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Prevalence and accuracy of nursing diagnoses in patients with malignant bronchial and lung cancer: A retrospective observational study

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ABSTRACT

Purpose: To describe the prevalence and accuracy of nursing diagnoses (NDs) in adult patients with malignant bronchial and lung cancer.
Methods: A retrospective, observational, monocentric study was conducted at the largest university hospital in Rome, Italy. Electronic health records (EHRs) of adult inpatients (≥18 years) hospitalized in 2022 with malignant bronchial and lung cancer were analyzed. NDs were documented using the Professional Assessment Instrument (PAI), a clinical nursing information system based on the Clinical Care Classification (CCC) standardized nursing terminology. The accuracy of nursing documentation was assessed with the D-Catch instrument, evaluating record structure, admission data, ND formulation, interventions, progress/outcome evaluations, and legibility. Descriptive statistics were used to analyze ND prevalence and documentation accuracy.
Results: A total of 682 EHRs were examined, identifying 3510 NDs across 34 distinct labels. Patients had a mean of 5.15 NDs (SD: 2.99; range: 1–16). Ten high-frequency NDs were identified, with Infection Risk (76.7 %), Fall Risk (66.6 %), and Acute Pain (53.1 %) emerging as the most prevalent. Overall documentation accuracy was high across most dimensions; however, ND formulation showed comparatively lower accuracy (mean score: 6.38; SD: 0.98).
Conclusions: Evaluating the prevalence and accuracy of nursing diagnoses enhances the understanding of the complex care needs of patients with malignant bronchial and lung cancer, a population marked by significant clinical vulnerability and multidimensional care requirements. Strengthening diagnostic reasoning—through structured documentation systems and continuous training—may improve care planning, facilitate interdisciplinary communication, and ultimately optimize patient outcomes.

1. Introduction

Globally, the adoption of standardized nursing terminologies (SNTs) is one of the best strategies to ensure clarity and consistency in nursing documentation. By providing a structured framework for describing patient care, SNTs enhance communication among healthcare professionals, support data-driven decision-making, and contribute to improved patient outcomes across clinical settings and populations (Cesare and Zega, 2024; Cristina Dos Santos et al., 2024). Among these SNTs, nursing diagnoses (NDs) serve as key clinical judgments that guide all nursing interventions and monitor patient progress over time. However, despite the recognized benefits, the adoption of NDs remains inconsistent worldwide particularly due to cultural resistances, logistical barriers, and challenges in implementing new technologies and clinical nursing information systems (Alrasheeday et al., 2023; Cesare and Zega, 2024; Cristina Dos Santos et al., 2024; Jedwab et al., 2023).

To make the benefits just described tangible, the accuracy of nursing documentation and NDs is essential, especially as electronic health

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records (EHRs) become the main standard for the description of patient care needs and progresses management (De Groot et al., 2020). Poorly formulated plans of care based on inaccurate NDs can lead to inconsistent care delivering, misinterpretation of patient needs, and suboptimal nursing interventions. Studies suggest that personal and professional attitudes—such as nurses' diagnostic reasoning skills, clinical expertise, and hospitals' institutional policies—play a crucial role in influencing the diagnostic process. While these elements can enhance nursing diagnostic accuracy and documentation quality, they can also introduce variability in NDs documentation (Cocchieri et al., 2023; D'Agostino et al., 2017a; Paans et al., 2011; Paans et al., 2010a; Paans et al., 2010b).

In oncology care, where patients require highly individualized and complex interventions, accurate nursing documentation—particularly through NDs—becomes critical for ensuring patient safety and optimizing care (Othman et al., 2021). Despite this, the actual use and diagnostic accuracy of NDs in oncology settings remain significantly underexplored (D'Agostino et al., 2017b), particularly among patients with bronchial and lung cancer.

