay: R0 ($R^2=0.010$; $p<0.001$); R1 ($R^2=0.015$; $p<0.001$); R2 ($R^2=0.023$; $p=0.007$). Regarding the source of participants across the HRs, admissions were observed via outpatient clinics, the A&E, and other sources. Overall, the majority of readmitted patients were admitted via the ED, primarily in the first four RHs, whereas in subsequent episodes, the source of readmissions varied (Table 1).

Table 1. Characterization of length of stay, admission and discharge destination.

	R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	%
Length of stay												
mean	10.1	10.7	12.3	14.3	14.5	12.9	7.6	9.3	11.7	6.0		
±	±	±	±	±	±	±	±	±	±	±		
SD, days	± 15.0	14.3	17.6	14.7	21.7	27.0	5.8	8.8	16.8	2.9	8.9	
Readmissions at 30 days, n (% of R0) n (% of R0)												
n	1985	312	91	30	13	10	7	5	3	1		
(%)	(100.0)	(15.7)	(4.6)	(1.5)	(0.6)	(0.5)	(0.4)	(0.2)	(0.2)	(0.0)		
Readmission												
Outpatient consultation	505	57	14	8	6	4	2	0	1	1		
	(25.4)	(18.3)	(15.4)	(26.7)	(46.2)	(40.0)	(28.6)	(0.0)	(33.3)	(100.0)		
Urgency	1304	207	51	14	2	3	2	0	1	0		
	(65.7)	(66.3)	(56.0)	(46.7)	(15.4)	(30.0)	(28.6)	(0.0)	(33.3)	(0.0)		
Other sources	176	48	26	8	5	3	3	5	1	0		
	(8.9)	(15.4)	(28.6)	(26.7)	(38.5)	(30.0)	(42.9)	(100.0)	(33.3)	(0.0)		
Destination after discharge (n)												
Discharged to home	1686	1631	223	63	18	6	3	3	1	2	1	79.44%
Specialized care	255	156	50	18	10	6	5	4	4	1	0	10.34%
Discharged against medical advice	44	181	1	1	0	0	0	0	0	0	0	7.45%
Deceased	0	17	38	9	2	1	2	0	0	0	0	2.81%

Analysis of the relationship between length of stay and patient source showed that in R0, R1, and R2, length of stay varied significantly by patient source (ANOVA, $p < 0.001$), with ED admissions associated with longer hospital stays.

Table 2 presents the three most frequent medical diagnoses that led to the initial admission and subsequent readmissions, allowing a longitudinal analysis of the diagnostic pattern from R0 to R10. The initial admission (R0) was predominantly related to acute infections and obstetric events, while in R1, chemotherapy treatments emerged in addition to infections. From R2 onwards, the latter took the lead; while acute tubulo-interstitial nephritis remained, aspiration pneumonia and urinary complications emerged.

At the time of initial admission (R0), according to ICD-10, the most common reasons for admission were oncological and cardiovascular conditions, as well as obstetric events. With regard to readmissions, the reasons for admission were generally related to injuries, poisonings and other consequences, including trauma; neoplasms; and diseases of the circulatory system (Table 3).

The occurrence of a second readmission (R2) was significantly associated with the ICD-10 codes of the initial admission (R0) and the first readmission (R1) (chi-square, $p<0.001$). In the case of R4, statistically significant associations were observed with the diagnoses of R3, R2, R1 and R0. From R5 onwards, the associations became less consistent. In this readmission, no associations were found with the diagnoses from the previous readmission (R4),

although significant associations were identified with R3, R2 and R1 (all $p<0.001$).

With regard to medical specialties, General Medicine consistently accounted for the highest proportion of readmissions across the different episodes, namely 32.9% in R0 and 33.6% in R1, reaching its peak in R2 (45.2%). In the first readmissions, General Medicine was followed by Surgery and Obstetrics, which together constituted the three most prevalent specialties. On the other hand, specialties such as Hematology became more prominent in successive readmissions, accounting for 100% of readmissions in R8, suggesting a pattern of greater clinical complexity in later episodes. Other specialties, such as Vascular Surgery, Urology and Nephrology, showed more sporadic occurrences and lower overall representation (Table 4).

