



## Research article

### A review of clinical coding accuracy at University College Hospital, Ibadan, Nigeria

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#### ABSTRACT

**Background:** Clinical coding is an important aspect of health information management and the process must be accurate as mistakes in coding can lead to multiplication of errors in patient care and clinical research. Coding accuracy measures the level of agreement between the disease classification systems code(s) and the selected code(s) recorded in the discharged record by the Coder. The integrity of data from clinical coding depends fundamentally on the quality of clinical documentation, availability of discharge summary in the patient record and Coders ability. The study examine accuracy in terms of levels of agreement and including completeness of codes and factors that may contribute to error in coding. **Methods:** A sample of 2000 discharged patients' health records that had been previously coded was randomly selected and re-coded by an experienced Clinical coder. Data extraction format was used to extract information on coding accuracy and factors that could lead to errors in coding. Data analyses were done using SPSS Version 25 with focus on descriptive statistics. **Results:** Coders in the clinical coding unit of the hospital are Health Information Management Professionals, with no formal training in coding but, on-the-job training. Discharge summary is not completed in most discharged patients' health records therefore, coders read through records to select diagnoses for coding. **Conclusion:** Absence of discharge summary could be counterproductive to clinical coding process in the hospital, resulting to time wasting, incomplete coding and coding error. Clinicians are therefore advised to write discharged summary in order to reduce coding error. Clinical Coding should be seen as an area of specialization in HIM hence, coders should be specially trained and encouraged to attend continuing professional development programme related to clinical coding. The Department of Health Records should retain experienced clinical coders and the clinical coding unit should be well-staffed to reduce work-load that could increase error in coding.

**Keywords:** Clinical coding; Clinicians; Coding accuracy; Diagnoses; Health Information Management Professionals; and Tertiary hospital

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#### INTRODUCTION

There had been a global recognition of good quality facility coded clinical data and the fundamental role it plays in the management of hospitals, care services and clinical researches. Clinical coding transforms healthcare diagnosis, procedures, medical services, and equipment into

universal medical alphanumeric codes that form a hospital database<sup>1,2</sup>. Naran *et al*, described clinical coding as the process by which details on patients' medical conditions, events, procedures, morbidity and complications during treatment are extracted and translated from clinical terminology to an internationally recognized codified language<sup>3</sup>. In

Nigeria, clinical coding is the major source of hospital-based morbidity and mortality data and it serves as an important tool for the assessment of hospital performance and community health status. It is being undertaken in most of the tertiary healthcare facilities in the country<sup>4</sup>. In addition to the use in clinical research, clinical coding also serves in developing healthcare policies, medical billing and funding strategies. Clinical coding enables hospital episodes to be grouped into meaningful categories, helping healthcare managers to better match patient needs to healthcare resources.

In Nigerian tertiary hospitals, clinical coding are done manually this is as a result of various failed attempt to introduce the electronic health records<sup>4</sup>. The International Classification of Diseases (ICD) and Office of the Population, Censuses and Surveys (OPCS) classification of interventions and procedures are used for coding diagnosis and procedures from hospital episodes<sup>5,6</sup>. Accuracy in clinical coding continues to be of great concern both as a result of the application of ICD codes for purposes other than those for which the classifications were originally designed as well as because of the widespread use for making far-reaching decisions on funding, clinical, and research<sup>7</sup>. Accuracy in clinical coding is a measure of the concordance or agreement between the classification systems code(s) and the selected code(s) recorded in the discharged record. McKenzie *et al.* described clinical coding accuracy as the concordance/agreement between the original ICD codes and the re-coded data by the coder<sup>8</sup>.

A study by O'Malley *et al.* showed that many sources of clinical coding errors are interposed between a patient's disease (as it is in truth) and the word label (the diagnosis) applied to it by a clinician and between the diagnosis and the nosologic code applied to it by a coder<sup>7</sup>. Though O'Malley *et al.*'s work provides a valuable overview of inpatient coding process and the potential sources of errors, it was specific to the American setting and the findings were not informed by perspectives coders<sup>9</sup>. One study

conducted in the Canadian context by Ennessy *et al.* re-abstracted charts from Calgary-based coders and linked the findings to coders' employment status, hospital level and volume of coding, among other factors<sup>10</sup>.