Bronchial and lung cancer is one of the leading causes of cancer-related mortality worldwide. Approximately 85 % of cases are non-small-cell lung cancer, for which the 5-year overall survival remains below 15 %. Prognosis is particularly poor in advanced stages of the disease (Jin, 2023; Yu and Liu, 2019). Patients with malignant bronchial and lung cancer frequently experience multiple physical and psychological challenges, including pain, respiratory distress, nutritional deficits, and emotional distress, which may limit their autonomy and quality of life (Sanson et al., 2019). Understanding and addressing these multidimensional needs requires the accurate identification and documentation of NDs, which are essential to guide individualized care and improve clinical outcomes (Cesare et al., 2025a; D'Agostino et al., 2017b; Sanson et al., 2019). However, to our knowledge, no previous study has examined both the prevalence and diagnostic accuracy of NDs in this specific patient group, limiting the ability to systematically identify their most common care needs and to evaluate how accurately these are recognized and documented in clinical practice.

1.1. Aim of the study

The aim of the study was to describe the prevalence of NDs in patients with malignant bronchial and lung cancer, and to evaluate the accuracy of nursing documentation, with a specific focus on the accuracy of NDs within EHRs.

2. Methods

2.1. Design and setting

This was a retrospective, observational study conducted at the A. Gemelli IRCCS University Hospital Foundation (FPG) in Rome, which has 1611 beds, 8 Departments, and 136 Inpatient Units (IUs). The study complied with the REporting of studies Conducted using Observational Routinely collected health Data (RECORD) statement (Benchimol et al., 2015).

2.2. Sample

The EHRs of all adult inpatients (≥18 years old) with malignant tumors of the bronchus and lung admitted in the study hospital across 2022 were included in the study. Patients were selected if their primary or secondary medical diagnosis in the hospital discharge summary was coded as Malignant tumors of the main bronchus (162.2) or Malignant tumors of the upper lobe, bronchus or lung (162.3) or Malignant tumors of the middle lobe, bronchus or lung (162.4) or Malignant tumors of the lower lobe, bronchus or lung (162.5) or Malignant tumors of other parts of bronchus or lungs (162.8) or Malignant tumors of bronchus or lung, unspecified (162.9), according to the International Classification of Diseases, 9th revision – Clinical Modification (ICD-9-CM) (Montedori et al., 2018).

2.3. Exclusion criteria

The exclusion criteria were patients with a short length of stay (1–2 days), as nursing documentation often lacks essential information when patients are hospitalized for less than 3 days (D'Agostino et al., 2017a).

2.4. Data collection

To address the study aim, data were collected retrospectively from January 1, 2022 to December 31, 2022 using patient data from two different databases: the Professional Assessment Instrument (PAI) (D'Agostino et al., 2012) and the Hospital Discharge Register (HDR) (Cesare et al., 2025b). These databases are integrated into each patient's EHR at the study hospital. For research purposes, they were merged into a single dataset by the data warehouse (D'Agostino et al., 2017b) through a deterministic matching process (Nagels et al., 2019). Furthermore, to assess the accuracy of nursing documentation, a prior sample size calculation for prevalence studies was performed based on an expected prevalence of 80 %, a confidence interval of 95 %, and a margin of error of 5 %, following recommendations for accuracy studies (Paans et al., 2010b). This calculation indicated that at least 181 EHRs were needed. To increase the precision and robustness of the estimates, a total of 209 EHRs were randomly selected from the final study sample and analyzed for documentation accuracy. The random selection was performed by assigning a computer-generated random number to each eligible EHR and subsequently selecting records according to the required sample size, ensuring an unbiased random sampling procedure.

2.5. Variables collected

For this study, the following variables were collected for each patient:

- Sociodemographic and organizational characteristics, such as age, length of stay, hospital admission, and discharge modality;
- Medical and nursing generated-data, such as diagnosis related group (DRG) category, medical diagnoses, and NDs prevalence. ND is a clinical judgment regarding the responses of an individual, family, or community to current or potential health problems or life processes. ND is the basis for selecting the nursing activities necessary to achieve the results for which the nurse is responsible (Seçer and Karaca, 2021). In this research, NDs identified within the first 24 h after hospital admission were considered (Cesare et al., 2025a).
- Nursing documentation accuracy, which is defined as the completeness of the nursing process, containing comprehensive, coherent, relevant, unambiguous, and linguistically correct data regarding a patient's admission, NDs, nursing activities, progress, and outcome evaluations (Cocchieri et al., 2023; Paans et al., 2010b). Nursing documentation accuracy was assessed using the D-Catch instrument (Paans et al., 2010a), which is described in the next section.