The study analyzed nursing diagnoses within the context of patient and carer care. Across 2,457 readmissions, 3,207 diagnostic statements were identified, corresponding to 148 different nursing diagnoses. Analysis of readmissions revealed that 87.87% of diagnoses were identified in R1. Regarding the focus of care, 79.01% of empowerment processes were directed at the patient and the remainder at the care provider. In the overall analysis of nursing diagnosis evaluations, 1,696 showed a positive change in status, reflecting effective gains in knowledge and/or ability in a specific domain. The following table presents the distribution of nursing diagnoses across their respective domains, organized according to nursing ontology (Table 5).

The nursing diagnoses were predominantly concentrated in the domain of self-management of the therapeutic regimen and in the event/episode domain, representing 24.2% and 22.6%, respectively.

Based on the wording of the nursing diagnoses, 'Potential to improve knowledge about fall prevention', 'Potential to improve knowledge about the preoperative period' and 'Potential to improve knowledge about the prevention of surgical wound complications' were the most frequently identified (Table 6).

Analysis of the relationship between the three main nursing diagnoses and post-discharge outcomes showed no statistically significant association (Potential to improve knowledge about fall prevention, chi-square $p=0.984$; Potential to improve knowledge about the preoperative period, chi-square $p=0.934$; Potential to improve knowledge about the prevention of surgical wound complications, chi-square $p=0.986$).

Regarding discharge destination, the majority of patients were discharged home, accounting for 79.44% of the total. This pattern remained consistent from the initial admission (R0) through to subsequent readmissions, albeit with a progressive reduction as the episodes progressed. Specialist care was the second most common discharge destination (10.34%), with relatively stable figures observed between R0 and subsequent readmissions. Discharges against medical advice and deaths accounted for a small percentage of discharges compared with other discharge destinations (Table 1).

Table 2. Top three medical diagnoses.

Medical diagnoses	n (%)
R0	
Acute tubulointerstitial nephritis	64 (3.22)
Preterm delivery without spontaneous labor	56 (2.82)
Unspecified sepsis	55 (2.77)
R1	
Acute tubulointerstitial nephritis	71 (3.57)
Unspecified septicemia	55 (2.77)
Chemotherapy session for neoplasm	52 (2.62)
R2	
Chemotherapy session for neoplasm	27 (8.65)
Acute tubulointerstitial nephritis	12 (3.85)
Pneumonia caused by food and vomiting/Pionephrosis	9 (2.88)
R3	
Chemotherapy session for neoplasm	13 (14.29)
Recurrent Clostridium difficile enterocolitis/ Unspecified septicemia	4 (4.10)
R4	
Chemotherapy session for neoplasm	9 (30)
Sepsis caused by other Gram-negative bacteria / Alcoholic liver cirrhosis with ascites	2 (6.67)
R5	
Chemotherapy session for neoplasm	6 (46.15)
Sepsis caused by other Gram-negative bacteria / Pancytopenia induced by antineoplastic chemotherapy / Neutropenia due to infection	1 (7.69)
Alcoholic liver cirrhosis without ascites	
Post-surgical malabsorption, not elsewhere classified	
Thrombosis caused by vascular devices, implants or grafts	
Gastrostomy care	
R6	
Chemotherapy session for neoplasm	6 (60)
Acute lymphoblastic leukemia (ALL), relapsed	1 (10)
Unspecified neutropenia	
Post-surgical malabsorption, not elsewhere classified	
Thrombosis caused by vascular devices, implants or grafts	
R7	
Chemotherapy session for neoplasm	4 (57.14)
Sepsis due to Escherichia coli	1 (14.29)
Agranulocytosis secondary to antineoplastic chemotherapy	
Postoperative malabsorption, not elsewhere classified	
R8	
Chemotherapy session for neoplasm	5 (100)
R9	
Chemotherapy session for neoplasm	1 (33.33)
Agranulocytosis secondary to antineoplastic chemotherapy	
Other neutropenias	
R10	
Agranulocytosis secondary to antineoplastic chemotherapy	1 (100)

Table 3. International Classification of Diseases at admission.

