ARTICLE

Factors Affecting the Accuracy of Coding Selection of Major Diagnoses on the Homepage of Medical Records

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Abstract

Objective This study aimed to investigate current issues, root causes, and improvement measures of the main diagnostic codes on the homepage of a hospital's inpatient medical records, and to improve the accuracy of the hospital's main diagnostic codes. **Methods** A retrospective analysis was carried out on the homepage data of inpatient medical records in a hospital. After implementing the quality control of medical record coding, we compared and analyzed 1000 medical records before the intervention (March 1 to June 30, 2020) and 1000 medical records after the intervention (March 1 to June 30, 2021). The accuracy of the homepage data of the medical records was compared and the quality control efficacy after the intervention was evaluated. **Results** Following the intervention, the number of major diagnostic errors on the homepage of medical records decreased by 84% (from 38 cases per 1000 to 6 cases per 1000, p<0.05). Among them, the main diagnosis error was reduced from 6 cases to 1 case, the main diagnosis selection error was reduced from 5 cases to 2 cases, the ambiguous (QY) medical records were reduced from 19 cases to 2 cases, and the medical records with codes not merged were reduced from 9 cases to 1 case. According to the analysis of influencing factors, after the intervention measures were taken, the filling errors by physicians decreased from 17 cases to 2 cases, the errors by coders decreased from 12 cases to 2 cases, and the errors from information management decreased from 9 cases to 2 cases. **Conclusions** After the intervention, the number of errors in filling by physicians, coding by coders, and information management on the homepage of medical records decreased significantly. In addition, the accuracy of the main diagnostic codes on the homepage has been greatly improved, which helps ensure the reliability of information statistics and effectively improves the quality and safety of medical care.

1.   INTRODUCTION

The accuracy of the main diagnosis of inpatient medical records directly affects the collection of disease statistics, the settlement and claim settlement of medical payments, the performance assessment of hospital management and the correct rate of disease coding. Therefore, it is closely related to the hospital's medical quality and medical safety. The quality of the main diagnosis on the front page of the medical record is critical for the statistics of the disease spectrum of medical institutions and regions, and it is also of great significance for supporting the diagnosis–related groups (DRGs), evaluating the level of medical quality and safety, and technical capabilities [1]. In February 2021, the National Health Commission of the People's Republic of China included "improving the correct rate of main diagnostic codes on the homepage of medical records" into the scope of 10 medical quality and safety improvement goals, highlighting the importance and pertinence of the main diagnostic coding work on medical records.

In this study, we utilized relevant documents such as the "International Classification of Diseases Knowledge (ICD-10) Application Guidance Manual" [2] and "Quality Specifications for Filling in Data on the Homepage of Inpatient Medical Records (Provisional)" as the evaluation criteria. The accuracy of the homepage data of the medical records was compared and the quality control efficacy after the intervention was evaluated.

2.   MATERIALS AND METHODS

2.1   General information of included medical records

The medical records of a tertiary hospital in a city were randomly selected by computer. Before the intervention, 1,000 medical records were archived from March 1, 2020 to June 30, 2020 as the control group. The same method was used to select the homepage data of 1000 medical records archived from March 1, 2021 to June 30, 2021 as the experimental group.

2.2   Inspection methods

The medical record inspectors are composed of members of the quality control team led by the director of the department. The inspection criteria were based on the "Regulations of the International Statistical Classification of Diseases and Related Health Problems ICD-10 and ICD-9-CM-3", the "Basic Norms for Writing Medical Records" promulgated by the Ministry of Health of the People's Republic of China in January 2010 [3], and the "Main Principles of Diagnosis Selection" promulgated by the National Health Commission. The inspectors carefully reviewed the homepages of each medical record one by one, and analyzed the main diagnostic coding defects on the front pages of the medical records before and after the intervention.

2.3 Intervention measurements

The interventions adopted by the experimental group are listed below. First, coders regularly receive technical training and learning courses, and actively participate in various clinical knowledge training activities in the hospital and responsible departments, supplemented by incentives and punishment mechanisms to enhance their professionalism and sense of responsibility. Second, clinicians are regularly trained in coding knowledge. Coders regularly train relevant ICD knowledge in clinical departments to improve physicians' familiarity with ICD coding and the requirements for filling out the homepage of medical records. Third, we also focus on improving the application level of informational tools, including updating and improving the hospital HIS system database, and optimizing the artificial intelligence quality control reminder function. Fourth, we have established a self–inspection and self–correction system, including coders' self–inspection, departmental quality control personnel's summary verification (monthly), and providing feedback to clinical departments for rectification.

2.4 Outcomes

The main diagnostic coding defects of the control group and observational group and the potential influencing factors of the main diagnostic coding were collected.

