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Effects of Training on Quality of Clinical Coding at Mbagathi County Referral Hospital, Nairobi City County, Kenya

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Abstract

Introduction: Professionals from various cadres in the health sector raise concerns regarding the poor quality of clinical coding leading to lack of evidence-based practice. Assessing the quality of the clinical coding in one of Nairobi City County's major hospital would be a step towards establishing the exact gaps in quality of the coding process and outcome. Training the professionals would also foster better clinical coding practice in one of the major facilities nationally.

Method: The study aimed at establishing the quality of clinical coding within Mbagathi County Referral Hospital, and thereafter determined the effect of training on the established clinical coding quality. An interventional trial study design was used, with a quality of clinical coding checklist used classify codes assignment or lack of which. The sample included 320 patient files selected randomly from a month-long list of patients.

Results: The study found out that the overall baseline code quality was slightly above average given that majority (55%) of the code assignment were good as established by a composite score of the various coding quality attributes assessed. Given the need for training based on the low quality, a training intervention was then conducted based on the needs identified. An indexing database was also installed for the coders to use in encoding the codes assigned. Code quality improved to 77% after the training. Code completion was excellent at the facility, as established from the 97% of the files that were completely coded at baseline and later improved to 99%. Notably, also, is that the hospital improved its coding of procedures and death certification by 32 and 53% respectively. The hospital also started using the indexing tool that was introduced as an intervention.

Conclusions: The health facility could act as a good benchmark for code completion. However, code completion without accuracy in the code assignment invalidates the overall quality of coding. Code accuracy improved with the training almost immediately after the interventions. More practice would for sure lead to better clinical coding accuracy.

Keyword: Quality, Clinical Coding, Code completeness, Code accuracy

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Introduction

The International Classification of Diseases (ICD) and ICP are the standard clinical coding tools used in diagnostics for epidemiology, clinical purposes and health management (WHO, 2015). It includes an analysis of specific population groups and their general health status. The tool is used to monitor the incidence or prevalence of specified diseases and other health related problems thus providing an overall picture of the health status of countries and populations. Clinical coding is used widely in the health sector by nurses, physicians, other healthcare providers, health information officers and managers, researchers, health information technology workers, insurers, policy-makers and patient organizations to do a classification of diseases and other health related problems recorded in the different forms of health and vital records like health records and death certificates. The records enable the storage and easy retrieval of information on diagnostics for purposes of clinical, epidemiological and quality as well as the compilation of national statistics on mortality and morbidity by the WHO Member States. Finally, clinical coding also facilitates decision making on reimbursement and resource allocation by countries (ICD, WHO, 2010).

Consistency in Clinical classification of diseases and medical procedures has been a huge challenge in the health sector, both locally and internationally. This is despite the globally approved use of ICD-10 and ICPM. In the global perspective, these coding tools serve well for comparability across nations. The current internationally available training modules endorsed by WHO are custom-made for the developed world, although the application of those modules is limited. South Africa has also made good use of the curriculum due to the capacity within the country's hospitals; the implication therefore is that the existing curriculum is best suited to well-established health systems. Locally, in Kenya, despite the setting up of the Disease Surveillance and Response Unit (DSRU), internal inconsistency of disease and medical procedure classification still remains a challenge thereby hindering the unit's early detection of outbreaks (Mwangi, 2012). The quality of clinical coding in Kenya is 33% - below the WHO standards (Gachoka & Gichuhi, 2015).

Accuracy of the codes, the completeness of codes as well as the timeliness of code assignment are key components that have compromised the quality of clinical coding. As such inadequacy of resources cannot be blamed for the below-par quality of clinical coding in most health institutions. Universality in disease classification, coupled with periodic training on clinical coding relevant to the local context holds promise for both disease surveillance as well as improvement of healthcare quality.