The authors found no consistent patterns between coder characteristics and face validity indicators (e.g., number of diagnoses coded)<sup>10</sup>. Other studies have suggested an association between the accuracy in coding and coders' characteristics such as knowledge, experience, education and training. This suggests the need for continued training and retraining of Health Information Management (HIM) Professionals in clinical coding<sup>11</sup>. All the diagnoses affecting the care of the patient during an episode of care are assigned codes, each diagnosis must be assigned its correct code(s) and be as complete as possible and must be sequenced correctly with the main diagnosis listed first.

Coding accuracy defined the extent to which the ICD nosologic code reflects the underlying patient's disease. The level of accuracy of the codes will directly impact the quality of decisions that are based on these codes, making code accuracy of great importance to morbidity and mortality data users. Groom, had indicated serious concern on the quality of clinical coded data and was of the opinion that the focus of clinical coders should be on all conditions that meet criteria for code assignment in order to describe the patient stay fully and truthfully<sup>12</sup>. It is the desire of medical practice to provide quality patient care, however, inaccurate medical coding can interrupt that goal, leading to frustration and confusion and a potential breakdown of the relationship built with valued patients. Even though the consequences of incorrect coding rarely fall onto a patient, it does happen and it is the most important consequence to try to prevent.

In recent years, data quality has become an important issue in most developing countries including Nigeria, not only because of its importance in promoting high standards of healthcare services, but also because of its impact

on government budgets for the maintenance of health services<sup>13</sup>. There remains the need to identify and understand the issues that leads to errors in clinical coding data from inpatient coding process in teaching hospitals in Nigeria. This study therefore determined the level of accuracy in clinical coding; identify the nature and source of errors in coding and factors associated with coding accuracy of patient's episodes in UCH, Ibadan, Nigeria.

## METHODS

Two thousand (2000) already coded discharged patients' health records were randomly selected and of which 1882 records were reviewed and re-coded by an independent senior coder in a blind audit. A checklist was used to audit the coded files. Comparisons were made between the original codes and the auditor-assigned codes. The following variables were collected: availability of discharge summary sheet, availability of diagnosis/procedure, source of diagnosis within the records, was diagnosis/procedure correctly coded and correctly recorded, accuracy of code(s), nature and source of error and ICD chapter effected. Key Informants Interview (KII) was conducted on coders to find out coders' highest qualification, years of service and years of coding experience. Data was analyzed using SPSS Version 25 to compute descriptive statistics and hypothesis were tested at p-value of  $\alpha 0.05$

## RESULTS

Findings show that at the time of the study, the number of coding staff in the Clinical Coding Unit were seven with highest educational qualification obtained as National Diploma (HIM) 1, Higher National Diploma (HIM) 4 and Master (HIM) 1. None of the staff had formal special training in clinical coding aside the clinical coding course while in Schools of Health Information Management. Four of the Coders in the unit have less than 4 years of work experience in the department, while only 2 had worked for between over ten years. Four of the Coders had less than 4 years coding experience, 1 had worked in the unit for 7 years while 2 had been in coding unit for over 13 years.

Table 1 reveals that 98.7% of the records studied did not have discharged summary inserted as a clinical note, indicating that physicians in the hospital do not write discharge summaries, upon the discharge of the patients. Findings also shows that coders need to read and explore patients' health records to abstract diagnoses before allocating code numbers to such diagnosis. Where the discharge summary is however available in the discharged patients' health records, diagnoses were clearly stated on the discharged summary. Findings indicated that overall, 82.5% of the diagnoses were correctly coded. More than half of the discharged patients' health records (51.3%) contain more than one diagnoses for an episode of admission, 53.0% of these were incompletely coded while 9.7% of those records coded were allocated wrong code numbers.

