

Medical Terminology Conformity and ICD-10 Coding Accuracy for Circulatory Diagnoses at Dr. Soekardjo Hospital, Tasikmalaya

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Abstract

Accurate diagnosis coding supports reliable health information. This study examined the association between medical terminology conformity and ICD-10 coding accuracy for circulatory system diagnoses at Dr. Soekardjo Regional General Hospital, Tasikmalaya. A quantitative study retrospectively reviewed 214 inpatient medical records from a population of 459 records for the first quarter of 2025. Data collection began on July 13, 2026. Terminology conformity and coding accuracy were assessed through document observation. Frequencies and percentages were calculated, and the association was examined using a two-sided Fisher's exact test. Terminology was classified as conforming in 11 records (5.1%) and non-conforming in 203 (94.9%). Codes were accurate in 46 records (21.5%) and inaccurate in 168 (78.5%). Accurate codes occurred in 9 of 11 records with conforming terminology (81.8%), compared with 37 of 203 records with non-conforming terminology (18.2%). The association was statistically significant ($p < 0.001$). Medical terminology conformity was associated with coding accuracy in the assessed records. The findings support attention to standardized diagnostic documentation but do not establish a causal relationship.

Keywords: ICD-10; coding accuracy; medical terminology; circulatory system; medical record

1. Introduction

Medical records are a fundamental source of clinical information, containing factual data on patients' conditions, medical history, previous treatment, and current health status (Abduh, 2021). The management of medical records requires qualified Medical Record and Health Information professionals who are responsible for maintaining the quality and reliability of health information. According to the Indonesian Ministry of Health Decree No. 312 of 2020 concerning the Professional Standards for Medical Record and Health Information professionals, these professionals are required to demonstrate competence in clinical classification, disease

coding, coding of other health-related conditions, and clinical procedures in accordance with the classification systems applicable in Indonesia (Kemenkes RI, 2020).

Diagnosis coding is the process of assigning alphanumeric codes to represent diseases or health conditions. Coding accuracy is influenced by several parties involved in patient care, particularly physicians, medical record personnel or coders, and other healthcare professionals who contribute to the completeness of clinical information (Kurnianingsih, 2020). In Indonesia, diagnosis coding is performed using the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD-10) as the standard classification system for diseases and health-

related conditions (Pramono et al., 2021). ICD-10 is also widely used as a standard for health documentation and disease statistics across different levels of healthcare services (Adawiyah et al., 2023).

One group of diagnoses that requires particular attention in the coding process is *diseases of the circulatory system*. These conditions include disorders of the heart and blood vessels, such as coronary artery disease, cerebrovascular disorders, rheumatic heart disease, and other cardiovascular conditions (Tarawan et al., 2020). Cardiovascular diseases also represent a substantial health burden in Indonesia. Based on data from the Institute for Health Metrics and Evaluation, the mortality rate due to cardiovascular disease in Indonesia reached 251.09 per 100,000 population in 2019, showing an increase compared with the previous year (Mustajab, 2023).

Within ICD-10, diseases of the circulatory system are classified under Chapter IX. Certain diagnoses in this chapter require specific coding rules, including the use of combination codes for hypertension accompanied by other conditions, such as heart disease or kidney disease. Errors in determining the appropriate code character or in applying combination codes may result in inaccurate diagnosis coding. Accurate coding is essential because coded data are used for health information management and various healthcare reporting activities. Inaccurate coding may reduce data validity and subsequently affect morbidity reports, lists of the most common diseases, and healthcare reimbursement processes (Sukawan et al., 2023).

Coding accuracy is also closely related to the conformity of medical terminology used in diagnosis documentation. Inappropriate terminology may create difficulties in determining the correct diagnosis code. Agustine and Pratiwi (2017) reported that inaccurate diagnosis coding may result from inappropriate medical terminology used by physicians in documenting diagnoses. Incomplete

terminology and the use of abbreviations may also hinder the coding process. Consistent use of standardized medical terminology is therefore important to ensure uniform interpretation and facilitate communication among healthcare professionals (Hatta, 2017). In addition, high-quality healthcare information requires data that are complete, accurate, timely, and reliable (Saraswati & Sudra, 2015).

Medical terminology and coding procedures are complementary aspects of health information quality. Agustine and Pratiwi (2017) reported an association between terminology accuracy and diagnosis coding accuracy in outpatient primary care, while Hernawan et al. (2017) identified coding problems in circulatory system diagnoses at a cardiac clinic. These findings provide a rationale for examining terminology conformity and ICD-10 coding accuracy together in inpatient circulatory system records, where diagnostic specificity and the application of classification rules warrant attention.