ICD	R0	Total number of medical diagnoses for readmission										
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	n (%)
Injuries, poisonings and other consequences	167	262	39	11	3	1	1	0	0	0	0	317 (12.90)
Neoplasms	307	262	26	4	2	0	1	0	0	0	0	295 (12.01)
Diseases of the circulatory system	246	226	35	4	0	0	0	0	0	0	0	255 (10.79)
Diseases of the genitourinary system	207	208	42	8	3	0	0	0	0	0	0	261 (10.62)
Pregnancy, childbirth and the postpartum period	222	221	13	0	0	0	0	0	0	0	0	234 (9.52)
Diseases of the digestive system	169	177	28	10	3	2	1	1	0	0	0	222 (9.04)
Diseases of the respiratory system	151	176	33	7	2	0	0	0	0	0	0	218 (8.87)
Infectious and parasitic diseases	123	146	22	16	3	1	0	1	0	0	0	189 (7.69)
Factors influencing health status and contact with health services	53	73	31	13	9	7	6	4	5	1	0	149 (6.06)
Endocrine, nutritional and metabolic disorders	147	102	13	5	2	0	0	0	0	0	0	122 (4.97)
Musculoskeletal and connective tissue disorders	64	34	3	3	0	0	0	0	0	0	0	40 (1.63)
Diseases of the nervous system	24	35	4	1	0	0	0	0	0	0	0	40 (1.63)
Blood disorders	0	20	6	3	2	2	1	1	0	2	1	38 (1.55)
Diseases of the skin and subcutaneous tissue	25	25	5	0	0	0	0	0	0	0	0	30 (1.22)
Unclassified signs and symptoms and clinical and laboratory findings	33	20	4	3	1	0	0	0	0	0	0	28 (1.14)
New diseases	27	21	3	2	0	0	0	0	0	0	0	26 (1.06)
Diseases of the ear and mastoid process	3	11	0	0	0	0	0	0	0	0	0	11 (0.45)
Mental and behavioral disorders	1	6	4	0	0	0	0	0	0	0	0	10 (0.41)
Congenital malformations and deformities	7	6	1	1	0	0	0	0	0	0	0	8 (0.33)
Eye and adnexa disorders	9	0	0	0	0	0	0	0	0	0	0	0 (0.00)
Total	1985	1985	312	91	30	13	10	7	5	3	1	2457 (100.00)

Table 4. Ranking of the top 3 medical specialties in readmissions.

Medical speciality n (%)	R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Medicine	653 (32.9)	668 (33.6)	141 (45.2)	37 (40.7)	7 (23.3)			2 (28.6)			
Surgery	207 (10.4)	181 (9.1)	25 (8.0)	11 (12.1)				1 (14.3)			
Obstetrics	219 (11.0)	210 (10.6)									
Vascular Surgery, Urology			19 (6.1)		2 (6.7)						
Hematology				14 (15.4)	12 (40.0)	7 (53.8)	7 (70.0)	4 (57.1)	5 (100.0)	3 (100.0)	1 (100.0)
Surgery, Medicine						2 (15.4)					
Nephrology						1 (7.7)					
Surgery, Medicine, Nephrology							1 (10.0)				

Table 5. Distribution of nursing diagnoses by ontology domain.

Ontology domains	R0	Total number of nursing diagnoses by readmission										n (%)
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	
Self-care	99	197	19	15	3	1	0	0	0	0	0	235 (7.33)
Self-management of treatment regimen	743	677	72	25	3	0	0	0	0	0	0	777 (24.2)
Event or episode	618	625	73	18	3	1	1	1	1	1	1	725 (22.6)
Behavioral problem	1	2	0	0	0	0	0	0	0	0	0	2 (0.06)
Cardiorespiratory process	147	197	28	19	4	0	0	0	0	0	0	248 (7.73)
Gastrointestinal system processes	5	12	1	1	0	0	0	0	0	0	0	14 (0.44)
Regulatory system processes	22	56	12	5	0	0	0	0	0	0	0	73 (2.28)
Reproductive and secretory system processes	136	497	28	0	0	0	0	0	0	0	0	525 (16.37)
Integumentary system processes	224	364	28	7	1	0	0	0	0	0	0	400 (12.47)
Urinary system processes	0	1	0	0	0	0	0	0	0	0	0	1 (0.03)
Mental processes	3	4	0	0	0	0	0	0	0	0	0	4 (0.12)
Neuromuscular process	162	186	8	9	0	0	0	0	0	0	0	203 (6.33)
Total	2160	2818	269	99	14	2	1	1	1	1	1	3207 (100)

Table 6. Characterization of nursing diagnoses in the context of empowering the individual and the carer.