2.5 Statistical analysis

The SPSS 22.0 statistical software was used. Enumeration data were expressed as n (%), and were tested by Chi–Squared Test. Measurement data were expressed as mean ± standard deviation and were tested by Student's t-test. P-value < 0.05 indicates statistical significance.

3. RESULT

3.1 Comparison of coding defects in main diagnosis on homepages of medical records

As shown in Table 1, after the rectification and optimization measures, the defect rate of the main diagnostic codes on the homepage of the 1,000 medical records in the experimental group dropped by 84% compared with the control group (0.60% vs. 3.80%, p<0.05). Among them, the main diagnosis filling error rate decreased from 0.50% to 0.10%, the main diagnosis selection error rate decreased from 0.50% to 0.20%, the QY medical record rate decreased from 1.90% to 0.20%, and the code unmerged rate decreased from 0.90% to 0.10%.

Table 1. Comparison of coding defects in the two groups of major diagnoses [cases, n (%)]

Parameters	Control group (n = 1000)	Experimental group(n = 1000)	χ^2	P value
illing error in main diagnosis	5 (0.50%)	1 (0.10%)	-	-
Selection error in main diagnosis	5 (0.50%)	2 (0.20%)	-	-
Ambiguous (QY) medical records	19 (1.9%)	2 (0.20%)	-	-
Medical records with codes not merged	9 (0.90%)	1 (0.10%)	-	-
Total	38 (3.8%)	6 (0.60%)	16.25	0.05

3.2   Factors affecting coding defects in major diagnoses

The main influencing factors of coding defects in the main diagnosis of the first pages of the medical records of the two groups are mainly concentrated in three aspects, including errors in filling in by physicians, errors in coding by coders, and errors in information management. Factors affecting coding defects in major diagnoses. As shown in Table 2, after the rectification and optimization measures, the defect influencing factors of the experimental group were significantly improved compared with those of the control group. Among them, physician filling errors decreased from 17 cases to 2 cases (per 1000 cases), coder errors decreased from 12 cases to 2 cases, and information management errors decreased from 9 cases to 2 cases.

Table 2. Analysis and comparison of the influencing factors of the coding of the main diagnosis between the two groups [cases, n (%)]

Parameters	Control group (n = 1000)	Experimental group (n = 1000)	χ^2	P value
Filling errors by clinicians	17 (44.74%)	2 (33.33%)	18.00	< 0.05
Coding errors by coders	12 (31.58%)	2 (33.33%)	13.00	< 0.05
Informational management errors	9 (23.68)	2 (33.33%)	9.528	< 0.05
Total	38	6	-	-

4.   DISCUSSION

Several factors contributed to the defects in the coding of main diagnosis in the homepage of medical records, including personnel, systems (institutional factor), methods, and communication (as shown in Figure 1). First, with regard to personnel issues, we found that the training of clinicians and coders to record the homepages of medical records needs to be strengthened. Many clinicians do not pay enough attention to the records of diagnosis on the homepage. Also, some clinicians do not know enough about ICD knowledge and the homepage filling standard, and often fail to record the diagnosis as required. In addition, we also found that some coders have insufficient professional knowledge, lack of thorough understanding of clinical knowledge, and lack of skills in reading medical records. Second, institutional factor is also involved, which is mainly due to imperfect or unimplemented hospital–related management systems. For example, the relevant systems on the homepage are not comprehensive, the implementation is not in–depth, and there is a lack of reward and punishment mechanisms (or insufficient enforcement of rewards and punishments). Regarding the implementation methods, it is mainly due to the insufficiency of learning and training implementation and informational application. For example, learning and training are too superficial and lack professional guidance. The reminder and restriction function of the hospital HIS system is unstable, and the update and maintenance are not timely. The fourth factor is communication barriers. For example, there is insufficient communication between clinicians and medical records departments. There is a lack of communication and discussion mechanisms between clinicians and coders. They have not formed a mechanism for mutual communication, joint research, and consensus on how to improve the accuracy

