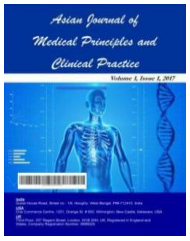

*Asian Journal of Medical Principles and Clinical Practice*

*1(2): 74- 82, 2018; Article no.AJMPCP.45217*

# Assessment of Clinical Coding Practices and Its Impact on the Quality of Health Care Services in Government Hospitals in Calabar Urban, Cross River State, Nigeria

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***Authors' contributions***

*This work was carried out in collaboration between all authors mentioned above. Author JAA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author IAB managed the analyses of the study. Author IIO managed the literature searches. All authors read and approved the final manuscript.*

***Article Information***

DOI: 10.9734/AJMPCP/2018/45217
Editor(s):
(1) Dr. Erich Cosmi, Associate Professor of Obstetrics and Gynecology, Department of Woman and Child Health, University of Padua, Italy.
Reviewers:
(1) Iroju Olaronke, Adeyemi College of Education, Nigeria.
(2) Arthur N. Chuemere, University of Port Harcourt, Nigeria.
(3) Tolga Dinç, Ankara Numune Training Hospital, Turkey.
Complete Peer review History: http://www.sciencedomain.org/review-history/27714

***Original Research Article***

***Received 16th September 2018***
***Accepted 23rd November 2018***
***Published 8th December 2018***

## ABSTRACT

The aim of this study is to assess ''clinical coding practices and its impact on the quality of healthcare services in Government Hospitals in Calabar urban, Cross River State, Nigeria. To achieve the purpose, the basic structures and the research objectives were identified. Three research questions and three hypotheses were formulated for the study. A well designed questionnaire was prepared and one hundred copies printed and distributed to respondents in the sampled hospitals for completion. The completed copies of the questionnaire were collected back for analysis. The data were extracted from the questionnaire and arranged in tables to ease percentage analysis. Chi – square statistical tool was used to test the hypotheses at 0.05 level of significance and the result of the study revealed positive relationship to the variables under investigation. The following recommendations were suggested for implementation: The institutions

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should provide incentives to motive the staff engage in coding and indexing activities in the Hospitals; re – training of coding staff to acquaint them of recent development in clinical coding; a computer – assisted coding system should be introduce to enhance coding of diagnosis.

*Keywords: Clinical coding; practices; impact; quality health care.*

## 1. INTRODUCTION

Quality healthcare depends on the availability of quality data. Data quality depends on accurate and prompt documentation of the care provided and regular analysis of content. Good quality healthcare data play a vital role in the planning, development and maintenance of optimal healthcare [1]. In the other hand, inaccurate data threatens patient safety and can lead to increased costs, inefficiencies, and poor financial performance [2]. The coded data constitute the key components required for regulatory submission. Hence, the function of coding is essential and the need to maintain high quality in the delivery of coded data should not be underestimated. Inaccurate or insufficient data inhibits health information exchange (HIE), and hinders clinical research, performance improvement, and quality measurement initiatives [3].

Clinical coding is the allocation of or a process of assigning numeric/alphanumeric codes to clinical data in accordance with international coding standards to facilitate ease of data retrieval for analysis and comparison [4]. Coding practices sets out the requirements for clinical coding to ensure compliance with standards, and the accuracy and consistency of information produced during the clinical coding process. It is an integral part of health information management (HIM) practice which provides valuable data for health care, quality evaluation, health resource allocation, health services research, medical billing, public health and programming [5].

The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) published by World Health Organization, is a veritable tool for the effectiveness of clinical coding practices. Its helps to translate medical information relating to a patients' encounter with the health facility into alpha-numeric codes. This codes enhances the analysis of health care activities by grouping diagnosis and procedures together according to recognised format. High quality coding allows for: assessment of health care needs, the sharing between healthcare organisations and clinicians of standardised records, effective resource management, medical and clinical audits to be carried out more easily and ease of use in epidemiological study [6]. Clinical coding is the transformation of diagnosis, surgical procedures, medical services, and equipment into universal medical alphanumeric codes according to International standard.

Consequently, this study aim at assessing'' clinical coding practices and its impact on the quality of healthcare services in Hospitals in Calabar urban, Cross River State, Nigeria.

