Factors Affecting Clinical Coding Errors

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Abstract

Background: Coding errors lead to incorrect classification of diseases and thus severely affect health care planning and epidemiological research.

Objectives: This study aimed to investigate the factors affecting clinical coding errors.

Methods: This descriptive study was conducted in 2020 in 2 stages. In the first stage, a questionnaire was developed by examining relevant resources, documents, and articles. The questionnaire's validity was examined by 5 health information management experts. Its reliability was determined using Cronbach α and correlation coefficient (r = 0.84%). In the second stage, the data were collected by visiting teaching hospitals affiliated with Shahid Beheshti University of Medical Sciences, examining the medical records, and interviewing the coders. Data were analyzed using descriptive statistics.

Results: Non-observance of diagnostic principles by physicians, illegibility of medical records, use of ambiguous and nonstandard abbreviations, and incomplete medical documentation were the most important causes of coding errors.

Conclusions: Considering the importance of coding in presenting correct data as a powerful lever in health care, knowledge of the factors affecting the occurrence of coding errors will greatly contribute to the selection of effective strategies to reduce and eliminate errors.

Keywords: Coding Error, Clinical Coding, Medical Records

1. Background

Clinical coding enables epidemiological studies and measurement of treatment effectiveness in health care systems (1). It involves translating the medical terms recorded by physicians into codes that are used to describe patient complaints, problems, diagnoses, treatments, or the reasons why patients visit medical centers (2). The most important goal of clinical coding is to facilitate information retrieval and classification of morbidities and mortalities (3). In fact, clinical coding creates a rich database that can be employed for various functions, including health care planning (4). Acceding to Lucyk et al., medical coding is used to retrieve information, conduct research, and make managerial decisions (5). Evaluating health trends/cost analysis, planning, and allocating health care resources are the other applications of clinical coding (6).

Because coding of clinical data is a gateway for standardization and retrieval of medical information standards, maintaining optimal coding quality is important in the accurate analysis and interpretation of clinical data.

Failure to pay attention to the quality of coding and the occurrence of coding errors lead to incorrect classification of diseases; thus, relying on data whose classification quality is unclear or poor threatens planning and epidemiological and medical research for both health care providers and managers (7). Coding errors can occur in coding both diagnoses and procedures (8). These errors hinder the efficient and effective performance and financial management of hospitals and potentially lead to inaccurate national statistics on the incidence of diseases in hospitals (9).

Previous studies have identified the factors that cause coding errors. Anian and Ismail considered the low quality of medical documents as the most important cause of coding errors. Upcoding and undercoding have also been reported as examples of coding errors. Upcoding is a non-care-related code assigned by the coder, resulting in a higher level of reimbursement (4), while undercoding is the lack of a complete report of procedures or services provided (10).

Opitasari and Nurwahyuni stated that coding errors are due to the choice of incorrect diagnoses for a code as-

signment by the coder, physicians' illegible handwriting, incomplete information and ambiguous abbreviations in the medical records or discharge summary, and confusion in reading the diagnosis (which results in incorrect interpretation and selection of incorrect codes) [11].

Cheng et al. considered the low quality of documentation to be the most important cause of coding errors and diagnosis-related group (DRG) changes. The result of their audit of DRG codes revealed that 56% of the coding errors were related to the quality of medical records (especially the lack of proper medical records at the time of coding), 13% were due to incorrect choice of the main diagnosis or determination of the original by the coder, 29% were related to the absence of additional codes in the medical records, and 2% were related to the use of unauthorized codes [12].

According to the literature, quality of coding is influenced by various factors. Given the impact of clinical coding errors on various aspects of the health care system, planning and action to reduce these errors are of utmost importance. However, this planning is impossible without knowing the factors causing clinical coding errors.

2. Objectives

The present study investigated the factors affecting clinical coding errors in the educational hospitals of Shahid Beheshti University of Medical Sciences (Iran).

3. Methods

This descriptive study was conducted in 2020 in 2 stages. In the first stage, a questionnaire was developed to tap into the factors affecting coding errors by examining credible and relevant resources, documents, and articles. This questionnaire consisted of 10 sections to assess experts' views on a 3-point Likert scale (low priority, medium priority, and high priority). The questionnaire's validity was examined by 5 health information management experts with at least 10 years of experience as faculty members. Its reliability was determined using Cronbach α and correlation coefficient (r = 0.84%). In the second stage, data were collected by visiting the teaching hospitals affiliated with Shahid Beheshti University of Medical Sciences, examining the medical records, observing the coding process, and interviewing the coders. As the population was small (n = 35), no sampling was performed, and the entire population was included in the study using the census method. The demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic Characteristics of Participants

Variables	Frequency (%)
Sex	
Male	12 (34)
Female	23 (66)
Education	
Bachelor's degree	19 (54)
Post graduate	16 (46)
Experience	
5 <	9 (26)
6 - 10	8 (23)
11 - 15	12 (34)
> 15	6 (17)

Subsequently, the data were analyzed using SPSS version 20 (SPSS Inc, Chicago, Ill, USA) and descriptive statistics (frequency and percentage). This study was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1400.313).

