The Relationship of Completeness of Medical Information with the Accuracy of Diabetes Mellitus Diagnosis Codes at X Kediri Hospital

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***Abstract*: Completeness of medical information is very supportive in determining the accuracy of the diagnosis code for each disease. The correct diagnosis code determines the value of the claim following the tariff pattern that has been determined by the insurance company. Diabetes mellitus is a disease that is in the top 10 diseases in Indonesia, so research in this field is important. The analysis of the relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code is the purpose of this study. The research design used correlation analytics with the cross-sectional approach. The population consisted of 68 medical record documents with diabetes mellitus cases in January-August 2021. The research sample used the entire population, namely 68 inpatient medical record documents. The results showed that complete medical information was 39 medical record documents (57%) and incomplete was 29 medical record documents (43%). The accuracy of the correct diagnosis code for diabetes mellitus is 17 medical record documents (24%) and the incorrect code is 51 medical record documents (76%). Based on the results of the Chi-Square statistical test, the results obtained p-value = 0.023, which means p-value <0.05 so H0 is rejected, which means that there is a significant relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code. As conclusion, the completeness of information in medical record influence the accuracy of diagnose, specifically in diabetes mellitus cases (p-value = 0.023) Therefore, medical record officer plays important roles for the completeness of the documents.**

***Keywords*: Accuracy, Completeness, Diabetes Mellitus, Diagnosis Code, Medical Information.**

I. INTRODUCTION

A hospital is a health service institution that organizes individual health services in a complete manner that provides inpatient, outpatient and emergency care services.[1] The provision of health services to patients in hospitals is provided in a systematic and organized manner, involving all health professionals, one of which is medical recorders and health information. Hospitals have an obligation to maintain medical records [2]

Medical record is a file that contains notes and documents regarding patient identity, history taking, examination, treatment, actions and other services that have been given to patients [3]. One form of organizing medical records is the assignment of disease diagnosis codes to medical record documents by medical recorders who have the appropriate competence and qualifications. As explained in the Regulation of the Minister of Health Number 55 of 2013 concerning the Implementation of the Work of Medical Recorders in article 13, that a medical recorder has the authority to carry out the coding of diseases and medical actions according to the correct terminology [4]

Providing a diagnostic code or coding is providing a code determination using letters or numbers or a combination of both that represent data components. Coding is something that must be done carefully. When giving a code, a medical record officer or coder must look at all medical record documents to get supporting data starting from anamnase, supporting measures, and treatment that has been given to patients to get a precise and accurate code. Precise and accurate codes are needed because the quality of coding has an important role in providing health care services and billing health services. In this era of national health insurance (JKN), the accuracy of coding greatly affects claims for INA-CBG's rates in the payment of national health insurance which is currently held by BPJS Kesehatan [5].

Diabetes is a chronic endocrine/metabolic disease characterized by hyperglycemia, especially hyperglycemia caused by insulin deficiency or insulin resistance. Diabetes mellitus is now a disease in Indonesia with a relatively high prevalence. According to the latest data from the International Diabetes Federation (IDF) in 2017, Indonesia is ranked 6th in the world with 10.3 million people with diabetes. From a preliminary study conducted at Tk.IV Hospital DKT Kediri, diabetes mellitus is also classified as a disease that has quite a lot of frequency. Therefore, the researcher took this case as research material.

From previous research that has been carried out on the analysis of the factors causing the inaccuracy of the diabetes mellitus diagnosis code based on the 5M management element, the factors that influence the inaccuracy of coding are the level of knowledge and training that the coder has attended, the completeness of medical record filling, the availability of SOP as a guideline for coding procedures , and the infrastructure used by coders in coding. According to a research journal regarding the relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnostic code that has been carried out by Warsi Maryati et al, [5] shows that there is a relationship between the completeness of medical information and the accuracy of the diagnostic code. Medical

information in medical record documents can support proper and accurate coding. If the medical information in a medical record document is incomplete, it can affect the accuracy of the resulting diagnosis code.[5] Based on a preliminary study conducted at Tk.IV Hospital DKT Kediri, problems were found in 5 inpatient medical record documents where there were still inaccuracies in giving the diagnosis code.