of medical records. In the internal management of the department, there is a loose situation that the relevant quality control processes and systems are not implemented in place.
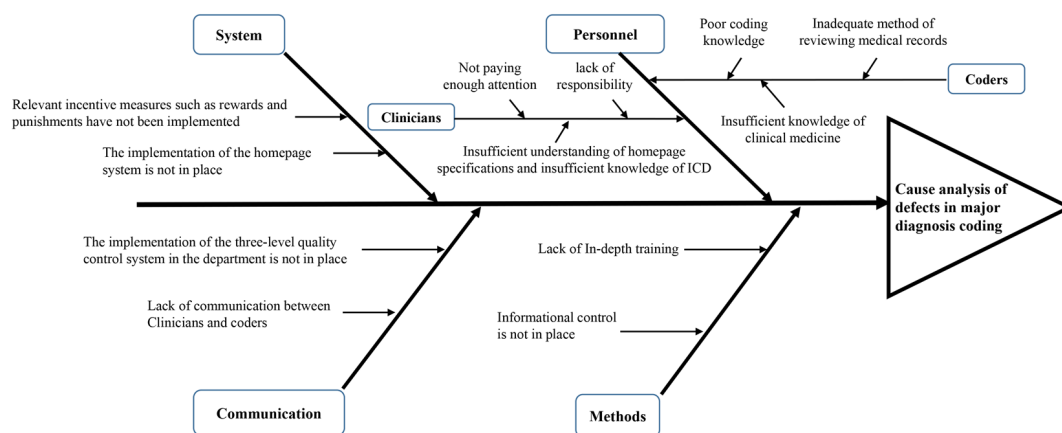

Figure 1. The main factors contributing to coding defects on the homepage of medical

Based on the results of this study, we proposed strategies to improve the coding quality of the main diagnoses on the homepage of medical records.

First, in-depth learning and training can be carried out. Clinicians and coders are directly responsible for the coding quality of the homepage of medical records. Multi-form, intensive and comprehensive professional training may be the decisive way to improve the coding quality of the homepage of medical records. For example, professional training and knowledge popularization of medical record homepage coding can be carried out through the training such as "three basics and three strictness", pre-job training, and lectures throughout the hospital [4]. In addition, the training of clinicians can be organized in batches and categories to strengthen their learning of ICD coding, especially the main diagnostic selection principles of the International Classification of Diseases and the requirements for filling out the homepage of medical records. In addition, we can regularly organize coders to conduct coding lectures and exchange research in clinical departments, and effectively integrate clinical theory and coding practice.

Second, the application of information technology can be a good way to improve the coding quality of the homepage of medical records. We need to ensure that the HIS system is continuously optimized and updated, which helps the stability of the system and the smooth connection with the superior system. We need to further improve the HIS system, including restrictions on coding errors, merging code touches, restrictions on mandatory items on the homepage, and information restrictions and reminder functions for quality control issues such as QY medical record screening. In addition, we can add different permissions and functions for physicians and coders in the system. For example, when a resident enters a diagnosis, the system can display the average cost, average length of hospital stay, and routine collocation surgeries or operations in the same province for each diagnosis. This may assist physicians in comparative thinking and in making a correct diagnosis. The coding interface can display the coding principles of diagnosis and the possible combined codes for reference by coders, thereby realizing the intelligent management of the HIS system.

Third, improving the system is the key to improving the coding quality of the homepage of medical records. For example, we can use the hospital's regular meeting, WeChat, telephone, written notification and other methods to timely feedback the pros and cons of the homepage of the medical records of clinical departments, and guide the departments with a high defect rate to rectify and improve in a timely manner. We need to improve the quality control effect of the department, and strictly implement the three-level physician management system in which the doctor in charge carefully fills in the homepage information, the attending doctor checks and checks, and the director of the department finally reviews [5]. In addition, it is important to actively build a supervision mechanism in which residents, attending physicians, chief physicians, department directors, responsible physicians, nurses, quality control physicians, quality control nurses, coders and other medical personnel are jointly responsible.

Fourth, optimizing the quality control process is also critical. In the management of medical records, a complete quality control process is important [6]. We propose to implement the "four-step" quality control model for the main diagnosis selection coding on the homepage of inpatient medical records to ensure that the reporting of medical record data is "objective, accurate and efficient". First, the data needs to be entered on time. Each coder shall ensure that the coding and entry of the department in charge of the previous month is completed before the 10th of each month. Second, it is necessary to conduct preliminary screening of information. With the help of DRGS, the quality control platform of the provincial department, etc., the medical records that may have problems such as QY, code touch, abnormal charging, and death in the low-risk group were initially screened, and timely feedback was given to the responsible coders for timely rectification. Third, key medical records need to be checked. The quality control team of the department checks, corrects and urges rectification of key cases such as monthly medical insurance, large expenses, and deaths, and forms a "problem ledger" for records. Fourth, we propose to review the medical records with typical problems. For example, clinicians and coders discuss and learn about the "problem ledger", clarify the principle of main diagnosis selection, ensure the consistency of coding in the whole hospital, and further improve the correct rate of main diagnosis selection.

The first page of the medical record is considered to be the condensed content of the entire medical record [7]. The main diagnosis code is the main content of the front page of the medical record, and it is also one of the medical quality and safety goals required by the National Health Commission to improve. Therefore, it is necessary to take multiple measures such as close communication and cooperation between clinicians and coders, strengthening professional and technical training of personnel, and improving management and systems.

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