4. Results

The results showed that non-observance of diagnostic principles by physicians, illegibility of medical records, use of ambiguous and nonstandard abbreviations, and incomplete medical documents with a high priority of > 80% were the most important causes of coding errors. These were followed by not using Both volumes of the International Classification of Diseases (ICD) (Tabular list and Alphabetical index) coders' insufficient knowledge and not studying all documents by the coders, which were recognized as important factors in the occurrence of coding errors (Table 2).

5. Discussion

Coding is a process whereby expressions are standardized so that the data can be used by people other than those who collect them [13]. A variety of errors can occur in this process. Although coding errors are inevitable, an acceptable level of coding accuracy must be considered [14]. Any error in clinical coding may have far-reaching consequences [15]. Thus, it is critical to pay attention to the quality of coding. There are several obstacles to high-quality coding, including (1) coders' limited ability to add, modify, or interpret medical documentation, (2) physicians' incomplete documentation, (3) discrepancies and

Table 2. Factors Affecting Clinical Coding Errors [a]

Factors affecting Clinical Coding Errors	Low Priority	Medium Priority	High Priority
Non-use of both volumes (tabular list and alphabetical index; ICD)	3 (8.6)	5 (14.3)	27 (77.1)
Coder's high workload	14 (40)	13 (37.1)	8 (22.9)
Coder's insufficient knowledge	0 (0	9 (25.7)	26 (74.3)
Not studying all medical documents by the coder	5 (14.3)	7 (20)	23 (65.7)
Inadequate physical space for coding the medical record	10 (28.6)	14 (40)	11 (31.4)
Non-observance of diagnostic principles by physicians	0 (0	1 (2.9)	34 (97.1)
Use of ambiguous and nonstandard abbreviations	1 (2.9)	6 (17.1)	28 (80)
Illegibility of the medical record	1 (2.9)	2 (5.7)	32 (91.4)
Incomplete medical documentation	3 (8.6)	4 (11.4)	28 (80)
No audit of coding	3 (8.6)	18 (51.4)	14 (40)

[a] Values are expressed as No. (%).

inconsistencies in the information recorded in the medical records, (4) the use of different terms to describe clinical diagnoses, and (5) a communication gap between coders and physicians (16).

Price and Robinson cited smudgy and illegible handwriting, incomplete and inadequate documentation, lost medical records, inaccessible electronic documentation, and coding deadlines as clinical coding challenges (17). Furthermore, according to Surján, the most common types of coding errors are ignoring diagnoses, incorrect or omitted inference, indexing errors, and violation of ICD rules and regulations (18).

In the present study, the most important factors leading to the occurrence of coding errors were non-compliance with the principles of diagnosis by physicians, illegibility of medical records, use of ambiguous abbreviations, and incomplete medical documentation.

According to Surján, the first source of coding errors is the physician. Here, we do not mean medical misdiagnosis but errors in the explicit formulation of diagnoses (ie, merely documentation of diagnoses). Because nowadays physicians are highly specialized, they focus on their field and ignore some details that do not belong to their specialty, though this is related to their documentation activities and not their medical activities (18). Therefore, it is necessary for physicians to be aware of the importance of documentation and write a detailed description of the procedures performed. Some procedures are complex, and sometimes a small change in a method can alter the final code (13).

Regarding incomplete medical records, Anian and Ismail stated that poor documentation of medical records leads to incorrect coding, and thus clinical coders have to assume what the physicians wanted to document. Accord-

ing to them, the role of documentation in the occurrence of coding errors is that most caregivers, such as physicians, nurses, and laboratory technicians, are unaware of the coder's need for proper diagnosis coding after treatment (4).

Regarding the role of poor or inaccurate documentation, Maryati et al. emphasized that high-quality medical information leads to a better diagnostic code (about 73.80%), while low-quality medical information leads to a poor diagnostic code (about 36%). When the quality of medical information is high, the quality of the diagnostic code is 1.54 times higher than when the quality of medical information is low (19).