Based on the background description, the researcher is interested in conducting research by taking the title "Relationship of Completeness of Medical Information with the Accuracy of Diagnostic Codes of Diabetes Mellitus."

II. RESEARCH METHODS

This type of research uses quantitative methods. The cross-sectional study design associated the independent variable completeness of medical information with the dependent variable accuracy of diagnosis in patients with diabetes mellitus. Completeness analysis by observing medical record documents by researchers and the accuracy of the diagnosis were analyzed by experienced coding experts by looking at the data table for the completeness of medical information. The data types of the two variables are nominal. Analysis of the relationship between the two variables using the SPSS 20 tool in a univariate (percentage) and bivariate manner with the Chi-Square statistical analysis model at a significance level of 95%. The working hypothesis (H1) is accepted if the p value <0.05 [6]

The design of this study was a cross-sectional quantitative study linking the independent variable completeness of medical information with the dependent variable the accuracy of diagnosis in patients with diabetes mellitus.

The population of this study were all medical record documents for patients with diabetes mellitus for the period January to August 2021, consisting of 68 medical record documents. The sample uses a total population of 68 medical record documents [6].

Data on the completeness of medical information and diagnosis codes were obtained through observation of medical record documents: history taking on the initial medical assessment form, diagnosis code on the medical resume form, physical examination on the inpatient medical assessment form, supporting examinations on the supporting examination sheet form, and records of drug administration (CPO) on the drug administration sheet form. Information is declared complete if all of the information is filled in.) Observation results are listed in the table of data collection tools. [6]

Data on the dependent variable (completeness of medical information) were classified into two, namely complete (1) and incomplete (0), while data on the accuracy of the diagnosis were categorized into correct (1) and incorrect (0). Presentation of the results of this univariate analysis is displayed in the form of a percentage. The relationship between the two variables was analyzed using the Chi-Square statistical analysis model at a significance level of 95%. ($\alpha = 0.05$ (5%). The results of the calculation of H0 were rejected if the p-value <0.05. This test was used because the type of research data is nominal .[6]

III. DISCUSSION

1. *Completeness Of Medical Information*

The completeness of medical information in this study was seen based on filling in the medical record form by health workers who provide health services at the hospital. The observed forms consist of: anamnase on the initial medical assessment (ER) form, diagnosis code on the medical resume form, physical examination on the inpatient medical assessment form, supporting examinations on the supporting examination sheet form, and records of drug administration (CPO) on the form sheet drug administration. The results can be seen in table 1

Table 1. Completeness And Incompleteness Of Medical Information

Completeness of Medical Information	Amount of Medical Record Documents	Percentage (%)
Complete	39	57%
Incomplete	29	43%
Total	68	100%

From table 1 we can see that the completeness of medical information at the hospital only reached 57%. According to the Decree of the Minister of Health Number: 129/Menkes/SK/II/2008 the standard for completeness of medical records 24 hours after service should be 100% so that these conditions are still far from standard.[7] In detail, the completeness of medical information can be seen in Figure 1. In accordance with the results of research (Maryati, 2019) that incomplete medical information has an impact on the quality of medical record documents, thereby affecting the accuracy of the code given. [5] In addition, this statement is supported by the results of other studies, namely the completeness of writing medical information plays an important role in determining the accuracy of the code.