2.6. Data collection tools

Study variables were collected using the following tools:

- D-Catch instrument. This tool is designed to assess the accuracy of nursing documentation in the hospital setting (Paans et al., 2010a). It uses quantitative and qualitative criteria to evaluate the accuracy across six items: (1) accuracy of record structure, (2) accuracy of admission, (3) accuracy of NDs, (4) accuracy of intervention, (5) accuracy of progress/outcomes evaluation, and (6) legibility. The D-Catch instrument consists of a chronological descriptive accuracy

construct (items 1, 2, 4, 5, and 6) and a diagnostic accuracy construct (item 3). Each item is scored on a 4-point Likert scale. Items 1 and 6 are assessed using only qualitative criteria (possible scores from 1 to 4), while items 2, 3, 4, and 5 are evaluated with both qualitative and quantitative criteria (possible scores from 2 to 8). The D-Catch magnitude for qualitative criteria is defined as follows: 1 = poor, 2 = moderate, 3 = good, and 4 = very good. The D-Catch magnitude for quantitative criteria is defined as follows: 1 = none, 2 = incomplete, 3 = partially, and 4 = complete (D'Agostino et al., 2017a; Paans et al., 2010b). Quantitative criteria assess the presence of documentation components, while quality criteria evaluate description for relevance, ambiguity, and linguistic correctness (Tuinman et al., 2017). The D-Catch score can be calculated for each individual item or as a total score of a construct. The advantage of using individual item scores consists in the ability to make specific comparison across different aspects of accuracy (Cocchieri et al., 2023). For this study, the Italian version of the D-Catch instrument was used, which demonstrated good psychometric properties in terms of validity and reliability in assessing the accuracy of nursing documentation (D'Agostino et al., 2017a).

- The PAI is a computerized nursing information system designed to support nursing care documentation according to the structure of nursing process using SNTs such as NDs (D'Agostino et al., 2012). The PAI integrates an algorithm to support nurses in clinical reasoning and assist nurses in formulating NDs, selecting appropriate interventions, and evaluating patient outcomes (Zega et al., 2014). The system is fully integrated into the hospital's electronic health record and has been in continuous use for over a decade. Currently, the PAI adopts the Italian version of Clinical Care Classification (CCC) system taxonomy to standardize the documentation of NDs (Zeffiro et al., 2021). This structured approach promotes consistency, supports diagnostic reasoning, and facilitates accurate and complete nursing documentation (Vanalli et al., 2023).
- The HDR is a tool for collecting information for each patient discharged from public and private hospitalization institutions across the Italian territory. It includes patients' sociodemographic characteristics (e.g., age), details of hospitalization (e.g., length of stay, admission and discharge modalities), and clinical characteristics (e.g., DRG category and medical diagnoses). The HDR uses the Italian version of ICD-9-CM for codifying medical diagnoses.

2.7. Ethical considerations

Prior to conducting the study, a research protocol was submitted to and approved by the hospital's ethics committee (CET Lazio Area 3, Prot. 0012915/24, approved on May 16, 2024). Data collection started after securing written informed consent from all participating patients. An additional consent was obtained from healthcare professionals responsible for drafting the clinical documentation. Upon hospital admission, patients were provided with a general consent form authorizing the processing and analysis of anonymized clinical data recorded in their EHRs. Thereafter, as part of the ethical process, patients were reached by phone or mail to be informed about the study, its objectives, the handling of anonymized data, and their rights, including the possibility to revoke consent at any time. If patients could not be reached after three attempts within a three-month timeframe, they were excluded from the study. Data were anonymized before analysis and all information was securely stored in a password-protected database, with access restricted to authorized researchers, ensuring compliance with institutional and regulatory guidelines. The study adhered to the principles of the Declaration of Helsinki (World Medical Association Declaration of Helsinki, 2025: Ethical Principles for Medical Research Involving Human Participants, 2025) and good clinical practice. Patient confidentiality and ethical integrity were preserved during the conduction of the study.