Similar coding problems were identified at Dr. Soekardjo Regional General Hospital, Tasikmalaya. A preliminary study conducted on January 17, 2026, involving 10 inpatient medical records with circulatory system diagnoses found that 7 records (70%) contained inaccurate diagnosis codes, whereas only 3 records (30%) were coded accurately. The identified problems included incomplete diagnosis documentation, errors in determining the fourth character of ICD-10 codes, and the use of separate codes for conditions that should have been assigned combination codes.

The present study extends this context by examining the association between terminology conformity and coding accuracy in inpatient records with circulatory system diagnoses. This diagnostic group is relevant because code selection may require specific diagnostic information and the application of combination-code rules. Examining both variables within this group provides evidence about the relationship between documented terminology and coding

accuracy at the medical-record level, without assuming that terminology alone determines coding outcomes.

Therefore, this study aimed to examine the association between medical terminology conformity and ICD-10 coding accuracy for inpatient circulatory system diagnoses at Dr. Soekardjo Regional General Hospital, Tasikmalaya.

2. Method

This study employed an analytical cross-sectional design with a retrospective review of inpatient medical records to examine the association between medical terminology conformity and ICD-10 coding accuracy at Dr. Soekardjo Hospital, Tasikmalaya, Indonesia. The study population comprised 459 inpatient medical records with a final principal diagnosis of a circulatory system disease from the first quarter of 2025. Data collection began on July 13, 2026.

The sample size was calculated using the formula $n = N/(1 + Ne^2)$, where N represents the population size and e represents an error tolerance of 0.05. With a population of 459 records, the calculation yielded $n = 459/[1 + 459(0.05^2)] = 213.74$, which was rounded up to 214 medical records. The records were selected using simple random sampling.

The inclusion criteria were inpatient medical records from Dr. Soekardjo Hospital, Tasikmalaya, covering January–March 2025, with a final principal diagnosis of a circulatory system disease and a completed inpatient episode. Records had to be accessible and contain the diagnostic documentation required to assess medical terminology conformity and ICD-10 coding accuracy. Records were eligible regardless of whether the documented terminology was conforming or the assigned code was accurate.

Data were collected through a review of the selected medical records using a structured observation sheet. The study examined two categorical variables: medical terminology conformity and ICD-10 coding

accuracy. Medical terminology was classified as conforming or non-conforming, while diagnosis coding was classified as accurate or inaccurate. The observation sheet was used to record the terminology assessment and the assessment of code completeness, specificity, and combination codes where applicable. The assessment focused on documented diagnoses and their assigned codes; coder competence and other potential explanatory factors were not measured.

Descriptive statistics were used to summarize both variables as frequencies and percentages. Their association was examined using a 2×2 contingency table and a two-sided Fisher's exact test because one cell had an expected frequency below five. Statistical significance was set at $p < 0.05$. The analysis assessed an unadjusted association between terminology conformity and coding accuracy and was not intended to establish a causal relationship.

Ethical approval was granted by the Health Research Ethics Committee of Poltekkes Kemenkes Tasikmalaya under approval number KP-KEPK/0165/2026 on July 6, 2026. Data collection began after ethical approval had been obtained.

3. Result and Discussion

3.1 Medical Terminology Conformity in Diagnosis Documentation

Table 1. Distribution of Medical Terminology Conformity in Circulatory System Diagnosis Documentation.

Medical Terminology Conformity	Frequency (n)	Percentage (%)
Conforming	11	5.1
Non-conforming	203	94.9
Total	214	100.0

Source: Authors' analysis of inpatient medical records from January–March 2025; data collected in 2026.

Among the 214 medical records, 11 (5.1%) were classified as having conforming medical terminology, whereas 203 (94.9%) were classified as non-conforming (Table 1).

This finding indicates that terminology conformity was uncommon under the assessment criteria used in the study.

The interpretation of terminology conformity depends on the reference standard and the criteria applied to diagnostic specificity and abbreviations. An abbreviation should not be classified as inappropriate solely because it is abbreviated; its acceptability depends on the applicable terminology standard and whether it allows an unambiguous interpretation of the documented diagnosis.

Agustine and Pratiwi (2017) discussed the relationship between medical terminology and coding accuracy, while Hatta (2017) emphasized the importance of standardized terminology in maintaining consistency in clinical information. These perspectives suggest that clear and specific diagnosis documentation may facilitate code selection. However, terminology conformity alone cannot establish whether the assigned code is accurate, because coding also requires the correct application of classification rules.

3.2 Accuracy of ICD-10 Coding for Circulatory System Diagnoses

Table 2. Distribution of ICD-10 Coding Accuracy for Circulatory System Diagnoses

Coding Accuracy	Frequency (n)	Percentage (%)
Accurate	46	21.5
Inaccurate	168	78.5
Total	214	100.0

Source: Authors' analysis of inpatient medical records from January–March 2025; data collected in 2026.

Of the 214 medical records, 46 (21.5%) were classified as accurately coded and 168 (78.5%) as inaccurately coded (Table 2). This distribution describes the frequency of coding inaccuracy in the assessed records. It does not, by itself, establish the causes of inaccurate coding or the competence of individual coders.