The study also reveal that 18.3% of the diagnoses in the records were allocated wrong code numbers but within the right chapter. It was found that 28.5% of the diagnoses allocated wrong codes numbers occurred in Chapter XXI, Factors Influencing Health Status and Contact with Health Services and 17.2% were in Chapter XV, Pregnancy, Childbirth and the Puerperium. Other chapters of the ICD-10 codes were wrongly allocated in Chapters II, IV and IX with 9.6%, 8.7% and 8.1% respectively. It is to be noted however that 8.3% of the codes wrongly coded were coded to a wrong Chapter of the ICD, with Chapter XXI, Factors Influencing Health Status and Contact with Health Services, having the highest (38.5). Most errors in coding was attributed to Coders (84.9%).

## DISCUSSION

Coders in the Clinical Coding Unit, Health Records Management Department, UCH, Ibadan are all him professionals and they were however trained to code on the job. The Coders had worked in other units of the HIM Department before they were deployed to the coding unit. A Coder may stay for a considerable length of time and be redeployed to another unit within the Department.

this means that no Coder is permanent in the unit. This does not encourage specialization

The study revealed that the majority of discharged patient health records do not have discharge summary, suggesting poor clinical documentation habits, which is considered a strong factor for coding error and against good health records practice. Absence of discharge summaries in discharged patient records places an additional burden on Clinical Coders, to search through discharged patients' records in order to locate patient's diagnoses. This could have resulted in errors in the choice of diagnosis and also time wasting during coding, leading to Coders' frustration. This supports O'Malley *et al.* findings that the sources of error in coding are two, the clinician and the coder<sup>7</sup>. The finding is also in tandem with a study, where gross under-utilization of discharge summary was reported<sup>14</sup>. There is also a high probability of Coders failing to locate all relevant and related diagnoses to a particular admission.

The few patient health records with discharged summaries have their diagnoses correctly coded, however, some of the allocated codes in the records were incorrect. Diagnoses incorrectly coded were found to be classifiable to Chapters II, IV, XV, and XXI, with Chapter XXI having the highest number of incorrect code number allocation. Few of the records had their diagnoses wrongly coded to another chapter. This was common with diagnoses classified to Chapter XXI, Factors Influencing Health Status and Contact with Health Services. This may be as a result of a lack of coding experience since Coders are rotated in and out of the unit.

Most records were found to contain more than one diagnosis and under such situations it is expected that all diagnoses are coded. The discharged patients' health records with two or more codes were however, often completely coded. Evidence shows that second diagnoses are mostly left uncoded. This could have resulted from the absence of discharge summaries and Clinical

Coders having to search through the records for diagnoses before allocating code numbers. Based on the findings, it is recommended that doctors should be educated on the importance of clinical coding and be impressed that writing of discharge summary is part of a clinician's responsibility.

## CONCLUSION

Absence of discharge summary could be counterproductive to clinical coding process in the hospital, resulting to time wasting, incomplete coding and coding error. Clinicians are therefore advised to write discharged summary in order to reduce coding error. Clinical Coding should be seen as an area of specialization in HIM hence, coders should be specially trained and encouraged to attend continuing professional development programme related to clinical coding. The Department of Health Records should retain experienced clinical coders and the clinical coding unit should be well-staffed to reduce work-load that could increase error in coding.

## Recommendations

1. There is need to educate physicians on the importance of clinical coding.
2. Physicians need to understand that writing of discharge summary is a part of a clinician's responsibility.
3. Clinical coding should be recognized as a specialized area of HIM practice and as a result, coders should be trained and re-trained on clinical coding to update their knowledge.
4. The Department should retain experienced coders and avoid rotating them out after acquiring experience.
5. Though coders are expected to review patients' health records in order to ascertain and confirm variation in diagnosis that may lead to modification of code numbers, they should not take the sole responsibility of determining the patient's diagnosis for an episode of admission