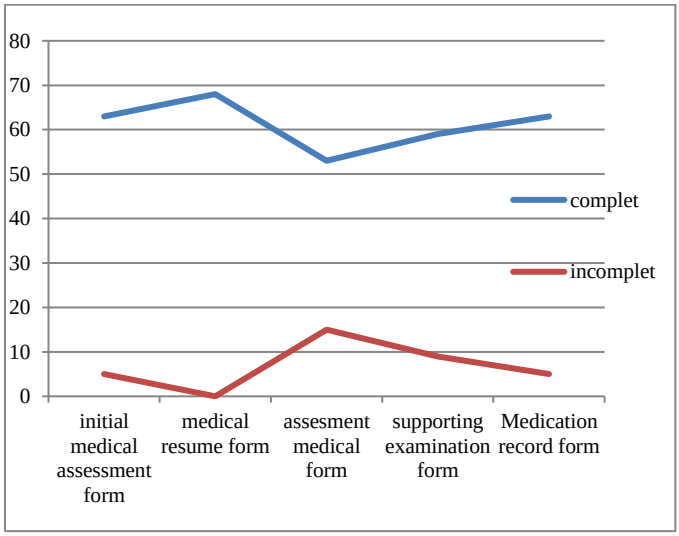

Fig. 1 completeness of medical information on the medical record form

From Figure 1 it can be seen that the inpatient medical assessment form and supporting examination sheet form are the most incomplete forms.

2. Accuracy Of Diabetes Mellitus Diagnostic Codes

The process of observing the accuracy of the diabetes mellitus diagnosis code at X Kediri Hospital was carried out using a checklist sheet as a research instrument. The checklist sheet contains points including No, RM No, diagnosis, hospital code, code accuracy (correct/incorrect), code accuracy value, and description. Based on the results of observations made in the January-August 2021 period on 68 samples of medical record documents for inpatients with cases of diabetes mellitus, the results were shown in table 2 as follows:

Table 2. Accuracy And Inaccuracy Of Diabetes Mellitus Diagnostic Codes

Diagnostic Code Accuracy	Amount of medical record documents	Persentage (%)
Exact code	17	24 %
Incorrect code	51	76 %
Total	68	100 %

From table 2 it can be seen that the diagnosis codes that are still incorrect reach 51 medical record documents or 76%. The causes of this inaccuracy can be seen more clearly in Figure 2.

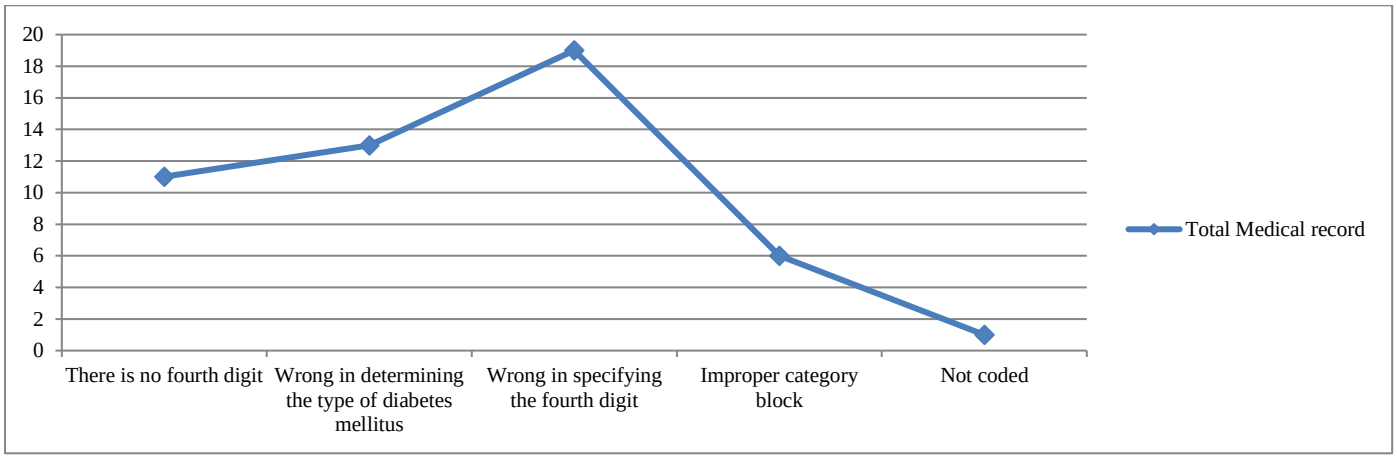

Fig. 2 Classification of Inaccurate Diagnostic Codes for Diabetes Mellitus.

From Figure 2, the most errors which are the cause of the inaccuracy of the diabetes mellitus diagnosis code are due to an incorrect determination of the fourth digit.

