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Determining Factors For The Accuracy Of Diagnosis Codes Using ICD-10 In Obstetric Cases: Riview Systematics

Syifa Sofia Wibowo[1]*

[1]Faculty of Health Science Universitas Dian Nuswantoro, Semarang, Indonesia

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Abstract

Medical record coder has complete duties, responsibilities, authority and rights to carry out medical record service activities in health service units. The accuracy of the disease diagnosis code is crucial, the accuracy of the diagnosis code will affect the claim for treatment costs, the allocation of health resources and the accuracy of hospital statistical data. This research systematically reviews articles uses the PRISMA diagram to help sort articles to use, also have criteria: research data is data from Indonesia, uses Indonesian or English, the article was published 2018-2023, the article can be downloaded in full and is not a thesis. This research searched articles through the Google Scholar database, Garuda Portal and Research Gate. As a result of the review of the 7 articles, it is known that inaccurate diagnosis codes in obstetric cases are caused by 7 different factors. The most influential factors are information in MRD (Medical Record Document) is written as unclear or incomplete. The second reason is MRD is not double-checked or inspected and the last is code errors in categories and sub-categories.

*Correspondence Address: Faculty of Health Science Universitas Dian Nuswantoro, Semarang City, Indonesia
E-mail: syfa.sofia.wibowo@dsn.dinus.ac.id

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Introduction

Medical records are documents that contain patient identity data, examinations, treatment, procedures and other services that have been provided to the patient. Minister of Health Regulation No. 24 of 2022 concerning Medical Records states that every health service is required to maintain an Electronic Medical Record (RME). One of the RME implementation activities consists of processing RME information (Article 13). The RME processing form involves coding, reporting and analyzing (Article 18). The results of inputting the disease classification code will be input into the financing application based on the results of the diagnosis and action written by the health care provider following the medical record to submit a service fee billing application (Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022 Tentang Rekam Medis, 2022).

Medical Recorders and Health Information (PMIK) are health workers who have completed formal Medical Record and Health Information (RMIK) education. Medical record coder has complete duties, responsibilities, authority and rights to carry out medical record service activities in health service units. Based on the Decree of the Minister of Health of the Republic of Indonesia Number 377/Menkes/SK/III/2007 concerning Medical record coder Professional Standards, it is written that the

competence of a PMIK includes determining diagnosis code numbers according to the ICD-10 book, clarifying and guaranteeing the validity of accurate diagnosis code data. Following the above, the accuracy of the disease diagnosis code is the responsibility and must be carried out accurately by a Medical record coder (Keputusan Menteri Kesehatan Republik Indonesia Nomor: 377/Menkes/SK/III/2007 Tentang Standar Profesi Perekam Medis Dan Informasi Kesehatan, 2007). The World Health Organization or WHO proposed ICD-10 as a language used by healthcare providers worldwide to classify diseases and conditions (Alifa Puspaningtyas et al., 2022).

The accuracy of the disease diagnosis code is crucial, as is the result of research by (Hastuti Suryandari, 2019) shows that the accuracy of the diagnosis code will affect the claim for treatment costs, the allocation of health resources and the accuracy of hospital statistical data. The Minister of Health's regulation also states that the results of the disease diagnosis code can influence the grouper's results in filling out the INA-CBGs application. The INA-CBGs application claims costs for care and services for patients participating in national health insurance in Indonesia (Peraturan Menteri Kesehatan Republik Indonesia Nomor 76 Tahun 2016 Tentang Pedoman INA-CBGs Dalam Pelaksanaan JKN, 2016). The principal diagnosis code is the most crucial diagnosis code of all diagnosis codes written in the patient's medical record document when the patient undergoes an examination. The main diagnosis code has a vital role in ICD codes, if there is an error in coding it can cause claim rejection or it can cause revenue losses for the hospital (Diao et al., 2021). Based on the background above, the author is interested in reviewing several research articles that aim to determine the determining factors that influence the accuracy of diagnosis codes using ICD-10 in obstetric cases.

