The Accuracy of ICD-10 Codes for Clinical Diagnosis and Supporting Examinations of Hypertension Cases in Inpatient Care at Hospital

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ABSTRACT

Background: Accurate diagnosis coding is essential to support processes such as the preparation of statistical reports, health insurance claims to BPJS, and data-based decision-making. A preliminary study at RSUD X Makassar in the first quarter of 2025 found 243 electronic medical records of inpatients diagnosed with hypertension with diabetes mellitus complications, of which 20 records contained incorrect codes. **Objective:** To determine the relationship between clinical diagnosis and supporting examinations with the accuracy of ICD-10 codes in hypertension cases among inpatients at RSUD X Makassar. **Methods:** This study employed a cross-sectional design with a quantitative approach. The population consisted of inpatient medical records from the first quarter, with a sample of 71 medical records of hypertension cases selected using random sampling. Results: Based on hypothesis testing, two variables were analyzed: clinical diagnosis and ICD-10 code accuracy. The significance value (p-value) was 0.184. Since the significance value of $0.184 > 0.05$, the next variable tested was the completeness of supporting examinations and code accuracy, which yielded a significance value of $0.452 > 0.05$. Further Pearson correlation testing revealed that the strength of the relationship between clinical diagnosis and code accuracy had a correlation coefficient of $r = 0.158$ with a significance value of $p = 0.189$ ($p > 0.05$). Meanwhile, the relationship between completeness of examinations and code accuracy showed a correlation coefficient of $r = 0.089$ with a significance value of $p = 0.459$ ($p > 0.05$), indicating a very weak correlation. **Conclusion:** Both variables demonstrated no significant relationship, suggesting that other factors may be more dominant. The experience and training of coders may have a greater influence than the completeness of medical records. Moreover, the implementation of health information technology could further enhance coding accuracy.

INTRODUCTION

Hospitals, as one of the health care facilities, must provide proper medical record services as an effort to improve the quality of hospital services. Medical record services are among the essential services available in hospitals. According to the Regulation of the Minister of Health (Permenkes) No. 24 of 2022, "a medical record is a file containing documentation of a patient's identity, examinations, treatments, procedures, and other services that have been provided to the patient." The information contained in medical records serves as the basis for coding (Pratama et al., 2023). Coding is the process of managing medical record data by assigning codes in the form of letters, numbers, or a combination of both, representing data components. The determination of codes for disease classification follows the ICD-10 for diseases, while ICOPIM and ICD-9-CM are used for procedures, and coding may also be performed through computer-based (online) systems (Sitorus et al., 2023).

Accurate diagnosis coding plays a crucial role in supporting financing claims to BPJS Kesehatan, preparing statistical reports, and facilitating data-based decision-making. Errors in coding can result in data inaccuracies, claim rejections, and even clinical errors in patient management (Ramdhani et al., 2024). One of the most common diseases encountered in health care services is hypertension. This condition is not only prevalent but often coexists with other complications such as heart or kidney disease. In ICD-10, hypertension is classified into several categories based on organ involvement, including primary hypertension (I10), hypertension with heart disease (I11), hypertension with kidney disease (I12), and hypertension with combined heart and kidney disease (I13). The accuracy of hypertension coding poses challenges for hospitals, as it involves determining the primary diagnosis, secondary diagnoses, and the use of combination codes for cases involving comorbidities such as chronic kidney disease (CKD) or atherosclerotic heart disease (Febriyani et al., 2025).

A preliminary study of inpatient electronic medical records at RSUD X Makassar during the first quarter of 2025 (January–March) revealed a total of 243 records of inpatients diagnosed with hypertension and complications of diabetes mellitus, of which 20 medical records contained incorrect codes. The impact of inaccurate coding is closely related to the quality of claim submissions, service quality, and as a foundation for both clinical and managerial decision-making. This condition highlights the necessity of paying greater attention to, and further evaluating, the accuracy of diagnosis coding. Therefore,

further research is needed to examine the extent of coding accuracy for hypertension diagnoses in inpatient electronic medical records at RSUD X Makassar during the first quarter of 2025.

METHODS

This study employed a quantitative approach, which is conducted to answer research questions by adhering to concrete scientific principles. The research design was descriptive, utilizing observational methods to identify phenomena occurring within the target population. The study was carried out from July to August 2025 at RS X Makassar. A simple random sampling technique was applied, yielding a total of 71 medical records of hypertension cases. The research utilized an observation sheet as the primary instrument to assess clinical diagnoses by determining both primary and secondary diagnoses, the completeness of supporting examinations from medical records, and the accuracy of diagnostic coding using ICD-10.