3. Incorrect Code Because There Is No Fourth Digit

As mentioned in Figure 2, there are 11 incorrect codes caused by the coder not adding a fourth digit to the given code. This causes the code to be inaccurate because the code is considered incomplete. The following are cases of code inaccuracy caused by the absence of the fourth digit:

Table 3. Inaccurate Code Because There Is No Fourth Digit

No.	Diagnosa	ICD-10 code		Total
		Hosp	Researcher	
1.	Viral infection + DM	E11	E11.8	1
2.	DM tipe 2 + Ischemic heart disese, heart failur	E11	E11.7	1
3.	DM	E11	E11.9	3
4.	DM Tipe 2	E11	E11.9	2
5.	DM + Ulcus pedis	E11	E11.5	1
6.	G2P0 UK17MG DM	O24	O24.9	1
7.	DM Tipe 2 + Ulcus Pedis	E11	E11.5	1
8.	DM+ Suspec covid	E11	E11.9	1
Total				11

The coding error found by the researcher was that there was no fourth digit in the given code. Based on the results of observations, the coding procedure carried out by the medical record officer is by looking at the patient's diagnosis on the medical resume form and the entry and exit summary form on the patient's medical record document. Then the medical record officer did the coding by looking at the auxiliary book that had been made by the medical record unit itself without double checking the ICD-10. The coder provides a code based on previous problems that often occur in hospitals (customs). This is not in accordance with the coding steps described by Kasim and Erkadius about 9 coding steps. As mentioned in previous research, repeated coding based on the habit of seeing frequent diagnoses can affect the accuracy of the code given [8]. For example, cases of type 2 diabetes mellitus at Tk. IV Kediri DKT was given the code E11 because previous cases were also coded E11 and in the auxiliary book it was only written E11, while the correct code based on ICD-10 vol 1 is the code for diagnosing type 2 diabetes mellitus, namely E11.9. According to the ICD-10 user manual, the fourth character, .9, is used to describe the same condition as the third category without additional information. Where this is relevant to the results of previous research that the coder must carry out the coding procedure in a coherent manner so that he can choose the correct code so as to produce a precise and accurate code. [9]

4. Code Inaccuracy Due To Incorrect Determination Of The Type Of Diabetes Mellitus

This case was found in 13 medical record documents where 1 medical record document was purely caused by an error in the three-character category and 12 other medical record documents were caused by an error in the three-character category and an error in the fourth digit. The results of the cases found will be explained in the following table;

Table 4. Code Inaccuracy Due To Incorrect Determination Of The Type Of Diabetes Mellitus

No.	Diagnosa	ICD-10 code		Total
		Hosp	Reseacher	
1.	Vomiting DM	E14.9	E11.9	1
2.	DM + CKD	E16.8	E11.2	1
3.	DM tipe 2 + gastropati	E11.7	E10.6	1
4.	DM tipe 2 + HT + vertigo perifer	E11.8	E10.7	1
5.	DM + Ulcus pedis	E11.9	E10.5	1
6.	DMT2 + Hematochesia + Anemia + Hypoglikemi	E10.9	E11.7	1
7.	DM	E10	E14.9	1
8.	DM + HT	E11	E10.6	1
9.	DM	E11	E14.9	2
10.	DM	E11	E10.9	1
11.	DM tipe 2 + CKD + Ulcus pedis + Anemia	E11	E10.7	1
12.	DM+Ulkus Pedis	E11	E10.5	1
Total				13

Based on the results of observations that have been made, errors in determining the type of diabetes mellitus are caused by the coder who is not careful in looking at supporting examinations and the type of drug given. For example, patients who receive routine insulin injections and those who are receiving insulin injections for the first time will have different types of diabetes mellitus and their diagnosis code. Whereas on the medical resume form the doctor only wrote the diagnosis of diabetes mellitus. This requires the coder to look through all of the patient's medical information carefully to assist in providing the correct code.