Methods

This research systematically reviews articles with the same topic and keywords. The article criteria used are: research data is data from Indonesia, uses Indonesian or English, the article was published a maximum of 5 years ago (2018-2023), the article can be downloaded in full and is not a thesis. This research searched articles through the Google Scholar database, Garuda Portal and Research Gate. The keywords used are accuracy of diagnostic codes, obstetrics and ICD-10. This literature review uses the PRISMA diagram to help sort articles to use. The following are the results of this article's PRISMA diagram:

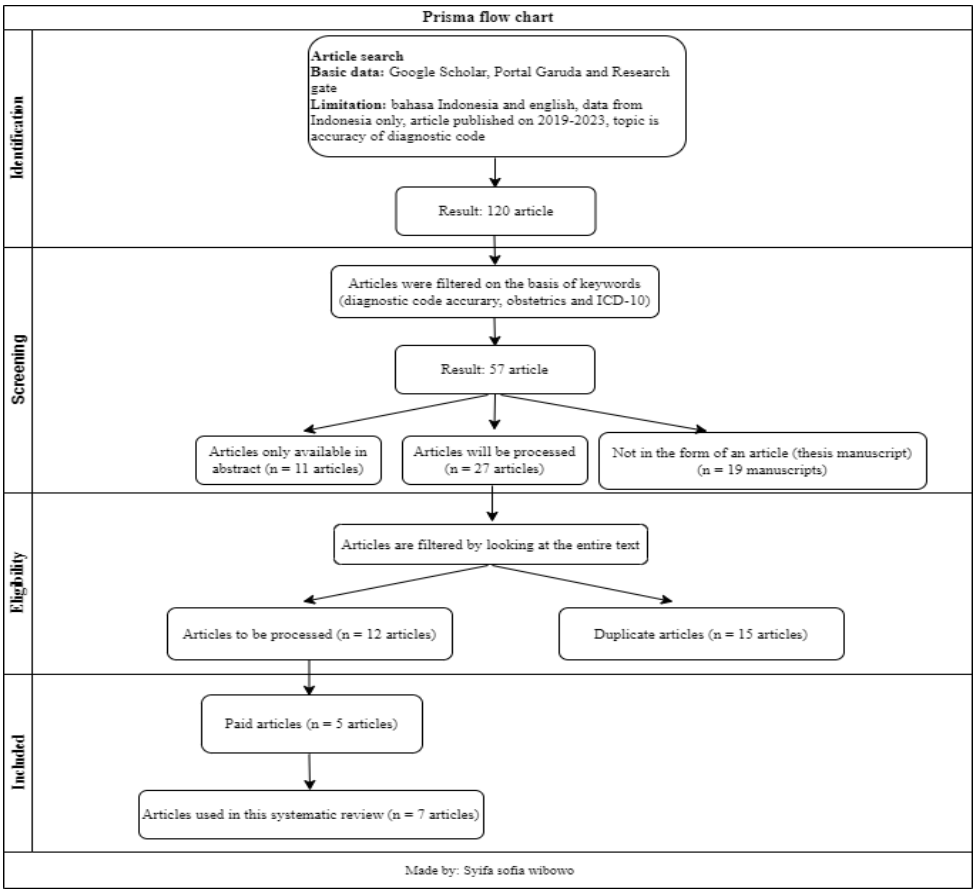

Figure 1. PRISMA diagram

Results

From the results of the article search with the help of PRISMA, seven articles were obtained that were suitable and suitable for the review process. The following are the results of the review of the article:

Table 1. Results of the review of the article

No	Author	Title	Publication year	Study design	Sample	Result
1	Citra Alifa Puspaningtyas, et.al (Alifa Puspaningtyas et al., 2022)	Analysis of the Relationship between the Accuracy of Writing a Diagnosis and the Accuracy of Diagnosis Codes in Obstetrics and Gynecology Cases at Tk Hospital. IV DKT Kediri	October 2022	Cross sectional	100 MRD	A sample of 100 medical record documents (100%) shows that the percentage of accuracy in writing a diagnosis is 56% (56 MRD), the percentage of accuracy in diagnosis codes is 43% (43 MRD), and there is a relationship between the accuracy of writing a diagnosis and the accuracy of the diagnosis code obstetrics and gynecology cases at Tk Hospital. IV DKT Kediri ($p < 0.025$).
2	I Wayan Gede Arimbawa, et.al (Arimbawa et al., 2022)	The Relationship between the Completeness of Writing a Diagnosis and the Accuracy of ICD-10 Codes for Obstetric Cases in the Third Quarter of Inpatients at Premagana General Hospital	March 2022	Cross sectional	90 MRD	As many as 45.6% of medical record files needed to be completed in writing the diagnosis and 49% of the files were complete in writing the diagnosis of obstetric cases in the third quarter of inpatients at Premagana General Hospital. As many as 78.9% of the ICD-10 code files for obstetric cases in the third quarter of inpatients at Premagana General Hospital were inaccurate and 21.1% of the ICD-10 code files were accurate. There is a relationship between the completeness of writing the diagnosis of obstetric cases in the third quarter of inpatients at Premagana General Hospital and the accuracy of the diagnosis code with a p-value <0.05 and OR value of 1.6 was obtained for medical records whose documentation was complete supporting coding accuracy 1.6 times greater than medical records whose documentation was not complete.
3	Ressa Oashttamadea SM	Analysis of the Accuracy of Obstetric	October 2019	Cross sectional	60 MRD	The coding accuracy level of Naili DBS Hospital obstetric diagnosis in the first quarter

No	Author	Title	Publication year	Study design	Sample	Result
	(Oashttamadea, 2019)	Diagnosis Coding at Naili DBS Hospital in Padang				of 2019 was 35 accurate (58%) and 25 inaccurate (42%). Based on 25 diagnosis codes that were not accurate, there were 12 codes (48%) that were inaccurate in subcategory determination, and 13 codes (52%) were inaccurate in determining categories and subcategories.
4	I Made Sudarma Adiputra, et.al (Adiputra et al., 2020)	Description of the Accuracy of Icd-10 Codes for Quarter 1 Obstetric Cases in Inpatients at Sanjiwani Hospital, Gianyar	October 2020	Cross sectional	87 MRD	The accuracy of ICD-10 codes for first quarter obstetric cases in inpatients at Sanjiwani General Hospital, Gianyar, of the 87 obstetric case medical records studied, it was found that 35 medical records had correct codes with a percentage of 40.23%, while 52 records had incorrect diagnosis codes medical with a percentage of 59.77%. The inaccuracy of ICD-10 codes for obstetric cases is mainly caused by the ICD-10 outcome of the delivery code not being entered into the medical record.
5	Angela Marsiana Siki, et.al (Siki et al., 2023)	Analysis of the Accuracy of Diagnosis Codes in Inpatient Childbirth Cases at Patria Ikkt Hospital in 2022	April 2023	Cross sectional	100 MRD	The percentage of correct diagnosis codes for delivery cases was 22.33%, while the incorrect diagnosis code was 77.67%. The reason for the inaccuracy of the ICD-10 code for childbirth cases is that filling in the diagnosis does not include the delivery method and outcome, and no coding evaluation or audit has ever been carried out.
6	Hery Setiyawan, et.al (Setiyawan et al., 2023)	Analysis of Completeness and Accuracy of Obstetric Medical Terminology Coding at the Jetis Bantul Community Health Center, Yogyakarta	2023	Cross sectional	78 MRD	The accuracy of the code for physiological (spontaneous) and pathological labor was less accurate (37%), the 4th character was not correct and the 4th character was not written. The accuracy of pathological labor conditions is less (32%), consisting of not correct in the fourth character, the fourth character was not written, not correct in the second character until 4th,