2.8. Data analysis

Descriptive and inferential statistics were conducted. The normality of continuous variables was assessed by examining skewness and kurtosis indices, considering absolute values within ±2 for skewness and ±7 for kurtosis as acceptable thresholds (Kim, 2013). Continuous variables (e.g., age, D-Catch scores) were presented using mean, standard deviation (SD), and range, while categorical variables (e.g., NDs and medical diagnosis) were reported as absolute and relative frequencies. In this study, ND prevalence was defined as the proportion of patients presenting with each specific ND out of the total study population. NDs with a prevalence of 20 % or higher were classified as high-frequency (HF) NDs (D'Agostino et al., 2017b).

To assess nursing documentation accuracy, D-Catch scores were analyzed for each item using descriptive statistics (mean, SD, range). The diagnostic accuracy component was further examined in both quantitative and qualitative dimensions, with scores rated on a 4-point Likert scale. Although D-Catch scores are based on ordinal 4-point Likert scales, they were treated as continuous variables for descriptive purposes. This approach follows established psychometric practice where Likert-type data with multiple response categories, approximately normal distributions, and sufficient variability may be appropriately summarized using means and SD (D'Agostino et al., 2017a). To ensure the reliability of the evaluations conducted using D-Catch, a structured approach to minimize the risk of subjectivity among evaluators was applied. The evaluations were performed by trained nurses with expertise in SNTs and documentation accuracy. Each EHR evaluation was conducted by two researchers. Consensus among evaluators was reached through a structured discussion process. In cases where consensus could not be achieved, a third independent researcher was consulted to review the discrepancies and provide a final decision, ensuring a consistent and rigorous evaluation process. All statistical analyses were performed using IBM SPSS *Statistics*® for Mac OS (Version 29.0.2.0).

3. Results

3.1. Sociodemographic and hospital-related characteristics of the sample

A total of 837 EHRs of adult inpatients with malignant tumors of the bronchus and lungs were considered in this study. Following the criteria outlined in the method section, 155 EHRs were excluded resulting in a final study sample of 682 EHRs eligible for this research. The mean patient age was 69.86 years (SD: 10.59), with an average LOS of 9.55 days (SD: 8.15). The hospital admission modality was planned for most individuals (59.5 %), and most of them were discharged home (88.9 %) (Table 1).

3.1.1. Clinical characteristics and NDs of the sample

Among the sample, 59.5 % were categorized as surgical patients. The most frequently identified medical diagnosis was *Malignant tumors of the*

Table 1
Sociodemographic and hospital-related characteristics of the sample (N = 682).

Variables	Descriptive Statistics	
Age (years) (mean (SD); range)	69.86 (10.59)	26–101
Length of stay (days) (mean (SD); range)	9.55 (8.15)	3–51
Hospital admission modality (n; %)		
Planned	406	59.5
Urgent	276	40.5
Hospital discharge disposition (n; %)		
Death	43	6.3
To home	606	88.9
Transferred	30	4.4
Voluntary	3	0.4

Legend: SD, standard deviation.

upper lobe, bronchus or lung, comprising 43.4 % of cases. A total of 3510 NDs were identified in the study population, including 34 distinct NDs, of which 10 were HF-NDs. Patients had an average of 5.15 NDs (SD: 2.99; range 1–16). The three most prevalent NDs were *Infection Risk* observed in 76.7 % of cases, *Fall Risk* (66.6 %), and *Acute Pain* (53.1 %) (Table 2).