As mentioned by Diao et al., 2021 [10] in their research that a coder looks at and pays attention to the patient's clinical records listed in the medical record document in order to determine the right code. This is also in accordance with the results of previous studies which state that apart from looking at the existing diagnoses, you also have to look at the medical information listed on each medical record sheet to get the right code. [5]

5. Incorrect Code Due To Incorrect Determination Of The Fourth Digit.

The results of observations that have been made, this case was found in a number of 19 medical record documents. The following is the researcher presented in the table 5:

Table 5. Inaccurate Code Due To Incorrect Determination Of The Fourth Digit

No.	Diagnosa	ICD-10 code		Total
		Hosp.	Reasecher	
1.	DM hipoglikemia	E11.1	E11.6	1
2.	DM Selulitis pedis + HT	E11.9	E11.7	1
3.	Ulcus pedis + DM	E11.9	E11.5	2
4.	DM tipe 2 + Hiperglikemia + Efusi pleura + Anemia	E11.8	E11.7	1
5.	DM hiperglikemia	E11.0	E11.6	1
6.	DM + Anemia perdarahan	E11.9	E11.7	1
7.	DM + Ulcus pedis	E10.9	E10.5	1
8.	DM tipe 2	E11.8	E11.9	1
9.	DM tipe 2 + gastropati + HT	E11.8	E11.7	1
10.	G2P1 UK37MG DM I	O24.9	O24.0	1
11.	DM + Asma	E11.8	E11.6	1
12.	DM + Ulcus pedis	E11.8	E11.5	1
13.	DM	E11.8	E11.9	1
14.	DM + Cellulitis Pedis	E11.9	E11.5	1
15.	DM+Efusi Pleura	E11.9	E11.6	1
16.	Ulcus Pedis+DM Hyperglikemia	E11.8	E11.7	1
17.	DMT2 + HT+ gastropati + Hipoglikemi	E11.9	E11.7	1
18.	DM + HT	E11.8	E11.6	1
Total				19

Blame in determining the fourth digit were caused by the inconsistent writing of diagnoses, both primary diagnoses and secondary diagnoses, between the medical resume sheets and the entry and exit summary sheets. For example, the secondary diagnosis is written on the entry and exit summary sheet, but the secondary diagnosis is not listed on the medical resume sheet. This is supported by previous studies which state that inconsistencies in writing diagnoses can lead to differences in perceptions between treating doctors and coders, thereby affecting the accuracy of the code produced.[11]

Therefore, to support proper coding, it is necessary to have communication between medical record officers and doctors and other medical personnel regarding unclear data. This is as stated in previous research that if there is incomplete or unclear information, it needs to be communicated to the doctor in charge before setting the code.[5] The medical record officer does not just code, but must also communicate this to the doctor as a form of clarification and improve coding skills to prevent code inaccuracies.[12]

6. Incorrect Code Due To Inappropriate Category Blocks

Code inaccuracies caused by inaccuracies in selecting code blocks were found in 6 medical record documents that the researchers presented in table 6. Code inaccuracies due to

inaccurate category blocks can occur due to diseases that are too complex or conditions that refer to more than one diagnosis. So the coder must reselect the correct code as a primary code or secondary code which is adjusted based on existing medical information. This is relevant to previous research which states that the complexity of the disease mentioned can cause difficulties in verification and can cause the coder to set an incorrect code.[11]

A coder must have good understanding and knowledge of medical terminology as well as the use of ICD-10. This is in accordance with previous research that an understanding of medical terminology, coding, coding procedures, and provisions in ICD-10 is important in supporting the quality of coding and a competent coder must have knowledge of using ICD-10 and how to determine the code. right.[11]

Table 6. Inaccurate Code Due To Inappropriate Category Block

No.	Diagnosa	ICD-10 code		Total
		Hosp	Reseacher	
1.	DM + HT+ Pneumonia + CKD	J18.9	E11.7	1
2.	DM + CVA + Pneumonia	E78.1	E11.7	1
3.	Vomting + DM	R11	E11.9	1
4.	DM tipe 2 + HT	I15.9	E11.6	2
5.	DM Tipe2 + Ulcus Pedis	R10	E11.5	1
Total				6

7. Relationship Between The Completeness Of Medical Information And The Accuracy Of The Diabetes Mellitus Diagnosis Code For Inpatients At Tk.Iv Hospital Dkt Kediri

Analysis of the relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code for inpatients at TK.IV DKT Kediri Hospital, using the chi square correlation analysis with the SPSS 20 application and the results are shown in table 7.