RESULTS

Based on the research conducted at Hospital X from July to August, entitled "The Accuracy of ICD-10 Codes for Clinical Diagnosis and Supporting Examinations of Hypertension Cases in Inpatients at RSUD X", the results obtained are as follows.

Table 1. Frequency Distribution of Age Hospital X The First Quarter Period of 2025

Criteria	Frequency	Percentage
30 - <45 years old	5	7,0
45 - <60 years old	36	50,7
60 - <75 years old	30	42,3
Total	71	100,0

Based on the frequency distribution table of inpatient age at RSUD X during the first quarter of 2025, out of a total of 71 samples, there were 5 patients (7.0%) aged 30–<45 years, 36 patients (50.7%) aged 45–<60 years, and 30 patients (42.3%) aged 60–<75 years. Thus, the largest age group was within the 45–<60 years range.

Table 2. Frequency Distribution of Gender Hospital X The First Quarter Period of 2025

Criteria	Frequency	Percentage
Male	15	21,1
Female	56	78,9
Total	71	100,0

Based on the frequency distribution table of inpatient gender at RSUD X during the first quarter of 2025, out of a total of 71 samples, there were 15 male patients (21.1%) and 56 female patients (78.9%). Thus, the majority of inpatients during this period were female.

Table 3. Frequency Distribution of Clinical Diagnosis Hospital X The First Quarter Period of 2025

Criteria	Frequency	Percentage
Primary	16	22,5
Secondary	55	77,5
Total	71	100,0

Based on the frequency distribution table of clinical diagnoses of inpatients at RSUD X during the first quarter of 2025, out of a total of 71 samples, there were 16 patients (22.5%) diagnosed with primary hypertension and 55 patients (77.5%) diagnosed with secondary hypertension. Thus, the majority of patients during this period were dominated by secondary hypertension cases.

Table 4. Frequency Distribution of Examination Completeness Hospital X The First Quarter Period of 2025

Criteria	Frequency	Percentage
Complete	49	69,0
Incomplete	22	31,0
Total	71	100,0

Based on the frequency distribution table of examination completeness among inpatients at RSUD X during the first quarter of 2025, out of a total of 71 samples, there were 22 patients (31.0%) with incomplete examination data and 49 patients (69.0%) with complete examination data. Thus, the majority of patient medical records during this period were already supplemented with examination results.

Table 5. Frequency Distribution of Code Accuracy Hospital X The First Quarter Period of 2025

Criteria	Frequency	Percentage
accurate	37	52,1
Inaccurate	34	47,9
Total	71	100,0

Based on the frequency distribution table of code accuracy for hypertension diagnoses in inpatient electronic medical records at Hospital X during the first quarter of 2025, out of a total of 71 samples, there were 37 electronic medical records (52.1%) with accurate diagnostic codes and 34 electronic medical records (47.9%) with inaccurate diagnostic codes. Thus, the majority of coding was accurate, although nearly half of the cases were still not in accordance.

Table 6. Relationship between Clinical Diagnosis and ICD-10 Code Accuracy

	Value	df	Asymptotic Signifiance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.767^a	1	.184		

Based on the table 6, the hypothesis tested was whether there is a relationship between the two categorical variables, namely Clinical Diagnosis and ICD-10 Code

Accuracy. The significance value or p-value was 0.184. Since the significance value of 0.184 > 0.05, it can be concluded that there is no statistically significant relationship between Clinical Diagnosis and ICD-10 Code Accuracy.

Table 7 . Results of the Chi-Square Test Supporting Examinations and ICD-10 Code Accuracy

	Value	df	Asymptotic Signifiance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	$.566^a$	1	.452		

Based on the table above, the hypothesis test examined whether there was a relationship between the two categorical variables, namely the Completeness of Supporting Examinations and Code Accuracy. The significance value was 0.452, which is greater than 0.05. Therefore, it can be concluded that there is no statistically significant relationship between the two variables.

Table 8. Correlation Test Results Clinical Diagnosis and ICD-10 Code Accuracy

		Clinical Diagnosis	Code Accuracy
Clinical Diagnosis	Pearson Correlation	1	.158
	Sig. (2-tailed)		.189
	N	71	71
Code Accuracy	Pearson Correlation	.158	1
	Sig. (2-tailed)	.189	
	N	71	71

The correlation analysis indicated that the relationship between clinical diagnosis and code accuracy had a Pearson correlation coefficient (r) of 0.158 with a significance value of 0.189 (>0.05). This suggests a very weak positive relationship that is not statistically significant between the two variables.