3.1.2. D-catch scores for the accuracy of nursing documentation

To evaluate the accuracy of nursing documentation in EHRs using the D-Catch instrument, 209 EHRs were randomly selected based on the prior sample size calculation. The *Accuracy record structure* had a mean score of 3.79 (SD: 0.42), with individual scores ranging from 2 to 4. The *Accuracy of admission* demonstrated the highest mean score of 7.52 (SD: 0.73), with scores varying from 5 to 8. The *Accuracy of nursing diagnosis* had the lowest mean score of 6.38 (SD: 0.98), with recorded scores ranging from 4 to 8. The *Accuracy of intervention* scored a mean of 7.07 (SD: 1.17), with values between 4 and 8, while the *Accuracy of progress/outcome evaluation* had the same mean score of 7.07 (SD: 1.06), but with a wider range of 2–8. Notably, the *Legibility* item achieved a perfect mean score of 4.00 (SD: 0.00), indicating uniformity across all evaluations (Table 3).

Table 2
Clinical characteristics and NDs of the sample (N = 682).

Variables	Descriptive Statistics	
DRG category (n; %)		
Medical	276	40.5
Surgical	406	59.5
Medical diagnoses related to malignant tumors of the bronchus and lung (N = 688) (ICD-9-CM) (n; %)		
Malignant tumors of the main bronchus (162.2)	37	5.4
Malignant tumors of the upper lobe, bronchus or lung (162.3)	299	43.4
Malignant tumors of the middle lobe, bronchus or lung (162.4)	77	11.2
Malignant tumors of the lower lobe, bronchus or lung (162.5)	176	25.6
Malignant tumors of other parts of bronchus or lungs (162.8)	18	2.6
Malignant tumors of bronchus or lung, unspecified (162.9)	81	11.8
NDs (CCC) (N = 3510) (n; %)		
Infection Risk	523	76.7
Fall Risk	454	66.6
Acute Pain	362	53.1
Sleep Pattern Disturbance	260	38.1
Body Nutrition Deficit	192	28.2
Breathing Pattern Impairment	188	27.6
Fluid Volume Deficit	187	27.4
Skin Integrity Impairment Risk	187	27.4
Anxiety	179	26.2
Physical Mobility Impairment	143	21.0
Injury Risk	122	17.9
Urinary Elimination Alteration	91	13.3
Activity Intolerance Risk	87	12.8
Constipation	86	12.6
Skin Integrity Alteration	85	12.5
Bathing/Hygiene Deficit	68	10.0
Activity Intolerance	61	8.9
Toileting Deficit	54	7.9
Feeding Deficit	32	4.7
Tissue Perfusion Alteration	32	4.7
Dressing/Grooming Deficit	26	3.8
Fear	15	2.2
Aspiration Risk	14	2.1
Chronic Pain	14	2.1
Fatigue	13	1.9
Swallowing Impairment	12	1.8
Bowel Incontinence	6	0.9
Diarrhea	4	0.6
Body Image Disturbance	4	0.6
Confusion	3	0.4
Noncompliance	3	0.4
Individual Coping Impairment	1	0.1
Social Interaction Alteration	1	0.1
Functional Urinary Incontinence	1	0.1

Legend: DRG, Diagnosis Related Group; ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification; NDs, nursing diagnoses; CCC, Clinical Care Classification System Version 2.5.

3.1.3. D-catch scores for assessing the accuracy of nursing diagnosis

The item measuring the *Accuracy of nursing diagnosis* was further analyzed through both quantitative and qualitative evaluation criteria. In the quantitative assessment, the mean score was 2.77 (SD: 0.77). The distribution revealed that all cases received a score ≥2, with most of them (43.5 %) receiving a score of 2 (indicating an *incomplete* ND). In the qualitative assessment, the mean score was 3.61 (SD: 0.55), with a broader distribution spanning from 1 to 4. Most scores were in the upper range, with 63.2 % of EHRs scoring 4. Lower scores were infrequent, with only 1.9 % of cases receiving scores between 1 and 2 (Table 4).