Professionals from various cadres in the health sector raise concerns regarding the poor quality of clinical coding leading to lack of evidence-based practice. In Kenya, training more professionals in the medical field on disease and procedural coding is fundamental in eliminating the inconsistency. Resultantly, there would be accurate research, improved adherence to the set standards, improved reliability of data on cause of death and higher capacity to conduct ICD certification and coding (GOK, MOH, 2015). Tailor-made procedures for disease classification for particular contexts often translate to better consistency of responses and diagnoses as attested by medical practitioners (MSF, 2015). Training on disease and procedural coding is useful for uniformity and continuity in statistics of morbidity and mortality for evidence-based decision making and international and national comparability (GOK, MOH, 2015). The system of classification diseases employed in the ICD system is a complicated model and demands a lot and continuous training to

adequately understand. Over time, in countries like Kenya, health information systems, health data and disease classification professionals have been involved in the clinical coding process, yet the variation in results still exists. Several studies conducted within the field of classification of disease, the effectiveness of the ICD and the challenges that face the implantation of the ICD codes reveal particular gaps in training. There is also the potential in the study providing a fine base for establishment of the exact disease burden in the nation as well as ways of improving health reporting. The study will also provide information that would enable NHIF which is now the main health insurance provider to be more objective in the reimbursement of funds.

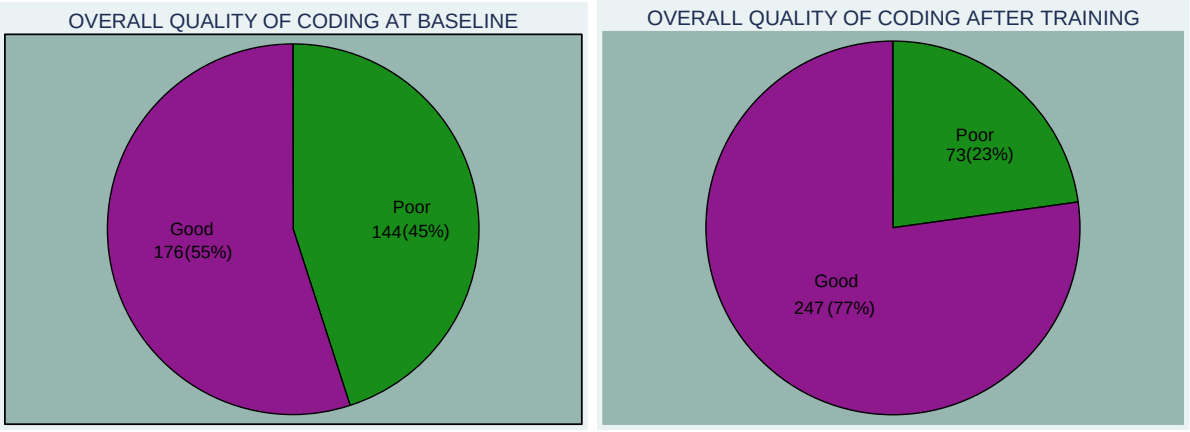
Methods

The study was conducted as a form of an Interventional trial that will use a before-and-after study design with mixed-method (quantitative/qualitative) approaches. A clinical audit was conducted to establish the baseline quality of clinical coding. Training was conducted based on the identified needs from the first clinical audit. Afterwards, a follow-up clinical audit was conducted to establish the effect of that training – first on the overall quality of clinical coding, and then on individual coding components. A sample of 320 files was randomly selected and coding quality checked, based on a pre-designed checklist. A unique serial number was assigned to each checklist providing reference to each of the audited files. The attributes of clinical coding quality that were assessed were diagnosis reporting, code assignment for diseases, external causes of injuries, medical procedure coding, causes of death, interpretation of medical abbreviations and indexing. The quality of clinical coding was assessed for each of these attributes. Based on the ratings for each attribute, a composite score was arrived at which was then used as an indication of the overall quality of clinical coding. The analysis was structured in such a way as to categorize the files based on single diseases (dubbed simple files) or comorbidities (dubbed complex files), and also comparisons made for various subsections. The audited files were from four subsections: Medicine [1], Paediatric [2], Surgery [3] and Obs/Gyn [4].

Results

Accuracy

A composite score was derived from the scores obtained in the various attributes of clinical coding quality. After-which, a mean score was obtained from the nonmissing codes for each case. The overall code accuracy was Fair given that slightly more than half (55%) of the code assignment were well coded. After training, however, the overall quality of clinical coding improved by 18%.



Completeness

The completeness of the codes for disease classification was exemplary with 97% of the audited files found to be having at least a code assigned for the disease-related codes. All the incomplete cases lacked at least one attribute two attributes in the audit tool, given that single diseases and comorbidities were treated as different entities. After the training, the completeness improved to 99%, with the 1% comprising of unreported cases – that is beyond the effect of the clinical coders. Although marginal, the improvement based on the Pearson chi-square and a Fisher's exact p-value of <.05, reveals a statistically significant difference after training.