Most common nursing diagnosis at admission	n (%)
R0	
Potential to improve knowledge of fall prevention	614 (30.9)
Potential to improve knowledge of preoperative care	402 (20.2)
Potential to improve knowledge of surgical wound complication prevention	168 (8.5)
R1	
Potential to improve knowledge of fall prevention	585 (29.5)
Potential to improve knowledge of preoperative care	349 (17.6)
Potential to improve knowledge of surgical wound complication prevention	282 (14.2)
R2	
Potential to improve knowledge of fall prevention	67 (21.5)
Potential to improve knowledge of preoperative care	26 (8.3)
Potential to improve knowledge of surgical wound complication prevention	16 (5.1)
R3	
Potential to improve knowledge of fall prevention	14 (15.4)
Potential to improve knowledge about preoperative care, Potential to improve the ability to optimize breathing	6 (6.6)
R4	
Potential to improve knowledge of fall prevention	3 (10.0)
Potential to improve knowledge on infection prevention, Potential to improve knowledge on preoperative care, Potential to improve knowledge on aspiration prevention, Potential to improve knowledge on examination, Potential to improve the care provider's knowledge of aspiration prevention, Potential to improve the care provider's knowledge of pressure ulcer prevention, Potential to improve the ability to optimize ventilation, Potential to improve the care provider's ability to position/assist with positioning, Potential to improve the care provider's ability to optimize ventilation, Potential to improve the care provider's ability to provide hygiene care Potential to improve the care provider's ability to feed via a gastric tube	1 (3.3)
R5	
Potential to improve knowledge of fall prevention, Potential to improve the care provider's ability to feed via a gastric tube	1 (7.7)
R6	
Potential to improve knowledge of fall prevention	1 (10.0)
R7	
Potential to improve knowledge of fall prevention	1 (14.3)
R8	
Potential to improve knowledge of fall prevention	1 (20.0)
R9	
Potential to improve knowledge of fall prevention	1 (33.3)
R10	
Potential to improve knowledge of fall prevention	1 (100)
Total the admissions [N=4451 including R0]	
Potential to improve knowledge of fall prevention	1289 (29.0)
Potential to improve knowledge of preoperative care	784 (17.6)
Potential to improve knowledge of preventing surgical wound complications	467 (10.5)

Discussion

This study sought to characterize hospital readmissions within 30 days and to analyze nursing diagnoses in the context of the health status of readmitted patients.

The sociodemographic analysis revealed that more than half of those readmitted within 30 days were aged 65 or over, corroborating evidence that identifies advanced age as one of the main risk factors for hospital readmissions. This phenomenon is largely explained by the higher prevalence of multimorbidity, clinical frailty, and therapeutic complexity associated with aging.^{9,19,20} With regard to gender, no significant differences were observed, in line with the literature, which suggests that rather than being male or female, readmission rates are strongly determined by clinical and functional factors.²¹

Regarding length of stay, the evidence indicates that this is determined by multiple factors, including comorbidities, gender, age, and the severity of the clinical condition, among others.^{19,20,22,23} In this study, length of stay did not show a linear relationship with the number of readmissions, indicating that this outcome may also be more directly associated with the person's clinical condition. In cases of late, multiple readmissions, the shorter duration may correspond to scheduled admissions focused on specific interventions, such as cancer treatment, suggesting that multiple readmissions do not necessarily represent failures in continuity of care but may reflect the natural progression of complex chronic diseases, particularly cancer. This finding is consistent with an analysis of 468 cancer patients, in which 82% of readmissions were unavoidable, being associated with the disease itself, progressive symptoms, and treatments.¹⁰

The longitudinal analysis of the three main medical diagnoses for each admission similarly demonstrated a change in patients' clinical profile across successive readmissions. The initial admission was characterized by a heterogeneous profile, in which acute conditions predominated, namely infections (sepsis, acute tubulointerstitial nephritis) and obstetric events, such as preterm birth without spontaneous labor. The latter does not reappear as a diagnosis in subsequent readmissions, constituting a distinct diagnosis that is physiologically and pathologically different from the other predominant categories.