4. Discussion

This study aimed to describe the prevalence of NDs in patients with malignant bronchial and lung cancer and to assess the accuracy of these diagnoses in EHRs. Our approach involved selecting EHRs for all adult inpatients diagnosed with this disease, including both primary and secondary discharge diagnoses, regardless of the inpatient units or hospitalization settings. This broad inclusion strategy was adopted because bronchial and lung cancer can either be the primary condition necessitating treatment and diagnostic investigations or a coexisting condition at the time of admission, both of which can influence treatment decisions and patient outcomes (Galindo-Utrero et al., 2022; Petrella, 2021).

To our knowledge, this is the first study to investigate the prevalence of NDs in patients with this specific cancer medical diagnosis. In existing literature, NDs have typically been studied in patients within age ranges or specific settings of care (e.g., adults or pediatrics) (Cesare et al., 2025a; D'Agostino et al., 2017b; Paans and Müller-Staub, 2015). Furthermore, research on SNTs has rarely focused on the prevalence of NDs in specific diseases or populations (D'Agostino et al., 2017b; Jomar and de Souza Bispo, 2014; Lisboa et al., 2016). To the best of our knowledge, an integrative literature review (Jomar and de Souza Bispo, 2014) summarized the existing evidence on the most common NDs in cancer patients, while only two studies in recent years have investigated the prevalence of NDs in oncology settings through SNTs (Othman et al., 2021; Sanson et al., 2019). However, none of these studies have specifically investigated NDs prevalence in patients with malignant bronchial and lung cancer.

Our findings reveal the prevalence of NDs in this patient population, aligning with existing literature on the prevalence of NDs in oncology patients (Jomar and de Souza Bispo, 2014; Othman et al., 2021; Sanson et al., 2019). The identified HF-NDs—which are *Infection Risk, Fall Risk, Acute Pain, Sleep Pattern Disturbance, Body Nutrition Deficit, Breathing Pattern Impairment, Fluid Volume Deficit, Skin Integrity Impairment Risk, Anxiety,* and *Physical Mobility Impairment*—reflect the complex clinical and psychosocial needs of our sample, who frequently experiences a combination of physical, psychological, and functional challenges, including pain, respiratory distress, nutritional and respiratory deficit,

Table 3
D-Catch scores for the accuracy of nursing documentation in the sample (n = 209).

D-Catch Instrument Items	Instrument Range	Mean (SD); (Range)
Accuracy of record structure	1–4	3.79 (0.42); (2–4)
Accuracy of admission	2–8	7.52 (0.73); (5–8)
Accuracy of nursing diagnosis	2–8	6.38 (0.98); (4–8)
Accuracy of intervention	2–8	7.07 (1.17); (4–8)
Accuracy of progress/outcome evaluation	2–8	7.07 (1.06); (2–8)
Legibility	1–4	4.00 (0.00); (4–4)

Legend: SD, standard deviation.

Table 4
D-Catch scores for assessing the accuracy of nursing diagnosis in the sample analyzed (N = 209).

Accuracy of nursing diagnosis	Instrument Range	Mean (SD); (Range)	Score (n; %)			
			1	2	3	4
Quantitative criteria	1–4	2.77 (0.77); (2–4)	0 (0.0)	91 (43.5)	75 (35.9)	43 (20.6)
Qualitative criteria	1–4	3.61 (0.55); (1–4)	1 (0.5)	3 (1.4)	73 (34.9)	132 (63.2)

Legend: SD, standard deviation.

according to the literature (Chowienczyk et al., 2020; Okoli et al., 2018). This hierarchy of HF-NDs reinforces the essential role of advanced practice nurses in oncology in managing symptoms, preventing complications, and coordinating care, with the primary goal to enhance patient well-being and improve overall outcomes (Serra-Barril et al., 2024). Furthermore, due to the progressive nature of the disease, understanding the prevalence of NDs in this population is crucial for facilitating interdisciplinary collaboration, ensuring timely interventions, and enabling nursing directors to optimize nursing care delivery.