Previous studies have discussed coder knowledge and competence (Maimun et al.,

2018; Prihantoro et al., 2023), training (Windari & Kristijono, 2016), and incomplete or unclear documentation (Hernawan et al., 2017; Indawati, 2017) in relation to coding accuracy. These factors provide possible explanations for coding difficulties, but they were not included as measured variables in the present statistical analysis.

The high proportion of inaccurate codes supports further examination of the documentation and coding process. Such examination should distinguish errors related to the interpretation of documented diagnoses from errors in applying ICD-10 rules. The present results do not support attributing coding inaccuracy to inadequate training, deficiencies in hospital procedures, or individual coder performance without additional assessment.

3.3 Association Between Medical Terminology Conformity and ICD-10 Coding Accuracy

Table 3. Association Between Medical Terminology Conformity and ICD-10 Coding Accuracy

Medical Terminology Conformity	Accurate n (%)	Inaccurate n (%)	Total	p-value
Conforming	9 (81.8)	2 (18.2)	11	<0.001
Non-conforming	37 (18.2)	166 (81.8)	203	
Total	46 (21.5)	168 (78.5)	214	

Percentages were calculated within rows. The p-value was obtained using a two-sided Fisher's exact test.

Accurate coding was observed in 9 of 11 records with conforming terminology (81.8%), compared with 37 of 203 records with non-conforming terminology (18.2%). A two-sided Fisher's exact test indicated a statistically significant association between terminology conformity and coding accuracy ($p < 0.001$).

Although terminology conformity was associated with coding accuracy, 37 records with non-conforming terminology were coded accurately, while two records with conforming terminology were coded inaccurately. These findings indicate that

terminology conformity alone did not determine coding accuracy. Non-conforming terms may have remained interpretable or been clarified by other documented information, whereas accurate terminology may still have been followed by errors in applying coding rules. However, these possible explanations were not directly assessed in this study and require further investigation.

This finding is consistent with the proposed role of clear diagnostic terminology in facilitating code selection. Specific and unambiguous terms may help coders identify the appropriate classification entry and verify the corresponding code. Nevertheless, the association was unadjusted and should not be interpreted as evidence that terminology conformity caused accurate coding.

The findings complement the work of Agustine and Pratiwi (2017) and the emphasis on terminology standardization described by Hatta (2017). Their practical implication is that documentation quality and coding procedures should be considered together. Further research is needed to assess whether diagnostic complexity, documentation completeness, coder characteristics, or other factors explain part of the observed association.

3.4 Practical Implications

The observed association supports attention to standardized diagnostic terminology and the clarification of ambiguous documentation. Hospitals may consider reviewing terminology guidance and communication procedures between physicians and coders as part of quality-improvement activities. The effectiveness of these measures, however, was not evaluated in this study.

Incomplete documentation, inconsistencies in clinical information, difficulties applying combination-code rules, coder knowledge, and institutional procedures remain possible explanations that require direct assessment. They should not be presented as confirmed determinants

of coding inaccuracy on the basis of the present two-variable analysis.

A practical follow-up would be to review a selection of records from each of the four combinations of terminology conformity and coding accuracy. Such a review could examine the documented diagnosis, the terminology criterion applied, the assigned code, and the reason for any disagreement with the reference code. Records with conforming terminology but inaccurate codes would help identify coding-rule issues, while accurately coded records with non-conforming terminology would help evaluate the interpretation and usefulness of the terminology criteria. This approach is proposed as a future quality-improvement activity and was not undertaken as part of the reported analysis. Any subsequent changes to terminology guidance or coding procedures should be evaluated using consistent assessment criteria so that improvements reflect changes in practice rather than changes in measurement.

3.5 Study Limitations

This study was restricted to one hospital, one diagnostic group, and medical records from a three-month service period, which limits the generalizability of the findings. Only 11 records were classified as having conforming terminology, resulting in a small subgroup. The analysis did not adjust for potential confounding variables and cannot establish a causal relationship.

Interpretation also depends on the terminology and coding criteria applied during document assessment. The statistical reanalysis used the reported aggregate counts and did not constitute an independent reassessment of individual medical records. Furthermore, the sample-size calculation was based on the population size and a specified precision parameter rather than an explicit calculation of statistical power for the association between the two variables.

4. Conclusion

Medical terminology conformity and ICD-10 coding accuracy were low among the assessed inpatient records with circulatory system diagnoses. Records with conforming terminology had a higher proportion of accurate codes than records with non-conforming terminology, and the association was statistically significant.

The findings support attention to standardized diagnostic terminology and clarification of ambiguous documentation. They do not establish causality or identify coder competence, hospital procedures, or documentation deficiencies as independent determinants of coding inaccuracy. Future studies should assess these factors directly and evaluate interventions intended to improve documentation and coding quality.

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