In Portugal, use of the A&E department is frequent following hospital discharge and, in most cases, for serious clinical reasons.²⁴ In this study, in the first 4 readmissions, the majority of patients were admitted via the A&E department, which constitutes the main gateway for unplanned readmissions. According to Ghazalbash et al. (2021, 2022), the post-discharge period constitutes a window of high clinical vulnerability, during which the A&E department functions as the main point of re-entry into the hospital system.^{25,26}

However, from R4 onwards, the majority of patients are admitted from other sources, suggesting a shift in the clinical and organizational profile of readmissions toward a chronic/scheduled pattern consistent with complex clinical pathways. This trend was observed when analyzing the reason for admission, with admissions related to the

continuation of cancer treatments and hematological complications secondary to the established antineoplastic therapy becoming predominant. This progressive diagnostic concentration suggests a selection phenomenon, in which multiple readmissions once again reflect the natural course of complex cancer. Recent studies demonstrate that the majority of readmissions in cancer patients are associated with disease progression, treatment toxicity, and symptom management, with only a small fraction considered preventable.^{27–29}

As for nursing diagnoses related to the potential and capacity of the individual, family member, or carer, their distribution across readmission episodes shows a significant concentration in the early episodes, particularly in the first readmission, where the highest number of cases is also observed. Analysis of the distribution of nursing diagnoses by ontology domains is most pronounced in three domains: Self-management of therapeutic regimen (24.2%), Event or episode (22.6%) and Reproductive and secretory system process (16.37%), together accounting for over 60% of the total diagnoses identified (n=3207).

The high number of nursing care needs identified in the context of self-management of the therapeutic regimen suggests that these difficulties are crucial factors in the care pathway of readmitted patients. This finding is consistent with the scientific evidence, which identifies inadequate management of the treatment regimen as one of the main factors associated with readmissions, particularly in older adults with chronic conditions.^{30,31} The high prevalence of this domain may reflect gaps in health education and support for self-care following hospital discharge, highlighting the need for more structured follow-up and training strategies.³²

The predominance of the diagnosis "Potential to improve knowledge about fall prevention" suggests that documented nursing practice is strongly oriented toward the prevention of immediate risks and adverse events during hospitalization. Its expression across different readmissions (R0 to R10) provides relevant evidence, in line with international recommendations that highlight multifactorial risk assessment and education as key components in the prevention of falls in a hospital setting.^{33,34}

Similarly, the predominance of the diagnoses "Potential to improve knowledge about the preoperative period" and "Potential to improve knowledge about the prevention of surgical wound complications" reflects a nursing practice centered on preparing the individual for the surgical procedure and on the prevention of perioperative complications. Their consistency across RH episodes supports their clinical relevance, in line with international evidence that positions preoperative education and patient empowerment as key strategies in reducing anxiety, promoting recovery and lowering the risk of complications.^{35,36}

The literature consistently states that interventions promoting the individual's ability to manage their own self-care are associated with a reduction in readmissions.³⁷ Studies show that a lack of knowledge about warning signs or seeking healthcare,^{37,38} ineffective medication management, or inadequate follow-up after discharge³⁹ are factors frequently associated with hospital readmissions. Thus,

interventions focused on empowering and training individuals can improve self-management behavior, self-efficacy, and adherence to the treatment regimen, which, in turn, helps to reduce the need for access to acute healthcare services.^{37,38}

Home was the most frequently observed discharge destination among patients in this study, accounting for a total of 79.44%, which is consistent with other studies suggesting that, regardless of the cause of the initial admission - whether trauma,⁴⁰ elective or emergency surgery⁴¹ or a medical condition⁴² - the preferred discharge destination for patients who are readmitted is the home.