The quality of documentation remains a cause for concern. When paper notes are in poor condition, they slow down coders and make it difficult for coders to extract accurate information from them. To reach a deadline, coders often rely on discharge summaries to identify diagnoses and treatments. However, the information in the discharge summary sheet is often weak and incomplete, leading to errors. Forty-eight percent of users utilize the clearance summary sheet as the only source of coding (20). On the other hand, a high percentage of incomplete clearance summary sheets shows a statistically significant relationship between a complete clearance summary sheet and coding errors (8).

The illegibility of medical records' documentation is an important factor in the occurrence of clinical coding errors. Lucyk et al. stated that the legibility of documents also impacts the quality of codes. In most cases, coders can interpret physicians' notes and coding documents in consultation with their colleagues, either based on their experience of the physicians' writing styles or by using the "best guess" method, which may lead to choosing the

wrong diagnosis (5). According to Mirhashemi et al., the percentage of document illegibility is 38% (3). Regarding the incorrect choice of the main condition by the coder due to an incomplete admission and discharge summary sheet and human error, Lucyk et al. (5) noted that in coding, one of the main obstacles to the quality of documentation is the diversity of patient admission to discharge time. The information provided by the coder must be interpreted and coded only from sources explicitly documented by physicians (3).

Also, according to the findings, the use of ambiguous and nonstandard abbreviations affected the occurrence of coding errors made by documentation specialists. According to Shilo and Shillo, although the use of abbreviations may save space and time, their writing is often ambiguous or erroneous and may have multiple interpretations (21). Politis et al. reported that 6.8% of the abbreviations were classified as "perceived but inappropriate or ambiguous" or "unknown" (22). Therefore, the ambiguity of abbreviations is a major concern and a source of error in clinical coding (23).

In the present study, non-auditing of coding was identified as another factor affecting the occurrence of coding errors. Coders expect their work to be evaluated and receive feedback to make them aware of their mistakes. Anian and Ismail believe that there should be regular monitoring of the quality of clinical coding to prevent any errors in the future (4).

Strict adherence to ICD coding rules and instructions by coders is crucial in reducing coding errors (24). According to Mahbubani et al., classification rules and standards mean that coders cannot assume clinical meaning but must accurately interpret information according to the instruction given to them (25). The process of encoding with ICD is done manually by coding specialists, which is highly time-consuming and prone to errors (26). Therefore, it is necessary to follow the coding instructions carefully.

Failure to follow the basic rules and instructions of coding and incorrect reporting by physicians are major obstacles to ensuring the quality of clinical coding. The World Health Organization (WHO) emphasizes that clinical coders need knowledge of medical terminology, legal aspects of health information, and health data standards. Training is an integral part of health information (23). As medical knowledge and diagnostic tools evolve (8), medical records are a big store of clinical data (27). Therefore, continuous training of coders is necessary to prevent errors related to coding rules and guidelines.

(28).

In the present study, not studying all medical documents by the coder was another factor leading to the occurrence of coding errors. Lack of time and inconsistencies in medical records were among the factors that made the coders reluctant to read the entire medical record. They were content with the diagnoses and procedures recorded on the admission and discharge summary sheet, if available. Otherwise, they would read the summary sheet of the case or the first sheet that could be read to understand the diagnosis and procedures. In this regard, Zafirah et al. mentioned that in the coding process, it is very important that coders read all the medical documents of the care period before assigning the code and not just review the summary sheet (8). The first step in decreasing the incidence of coding errors is to be aware of regularly reported problems (29).

The cooperation of physicians and clinical coders has a favorable effect on the accuracy and completeness of the coded data (30). Regular interaction between all influential groups during the coding process, with frequent reviews of clinical documentation, is critical (31). Regular interaction with physicians clarifies issues for physicians and coders on how to describe the care provided in the documentation for clinical coding purposes (32).

Also, the knowledge and skills of coders should be constantly improved to reduce the error rate. The hospital needs to develop in-house and out-of-hospital training programs for coders. Another acceptable way to reduce the rate of coding errors is to train each coder according to 1 specialty, rather than having all coders encode all specialties. By focusing on 1 specialty, the coder can apply all the coding instructions and skills to that particular specialty (33). Applying standards in documentation, audits, and physicians' awareness can enhance the quality of health documentation and help improve the quality of coded data and achieve its goals (34). Coder training affects coders' ability to assign correct codes. Advanced training improves documentation and, in turn, makes it possible to analyze patient details, thus leading to better coordination and outcomes (35). Moreover, according to Hay et al., clinical documentation improvement (CDI) enhances the patient quality and safety outcomes and increases reimbursement (36).

5.1. Conclusions

Therefore, considering the importance of adequate coding in providing accurate data as a powerful lever in the health care domain, awareness of the factors affecting the occurrence of coding errors will greatly contribute to the adoption of correct strategies to reduce and eliminate errors.

Acknowledgments

Footnotes

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