## REFERENCES

1. Khan MA. Medical Coding: An Introduction, 2017. Retrieved on 22.11.2021 and available at: <https://www.linkedin.com/pulse/medical-coding-introduction-dr-mahmood-a-khan/>
2. American Academy of Professional Coders (AAPC), 2019. What is Medical Coding? <https://www.aapc.com/medical-coding/medical-coding.aspx>.
3. Naran S, Hudovsky A, Antscherl J, Howell S, Nouraei SAR. Audit of accuracy of clinical coding in oral surgery. *British Journal of Oral and Maxillofacial Surgery*. 2014;52:735–739. [www.sciencedirect.com](http://www.sciencedirect.com).
4. Adeleke IT, Ajayi OO, Jimoh AB, Adebisi AA, Omokanye SA, Jegede MK. Current clinical coding practices and implementation of ICD-10 in Africa: a survey of Nigerian hospitals. 2015;3(1-1):38-46. doi: 10.11648/j.ajhr.s.2015030101.16.
5. World Health Organization. International Statistical Classification of Diseases and Related Health Problems (ICD-10). 10 ed. Geneva:World Health Organization; 1994.
6. NHS Connecting for Health. OPCS classification of interventions and procedures Version 4.6. Norwich: The Stationery Office, 2011.
7. O'Malley KJ, Cook KF, Price MD, Raiford WK, Hurdle JF, Ashton CM. Measuring diagnoses: ICD code accuracy, health research and educational trust validity of ICD-10 hospital discharge data? *BMC Health Services Research*. 2005.
8. McKenzie K, Enraght-Moony EL, Walker SM, McClure RJ, Harrison JE. Accuracy of external cause-of-injury coding in hospital records. 2014.
9. Lucyk K, Tang K, Lucyk HQ, Tang Q. Barriers to data quality resulting from the process of coding health information to administrative data: a qualitative study. *BMC Health Services Research*. 2017;17:766. doi 10.1186/s12913-017-2697-y.
10. Hennessy D, Quan H, Faris P, Beck C. Docoder characteristics influence validity of ICD-10 hospital discharge data? 2010; <http://www.biomedcentral.com/1472-6963/10/99>.
11. Olagundoye O, Boven K, Daramola O, Njoku K, Omosun A. Improving the accuracy of ICD-10 coding of morbidity/mortality data through the introduction of an electronic diagnostic terminology tool at the general hospitals in Lagos, Nigeria. *BMJ Open Quality*. 2021;10:e000938. doi:10.1136/bmj-oq-2020-000938.
12. Andrea Groom. Describing the 'clinical truth' in clinical coding. *HIM-Interchange*. 2018;8(1).
13. World Health Organization. Improving Data Quality: A Guide for Developing Countries. ISBN 92 9061 050 6 (NLM Classification: WA 950, 2003. .
14. Adeleke IT, Adekanye AO, Onawola KA, *et al*. Data quality assessment in healthcare: a 365-day chart review of inpatients' health records at a Nigerian tertiary hospital. 2012;19:1039-1042. doi: 10.1136/amiajnl-2012-000823.

### **Authors Contribution:**

OBM conceived of the study, initiated the design, participated in literature search, data abstraction and collection, analysis and coordination. OET participated in the design, literature search, technical process, data analysis and coordination and reviewed the final manuscript.

**Table 1: Availability of discharge summary and coding accuracy**

SN	ITEM	Yes	%
1	Is discharge summary available in record?	24	1.3
2	If discharge summary is available was diagnosis clearly stated?	24	1.3
3	In the absence of discharge summary, Coders had to search for diagnosis in the record	1856	98.6
4	On locating diagnoses are they coded?	1882	100
5	Were diagnoses correctly coded?	1552	82.5
6	Were there records with more than one diagnosis?	966	51.3
7	Where there are more than one diagnosis, were all the diagnosis allocated code numbers?	884	47
8	Where there are more than one diagnosis, were all correctly coded?	706	37.5
9	Do coders allocate wrong code number(s) within the ICD chapter?	344	18.3
10	Do coders allocate wrong code number(s) between ICD chapters?	156	8.3
11	Incomplete code(s) were allocated during coding	48	2.6
12	Are there transposition of codes?	0	0
13	Code transposed at what digit?	0	0