Table 9. Correlation Test Results Supporting Examinations and ICD-10 Code Accuracy

		Examination Completeness	Code Accuracy
Examination Completeness	Pearson Correlation	1	.089
	Sig. (2-tailed)		.459
	N	71	71
Code Accuracy	Pearson Correlation	.089	1
	Sig. (2-tailed)	.459	
	N	71	71

The correlation test between the completeness of supporting examinations and code accuracy revealed a Pearson correlation coefficient (r) of 0.089 with a significance level of 0.459 (>0.05). This indicates a very weak and non-significant relationship

between the two variables. Therefore, it can be concluded that the completeness of supporting examinations does not directly influence the accuracy of diagnostic coding.

DISCUSSION

Based on the results of this study, the relationships were categorized as very weak. Although some previous studies have indicated a relationship between the completeness of medical records—including the completeness of medical examinations—and the accuracy of ICD-10 coding, the present findings show no significant relationship between either independent variable, namely clinical diagnosis and examination completeness, and diagnostic code accuracy. This suggests that other factors may be more dominant. The experience and training of coders may have a greater influence than the completeness of medical records. Additionally, the implementation of health information technology can enhance coding accuracy by assisting in the management of complex medical information (Wahyuni et al., 2024).

Practically, although a positive correlation was observed, the strength of the relationship was very weak and insufficient to be considered meaningful. This indicates that neither the clarity of the clinical diagnosis nor the completeness of examinations individually directly affects the level of diagnostic coding accuracy. These findings reflect the complexity of the diagnostic coding process in medical documentation practice. The accuracy of diagnostic codes does not rely solely on a single aspect, such as the clinical diagnosis or examination results, but is rather determined by the quality and consistency of all information within the medical record. For instance, even if a diagnosis is documented, without adequate support from the patient's medical history, physical examination findings, or supporting investigations, the resulting code may be inaccurate or even indeterminable.

In addition, other factors that may influence coding accuracy but were not analyzed in this study include the skills of coding personnel, the availability of coding standard operating procedures, understanding of medical terminology, and the hospital information system in use. Therefore, it can be concluded that improving diagnostic code accuracy requires comprehensive enhancements to the overall medical documentation process, including training for medical staff and coders, improving the completeness and consistency of medical record content, and implementing information systems that effectively and efficiently support the coding process.

These findings are consistent with the theory stating that diagnostic coding accuracy

is a complex process influenced by multiple factors, not solely by the documented diagnosis or individual clinical examination results. According to Huffman (2004) in his book *Medical Record Management*, accurate diagnostic coding heavily depends on the completeness, consistency, and overall quality of medical record documentation, including the patient's medical history, physical examination findings, laboratory results, and physician interpretations.

These findings align with the results of medical record audits that meet the standards of high-quality documentation and coding. A positive correlation between accurate documentation and precise coding was observed, supporting the conclusion that high-quality documentation enhances coding accuracy. Although these data are encouraging, they also indicate room for improvement, which can be achieved through collaboration between clinicians with extensive clinical experience and coding professionals with comprehensive expertise in classification systems (Farhan et al., 2020).

High-quality documentation strongly supports the accuracy of diagnostic codes, as these codes serve as determinants for patient healthcare service costs. Moreover, the generated diagnostic codes must be accurate because inaccuracies can affect the claims process. Similarly, Indawati stated that diagnostic code accuracy is also a critical factor in the smooth processing of healthcare service claims by BPJS. In practice, some claims may be returned by BPJS if there is incomplete information or inaccuracies in the diagnostic codes (Maryati, Rahayuningrum, & Hestiana, 2023).

In addition to documentation, Wahyuni et al. (2024) noted that other factors cited in the literature as more dominant determinants of coding accuracy include the competence, experience, and understanding of the ICD classification system, as well as coder training, which may have a greater influence than the completeness of medical records. Furthermore, the implementation of health information technology can enhance coding accuracy by assisting in the management of complex medical information, alongside the consistent application of standard operating procedures (SOPs) in healthcare facilities.

Thus, the results of this study reinforce the view that diagnostic coding accuracy is not determined solely by the diagnosis or examination results, but rather by the integration of all medical record contents, the competence of coding personnel, and the supporting systems available within the hospital. To improve code accuracy,

enhancements are needed in coder training, quality supervision of documentation, and the implementation of information technology that can facilitate a more systematic and efficient coding process.

CONCLUSIONS

Clinical Diagnosis and ICD-10 Code Accuracy: Not significant, with a p-value of 0.184 (>0.05). **Supporting Examinations and Code Accuracy:** Not significant, with a p-value of 0.452 (>0.05). Both variables indicate that there is no significant relationship between the independent variables—clinical diagnosis and examination completeness—and diagnostic code accuracy. This suggests that other factors may be more dominant. The experience and training of coders may have a greater influence than the completeness of medical records. Additionally, the implementation of health information technology can enhance coding accuracy by assisting in the management of complex medical information.

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