Disease Code Completeness	Frequency (%)			Chi-square (p-value)
	Complete	Incomplete	Total	
Before Training	310 (96.8%)	10 (3.2%)	320 (100.0%)	2.827 (0.0445)
After Training	317 (98.8%)	3 (1.2%)	320 (100.0%)	

Simple Files

The baseline quality of clinical coding for simple files was above average, given that 75% (181) of the files were coded appropriately for the single diseases. The quality of disease coding for simple files good for 83% (222) files during the follow-up audit.

	Coding Quality		
Single diseases	Wrongly Coded	Well Coded	Total
Before Training	60 (25.0%)	181 (75.0%)	241 (100.0%)
After Training	19 (8.9%)	222 (92.1%)	241 (100.0%)

Comorbidities (Complex Files)

A total of 79 files had comorbidities. Less than half of the complex files (47%) were well coded. The definition for appropriate codes for comorbidities was determined by the correct code assignment that covered all conditions that a patient had. After training – which involved the explanation of the importance of using a single code for multiple conditions – the proportion of well coded complex files rose to 71%, representing one of the best improvements after training.

Comorbidities coding quality	Wrongly coded		Well coded		Total	
	n	%	n	%		
Before Training	42	(53.2%)	37	(46.8%)	79	100.0%
After Training	23	(29.1%)	56	(70.9%)	79	100.0%

External Causes of Injuries and Disease

Code assignment for external causes of injuries and disease was required for only 74 files – all of which came from Surgery, Paediatrics and Obs/Gyn specialities. Of all those files, the codes were either missing or wrongly assigned for 24 cases bearing. The effect of training was that 87% of the 74 cases were coded appropriately.

External Causes of injuries coding	Not/Wrongly coded		Well coded		Total	
	n	%	n	%		
Before Training	24	(32.4%)	50	(67.6%)	74	100.0%
After Training	10	(13.5%)	64	(86.5%)	74	100.0%

Procedures

43 files were assessed for surgical procedures quality of coding both in baseline and follow-up audit. In the baseline assessment, only 17 (40%) were well coded. The rest of the files were not coded at all. There is then the impression that had the codes been assigned, probably, the accuracy would have been great. After training, the quality of clinical coding improved by close to twice the baseline quality (72%), an indication that while at baseline, the quality of clinical coding was marred by code incompleteness, the result after training was wholly based on poor code accuracy.

Comorbidities coding quality	Not/Wrongly coded		Well coded		Total	
	n	%	n	%		
Before Training	26	(60.5%)	17	(39.5%)	43	100.0%
After Training	14	(27.9%)	31	(72.1%)	43	100.0%

Causes of Death and certification

This was the most poorly coded section with less than 10% of the 30 deceased cases appropriately coded and certification done accordingly.

Conclusion

The baseline quality of clinical coding of single diseases at Mbagathi County Referral Hospital was found to be slightly above average, although with great room for improvement. The interpretation of medical abbreviations was also good by the clinical coders given that 80% abbreviations were well interpreted with the most misinterpreted abbreviations including rare occurrences. The biggest challenge at baseline involved medical procedure coding as well as death certification. At baseline, the following conclusions were drawn, some of which were used to design the training tool:

- First, the hospital's clinical coders are more comfortable coding the single disease cases, and in so doing, they work rather efficiently, as seen in the cumulative 85% accurately coded and the less than 5% code-incomplete files.
- Secondly, relating to the overall quality of clinical coding of complex files, the meagre 36% of files that were well coded shows just how difficult the clinical coders at the facility found to code comorbidities.
- Thirdly, coding quality of external causes of injuries was the poorest attribute. This was observed by the either lack of codes or the wrong code assignment for all the cases that were assessed on this criterion.
- Finally, there was good quality of medical procedure coding, as given the accuracy of the files that were coded. However, the glaring lack of code among approximately 90% of files that required assignment of at least a procedure code is alarming.

Upon training, a follow-up audit was conducted one month after the training. The results showed massive improvements, with 32% and 53% increases in the proportions of well coded medical procedure and death certification respectively. All round improvements were also observed in code completeness, single disease coding, multiple diseases coding, and external causes of injuries coding with the rates improving by 2%, 17%, 24% and 19% respectively. The clinical coders also started indexing the clinical codes following the training. It is expected that after a few months, the quality of clinical coding will be even better given that the clinical coders will have practiced the knowledge they gathered during the training and made it more of a routine as suggested by Stausberg *et al. (2008).*

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