Beyond examining NDs prevalence in a specific patient population with a defined disease, our study made a significant contribution to assessing the accuracy of nursing documentation, and particularly the accuracy of NDs. In fact, among the multiple studies on the prevalence of NDs found in literature, none have evaluated their accuracy at the same time, creating a significant gap in current research. Indeed, when the accuracy of NDs is well-defined, nursing documentation becomes a reliable tool for guiding patient care and supporting clinical decision-making. This also ensures that prevalence studies yield meaningful insights by increasing the validity of the identified diagnoses, making them a true reflection of patients' condition. The accurate documentation of NDs enhances communication among nurses and facilitate the understanding of patients' needs (da Silva Alves Souza et al., 2025). This, in turn, can positively impact patient safety, nursing workload, and the ability to measure nursing contributions to patient outcomes (Cesare and Zega, 2024; D'Agostino et al., 2017b). Thus, our analyses were necessary to contextualize the use of NDs within this patient population, ensuring their clinical relevance and alignment with patient needs. Importantly, the accuracy of NDs may also directly influence the estimation of their prevalence. Inaccurate or inconsistently formulated NDs may lead to either underestimation or overestimation of certain conditions, thereby distorting the actual clinical representation of patients' needs (Diogo et al., 2021). For instance, systematic under-documentation of more complex or unfamiliar NDs may result in artificially low prevalence rates, while frequent use of generalized or pre-selected NDs may inflate their prevalence without reflecting true patient status. Therefore, in this context, evaluating diagnostic accuracy alongside prevalence was essential to ensure that the prevalence estimates were valid and clinically meaningful.

Overall, our results indicate a positive level of accuracy in nursing documentation within the 682 EHRs analyzed. Among the six items of the D-Catch instrument, "Legibility" received the highest score, which is likely attributed to the use of a structured nursing information system such as the PAI system. This system employs a SNT integrated with a validated algorithm which facilitates documentation processes and accuracy while minimizing errors in data entry, improving interpretation, and optimizing clinical decision-making (Cesare and Zega, 2024). Regarding the item "Accuracy of nursing diagnosis", the mean score was good, which, while positive, was the lowest among all D-Catch instrument items. However, when compared with previous studies that assessed nursing documentation accuracy using D-Catch (Cocchieri et al., 2023; D'Agostino et al., 2017a), our study reported a higher mean diagnostic accuracy score. At the same time, our findings are slightly lower than those reported in another study (Nool et al., 2023), which, however, enrolled a significantly smaller sample size. The divergences in the accuracy of NDs could be attributable to several factors, including variations in nurses' diagnostic reasoning skills or differences in institutional documentation policies, or more simply to the hospital organizations. Moreover, the complexity of oncology patients may evidently contribute to noticeable challenges in achieving high diagnostic accuracy, as their conditions often involve multiple problems and rapidly evolving health statuses that require continuous reassessment and refinement of care plans (Sanson et al., 2019). This dynamic nature may complicate the formulation of NDs, potentially leading nurses to inconsistencies or reduced accuracy in clinical documentation. Another potential explanation of divergences in NDs accuracy among different studies may lie in the differences in training and experience among nurses documenting NDs and their level of familiarity with SNTs. Previous studies have highlighted that nurses' familiarity with SNTs and their proficiency in diagnostic reasoning play a crucial role in the accuracy of nursing documentation (D'Agostino et al., 2017a; Paans et al., 2010a). Regarding this, in institutions where continuous education and structured training on NDs formulation are emphasized, higher diagnostic accuracy scores have been observed (Cocchieri et al., 2023). At the study hospital, for instance, the PAI system has been in use for over 10 years, supported by a continuous evaluation system for documentation accuracy, and nurses receive systematic training on SNTs and diagnostic reasoning. This suggests that training programs and the use of decision-support tools integrated into EHRs, may enhance diagnostic accuracy and improve the quality of nursing documentation (Cesare and Zega, 2024). Future research needs to confirm this factor, considering multicentric studies with different documentation practices or diverse nurses' levels of expertise to observe changes in nursing documentation and NDs levels of accuracy. This confirmation will be fundamental to understand how NDs identified in prevalence studies can be reliable and correspondent to real patient clinical and psychosocial needs. However, we should disclose that additional factors—such as workload, time constraints, and staffing levels—may also affect the accuracy of NDs but, unfortunately, we didn't collect these data since they were not part of our study's objectives. High patient-nurse ratios, nursing staff turnover, and increased clinical or administrative weight may bring to documentation burden (Gesner et al., 2022) and limit the time available for accurate patient assessments, leading to a reliance on pre-selected or general and not accurate NDs rather than individualized, patient-centered NDs.