No	Author	Title	Publication year	Study design	Sample	Result
						and not correct in all the characters.
7	Adelia Anggraini, et.al (Anggraini et al., 2023)	Analysis of the Accuracy of Diagnosis Codes for Sectio Caesarea Delivery Cases at Jakarta Harbor Hospital	January 2023	Cross sectional	70 MRD	It is known that the condition or complication component has inaccuracies in 63 records out of 70 medical records with a percentage of 88.57%. In coding for quality data results, a coder must follow the applicable classification system by selecting the correct diagnosis code, processing medical records completely and correctly, and being consistent in coding.

Furthermore, to find bias in the articles used in this systematic review, researchers used an assessment with Axis Tools (Downes et al., 2017). The following is the assessment table:

Table 2. AXIS Tools assessment

No	**Question**	**Jurnal**						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	Introduction							
1	Were the aims/objectives of the study clear?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Methods							
2	Was the study design appropriate for the stated aim(s)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Was the sample size justified?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Was the target/reference population clearly defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	Were measures undertaken to address and categorise non-responders?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Were the risk factor and outcome variables measured appropriate to the aims of the study?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	Is it clear what was used to determined statistical significance and/or precision estimates?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Results							
12	Were the basic data adequately described?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	Does the response rate raise concerns about non-response bias?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

No	Question	Jurnal						
		1	2	3	4	5	6	7
14	If appropriate, was information about non-responders described?	No	No	No	No	No	No	No
15	Were the results internally consistent?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	Were the results for the analyses described in the methods, presented?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Discussion							
17	Were the authors' discussions and conclusions justified by the results?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	Were the limitations of the study discussed?	No	No	No	No	No	No	No
	Other							
19	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	No	No	No	No	No	No	No
20	Was ethical approval or consent of participants attained?	No	No	No	No	No	No	No

Discussion

The results from the AXIS tool show that all articles included in this systematic review are articles that have controlled bias and are appropriate. The results from the AXIS tool are adequate if the answer 'yes' is written with a minimum of 10 answers. From the seven journals above, it can be seen that each journal has 16 'yes' answer points (Downes et al., 2017).

The article by Citra Alifa Puspaningtyas, et.al conducted with a sample of 100 MRDs (Medical Record Documents) stated that 57% of MRDs had inaccurate diagnosis codes. Inaccuracies in diagnosis codes are caused by two things, because the diagnosis given was not coded and because of errors in code selection by the medical records officer on duty. In detail, it was written that the officer did not write down the code because the officer was negligent in re-checking the patient's MRD, so the MRD that was not coded wasn't returned to the authorized health worker. Errors in code selection are caused by 3 things, namely, unclear medical information written in the MRD; the officer did not check the MRD carefully, resulting in coding errors in the third category and sub-category or fourth character in the patient's MRD; officers do not use the ICD in the coding process, officers only use reference books or notes made by themselves which contain the most frequently occurring cases (Alifa Puspaningtyas et al., 2022).

The second article by I Wayan Gede Arimbawa, et.al which was conducted with a sample of 90 MRDs (Medical Record Documents) stated that 41 articles needed to be completed and 71 MRD s were inaccurate. This research states that there is a relationship between the completeness of writing a diagnosis and the accuracy of obstetric case codes using ICD-9 and ICD-10 with a significance value of p = 0.00. The research results show that incomplete diagnosis writing by health workers will affect the accuracy of clinical coding by coders. This is because the diagnosis in the patient's MRD is the basis for the coder in determining the diagnosis code using ICD-9 and ICD-10 (Arimbawa et al., 2022). Another study by Ressa Oashttamadea SM in 2019 at a hospital in Padang used 60 MRD. Found 35 MRD s with accurate codes and 25 with inaccurate codes. Of the 25 inaccurate MRD s, 12 MRD s were inaccurate in sub-categories (example correct code O21.0 and incorrect code O20.0) and 13 MRD s were inaccurate in both categories and sub-categories (example correct code O98.4 and incorrect code wrong O98.9). The results of the study stated that the inaccuracy of the diagnosis code was caused by the coder not understanding medical terminology and not rechecking it after the code was assigned (Oashttamadea, 2019).