People with comorbidities, those on multiple medications, and those discharged to their homes even with support are at greater risk of readmission within 30 days.⁴² The difficulty of managing care in the home environment poses a major challenge in the transition from hospital to home, both for the individual and for the family carer, and is frequently associated with gaps in continuity of care, complex changes in treatment, and difficulties in managing medication regimens after discharge.^{43,44} Care transition programs that integrate early monitoring and coordination across different levels of care show potential for reducing HR risk, particularly in this population.⁴⁵

In this study, discharge against medical advice accounted for 7.45% of discharges. The literature identifies this phenomenon as a significant risk factor for adverse events following discharge, often reflecting social determinants, the individual's subjective perception of recovery, and difficulties in the therapeutic relationship. Furthermore, it is associated with greater subsequent use of the A&E department and, consequently, an increased likelihood of early readmission.^{46,47}

RHs have significant implications for people's quality of life and for healthcare costs. Interventions to reduce readmissions should therefore not focus solely on the primary condition but on a holistic consideration of all the person's comorbidities.⁴

Conclusion

Hospital readmission rates are frequently used as an indicator of the quality of hospital care. However, 30-day readmission rates often include both potentially preventable acute events and hospitalizations that are inherent to structured treatment pathways, particularly in the context of complex chronic conditions. This duality limits the validity of these metrics as stand-alone quality indicators, reinforcing the need for analyses adjusted to the diagnosis, clinical trajectory and context of healthcare provision.

This study characterized 30-day hospital readmissions and analyzed nursing diagnoses within the context of health literacy among readmitted patients.

Nursing diagnoses are concentrated mainly in the first readmission episodes and are predominantly distributed across the domains of self-management of the therapeutic regimen, events or episodes, and processes of the reproductive and excretory systems, highlighting the centrality of

therapeutic regimen management and clinical vulnerability in the post-discharge period.

Despite this evidence, the most frequently documented diagnoses reflect a nursing practice oriented toward immediate safety and the management of the acute episode, while diagnoses associated with self-care empowerment, adherence to the therapeutic regimen, and continuity of care at home are less prevalent. This discrepancy may also be related to an underrepresentation in the records of factors critical to preventing readmissions.

The results also confirm that readmissions within 30 days are influenced by advanced age, multimorbidity and clinical complexity, and are heterogeneous in nature. In later episodes, a shift is observed toward readmissions associated with the progression of complex chronic diseases, particularly oncological conditions; although these may be scheduled, they cannot be prevented, which reinforces the need for a nuanced interpretation of this phenomenon.

The data supporting the results can be found or stating that it will be provided on request.

Limitations

This study has several limitations that should be considered when interpreting the findings. The sample was purposively selected and included only readmission episodes in which at least one nursing diagnosis related to empowerment had been documented during the care trajectory. Consequently, the results reflect the characteristics of this specific subgroup and cannot be extrapolated to all 30-day hospital readmissions, nor can they be used to estimate the overall frequency of empowerment-focused nursing care.

The unit of analysis was the readmission episode rather than the individual patient. As approximately one-quarter of participants experienced more than one readmission, complete independence of observations could not be ensured. Furthermore, readmissions were not systematically classified as planned or unplanned. Although the nature of some episodes, such as sequential chemotherapy admissions, suggests that a substantial proportion of later readmissions were planned, this information was not consistently structured in the clinical records and therefore could not be analysed as an independent variable.

The evaluation of nursing diagnosis outcomes was based on the documented outcome status ("positive status change") recorded by nurses in the electronic clinical documentation system, without validation against external clinical indicators or patient-reported outcome measures. In addition, the association between this outcome and the main nursing diagnoses was explored using bivariate analyses only, limiting the ability to control for potential confounding factors and to establish more robust associations between empowerment-related nursing diagnoses and patient outcomes.

Finally, this was a retrospective, single-centre study based on routinely collected clinical documentation and is therefore subject to the inherent limitations associated with the completeness and quality of clinical records, as well as potential information bias. These characteristics may limit the generalisability of the findings to other healthcare

settings. Future research should employ multivariable analytical approaches, distinguish between planned and unplanned readmissions, and validate nursing outcomes using both clinical indicators and patient-reported outcome measures to provide a more comprehensive understanding of the contribution of empowerment-related nursing diagnoses to reducing hospital readmissions.

Data supporting the results will be provided on request.

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