Table 7. Cross Table Of Correlation Between Completeness Of Medical Information And Accuracy Of Diabetes Mellitus Diagnostic Codes

Complete medical information	Accurate Diagnostic Code		Total	Sig. level	**p**
	Not	Yes			
Complete	14	25	39	p < 0.05	0.023
Incomplete	3	26	29		
Total	17	51	68		

Based on the results of observations of 68 samples of medical record documents with cases of diabetes mellitus, the researchers found a total of 17 medical record documents with the correct diagnostic code, 51 medical record documents with an incorrect diagnostic code, 39 medical record documents with complete medical information, and 29 medical record documents with incomplete medical information.

The test results showed that the P value <0.023, this indicated that H0 was rejected and H1 was accepted, which means that there is a relationship between the completeness of medical information and the accuracy of the Diabetes Mellitus Diagnostic Code for Inpatients at X Kediri Hospital.

Based on the results of observations that have been made regarding the completeness of medical information with the accuracy of the diabetes mellitus diagnosis code in inpatients at Tk. Hospital. IV DKT Kediri with known results, namely a total of 14 medical record documents with complete medical information and the correct diagnostic code, a total of 3 medical record documents with incomplete medical information and the correct diagnostic code, a total of 25 medical record documents with complete medical information and incorrect diagnostic codes, and a total of 26 medical record documents with incomplete medical information and incorrect diagnostic codes. The results of the statistical test for the relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code using the Chi Square statistical test obtained a p-value of 0.023. Because the p value <0.05, it can be concluded that H0 is rejected and H1 is accepted, which means that there is a relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code for inpatients at Tk.IV Hospital DKT Kediri. This is in line with previous research that there is the relationship between the completeness of information supporting the diagnosis of birth asphyxia and the accuracy of the diagnosis code at Kasih Ibu Hospital in Surakarta with a significance value of p = 0.000, which means that the value of p <0.05 so that H0 is rejected.[13] This study is also in accordance with previous research that there is a relationship between the availability of medical information and the accuracy of the bronchitis diagnosis code on inpatient medical record documents at the Karanganyar Regency General Hospital with the result p (0.016) <0.05, which means H0 is rejected and H1 is accepted. [14].

IV. CONCLUSION

Based on the results and discussion of the study entitled "Relationship of Completeness of Medical Information with the Accuracy of Diagnostic Codes of Diabetes Mellitus Inpatients at Tk.IV Hospital DKT Kediri", it can be concluded that: 1. The completeness of medical information in the medical record documents of outpatients with diabetes mellitus inpatients at Tk.IV Hospital DKT Kediri totaled 39 DRM (57%). 2. The accuracy of the diabetes mellitus diagnosis code for inpatients at TK.IV Hospital DKT Kediri totaled 17 DRM (24%). 3. There is a relationship between the completeness of medical information and the accuracy of the diabetes mellitus diagnosis code for inpatients at Tk.IV DKT Kediri Hospital with a p value of 0.023.

The findings obtained from this research process provide a lot of input for the medical recorder and health information profession, especially the coding unit, so that they continue to improve the quality of their performance through: 1. Medical record officers, especially coders, need to attend

training on correct coding procedures. 2. There needs to be an evaluation so that coding is done based on SOP and in determining the code it is necessary to use the ICD-10 reference not based on existing habits. 3. It is necessary to periodically evaluate medical personnel who provide health services to complete the contents of medical record documents, bearing in mind the importance of the completeness of medical information for the coding process and for other parties. 4. Improving communication between medical record officers and doctors and other health workers, in order to create harmony of information and avoid miscommunication. 5. For future researchers, they can conduct research in the field of completeness of medical information using standard clinical pathways.

AKNOWLEDGEMENT

Thank you to the director, head of medical records and staff, staff of TKt 4 DKt Kediri Hospital for allowing and helping us complete this research. May all get blessings.

Biodata

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