The article discussed next is by I Made Sudarma Adiputra with a sample of 87 MRD. Of the 87 MRDs, 52 MRDs were found with ICD-10 codes in inappropriate obstetric cases. The research results stated that the officer in charge of determining codes for inpatients where the research was conducted had the qualifications of a general practitioner and had taken coding training organized by the hospital, however the inpatient station did not have a single medical records officer. Another factor that causes inaccurate diagnosis codes is because the MRD is incomplete, so officers lack information to assign diagnosis codes (Adiputra et al., 2020). The fifth article discussed in this review is by Angela Marsiana Siki in 2023. This article uses 100 MRD s as a sample and 77.67% of MRD s with incorrect code. The research results show that inaccurate diagnosis codes are caused by incomplete MRD writing and incomplete SOPs (Standard Operating Procedures (Siki et al., 2023).

The next article by Hery Setiawan in 2023 uses 78 MRD. It is known that 37% of MRD s have incorrect codes in cases of pathological labor. There is an incorrect code because it was not done because the officer did not check the MRD carefully, resulting in coding errors in the second, third and sub-categories or fourth characters in the patient's MRD (Setiyawan et al., 2023). The last article by Adelia Anggraini was published in 2023 at a hospital in Jakarta using 70 MRD. There were 63 MRD s that were incorrectly coded by delivery method. It is known that coding accuracy is influenced by the coder's accuracy when coding, unclear writing in the MRD and the unavailability of complete SOPs. (Anggraini et al., 2023).

From the discussion of the seven articles above, it is known that the most frequently mentioned factor causing inaccurate diagnosis codes for obstetric cases is that the information in the MRD is written unclearly or even incomplete in 5 articles, the following is a summary:

Table 3. Summary of riview articles

Description	Article							Total
	1	2	3	4	5	6	7	
MRD is not double-checked or be inspected	v		v			v	v	4
The information in MRD is written as unclear or incomplete	v	v		v	v		v	5
Code errors in categories and sub-categories	v		v			v		3
Not using ICD while coded	v							1
Officers did not understand medical terminology			v					1
Officers are not medical record graduates				v				1
SOPs are incomplete					v		v	2

The limitation of this research is that the discussion of BPJS claim factors is not only about the accuracy of diagnosis codes but also many other factors such as work motivation and the availability of standard operational procedures in health facilities. The author suggests that the next systematic review research can discuss other factors related to the BPJS claims process.

Conclusion

As a result of the review of the 7 articles above, it is known that inaccurate diagnosis codes in obstetric cases are caused by 7 different factors. The most influential factors are information in MRD is written as unclear or incomplete. The second reason is MRD is not double-checked or inspected and the last is code errors in categories and sub-categories. The accuracy of the disease diagnosis code is crucial, the accuracy of the diagnosis code will affect the claim for treatment costs, the allocation of health resources and the accuracy of hospital statistical data.

Author Contributions

S.S.W.; methodology, validation, resources, writing—original draft preparation, writing—review and editing, project administration and funding acquisition, A.A.; supervision, N.K.; visualization, S.S.W. and A.A.; data curation, A.A. and N.K.; formal analysis.

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Institutional Review Board Statement

Not applicable because the studies not involving humans or animals.

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Conflicts of Interest

The authors declare no conflict of interest.

Appendix

Figure A1. PRISMA diagram
Table A1. Results of the review of the article
Table A2. AXIS Tools assessment
Table A3. Summary of riview articles

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