4.1. Implications for global knowledge, healthcare policy, and nursing practice

Studying the prevalence of NDs among patients with a specific disease allows for a better understanding of their actual or potential responses to healthcare needs, enabling more effective care. Building on these premises, NDs serve as essential clinical judgments that guide the selection of appropriate nursing interventions, performed to achieve desired outcomes or maintain optimal health conditions for any patient (Jomar and de Souza Bispo, 2014; Jomar et al., 2017). The integration of NDs in clinical practice and the analysis of their prevalence appear indispensable for fostering a structured, evidence-based approach to patient cancer care. The most prevalent NDs could also be included in specific educational programs aimed at enhancing nursing knowledge in these domains of care—such as acute pain and anxiety, to name a few—and improving nurses' treatment of these conditions in this specific patient population. However, to maximize the effectiveness of NDs, it is crucial to address the factors that influence the accuracy of nursing data.

Efforts should be directed toward improving diagnostic reasoning skills, enhancing the usability of EHRs like PAI, and providing ongoing training on SNTs (Cesare and Zega, 2024). By doing so, NDs will more accurately capture patients' actual or potential health problems, ultimately strengthening the role of nursing documentation in clinical decision-making and promoting more effective multidisciplinary care planning worldwide.

4.2. Strengths and limitations

The main strength of this study lies in its original aim to describe the NDs of patients with malignant bronchial and lung cancer while assessing their accuracy. This brings to a richer understanding of nursing care directed at these patients and offers valuable insights into the precision of diagnostic processes. However, we should acknowledge some limitations. As retrospective research, our study relies on existing data, which may introduce information bias due to variability in data quality. Additionally, the diagnostic skills of nurses, as well as potential differences across different IUs, were not assessed before conducting the analyses. Nevertheless, nurses using PAI in the study hospital can be considered experienced users with a good confidence on PAI and diagnostic reasoning, as they have been trained and have used this system for over a decade (D'Agostino et al., 2012). Furthermore, while stratified analyses by patient characteristics (e.g., age, sex, medical diagnosis, or unit of care) might have offered additional insights into factors influencing ND prevalence, such analyses were not within the scope of the present study. Future prospective studies may consider these limitations to validate our findings, also replicating our research across different settings and populations.

5. Conclusion

Oncological diseases compromise patients' physical integrity and psychological well-being, requiring complex evaluations and multidisciplinary interventions (Sanson et al., 2019). This study described the prevalence of NDs in patients with malignant bronchial and lung cancers, by also analyzing their accuracy. By adopting this approach, this study transcends the boundaries of specific healthcare settings often adopted by existing literature on the prevalence of NDs, focusing instead on patients affected by the same disease. This study highlights the significance of integrating the assessment of NDs prevalence with an evaluation of diagnostic accuracy. This combined approach helps determine the reliability and appropriateness of the NDs under study for research purposes, ensuring their validity and applicability in clinical investigations.

CRediT authorship contribution statement

Manuele Cesare: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Erasmo Magliozzi:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Fabio D'Agostino:** Writing – review & editing, Validation, Software. **Valentina Zeffiro:** Writing – review & editing, Validation. **Antonello Cocchieri:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization.

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Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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