### 1.1 Statement of the Problem

The challenges confronting clinical coding practices in government hospitals in Calabar urban, are enormous. Notable among these are absence of automation, lack of political will, inadequate / experienced clinical coders and suboptimal documentation. Unacceptable abbreviations, multiple interpretations/not enough information for classification are also common challenges that are observed. Undocumented/ conflicting drug names, the same trade name being used for different products, spelling variations especially for drug names that can more easily be misinterpreted from actual drug name, all of these affect the quality of coding and as well as having indirect effect on the quality of care provided in the hospital.

The system is also suffering from inadequate and unmotivated workforce. Lack of adequate workforce to handle clinical coding impede the efficient operations and management of hospitals and potentially lead to inaccurate state of national statistics on hospital morbidity. It also has an adverse effect on hospital health data which in turn impact on clinical coding outcomes in hospitals. Thus, limiting national decision making as the error rate is often well established in general hospitals due to lack of trained manpower, logistic materials, resources and poor documentation of patient in the hospital. Despite the importance of clinical coding in promoting quality health care in hospitals, low / lack of government support also affect coding quality in the hospitals [7].

It was also observed that poor job satisfaction and lack of continuing education opportunities affect the quality of health care services and utilisation of clinical coding in hospitals. It was as a result of the above reasons that this study seeks to investigate 'clinical coding practices and its impact on the quality of healthcare services in Hospitals in Calabar urban, Cross River State, Nigeria.

## 1.2 Objective of the Study

The general objective of this study is to investigate 'clinical coding practices and its impact on the quality of healthcare services in government Hospitals in Calabar urban, Cross River State, Nigeria. The specific objectives are as follows;

1. To investigate whether government Hospitals in Calabar urban, Cross River State, Nigeria, adhere to clinical coding practices.
2. To ascertain whether government Hospitals in Calabar urban, Cross River State, Nigeria have trained staff to carry out coding and indexing activities.
3. To determine whether clinical coding impact on the quality of health care services provided in government Hospitals in Calabar urban, Cross River State, Nigeria.

## 1.3 Research Questions

1. Does government hospitals in Calabar urban, Cross River State, Nigeria adhere to clinical coding practices?
2. Does government hospitals in Calabar urban, Cross River State, Nigeria, have trained staff to carry out coding and indexing activities?
3. Does clinical coding impact on the quality of health care services provided in government hospitals in Calabar urban, Cross River State, Nigeria?

## 1.4 Hypotheses

1. That, government hospitals in Calabar urban, Cross River State, Nigeria do not adhere to clinical coding practices.
2. That, government hospitals in Calabar urban, Cross River State, Nigeria, do not have trained staff to carry out clinical coding activities.
3. That, clinical coding do not impact on the quality of health care services provided in government hospitals in Calabar urban, Cross River State, Nigeria.

## 1.5 Conceptual Clarification

The study of diseases and the International Classification of Diseases (ICD) began in the 16th century with the work of John Graunt on the London Bills of Mortality. Its main purpose was to permit systematic recording, analysis, interpretation and comparison of mortality and morbidity data collected in different Countries or areas and at different times [1]. They also said that, ICD is traditionally reviewed every ten years and in 1989, the International Conference on the 10th revision agreed that it would not be feasible to hold revision conferences more frequently than every ten years. In the same way, the ICD was developed for coding of surgical operations and other procedures. It is multi-axial structure and detail definitions of terminology which permits precise specification of procedures and enhances the ability of clinical coders in determining accurate procedure codes with minimal efforts [8].

Clinical coding is the transformation of healthcare diagnosis, procedures, and medical services into universal medical alphanumeric codes. The diagnoses and procedure are taken from medical record documentation, such as transcription of physician's notes, laboratory and radiologic results, etc. These codes are used to submit claims to third party payers, and to gather statistical information, both by tracking incidents of specific diseases, and by discerning /developing trends in treatment protocols [9].

Clinical coding is a specialised area within health information management. In the hospital, clinical coding involves collecting, collating, translating and assigning codes to clinical information relating to the diagnosis and operation for patients admitted to hospital in accordance with local and national coding practices in an accurate and timely manner [7]. Clinical coding and classification processes transform natural language descriptions in clinical text into coded data that can be subsequently used for clinical care, research, and other purposes. Accurate recording of the care given to a patient (usually diagnostic and procedure information) using clinical terms, leads to better quality information within the healthcare information system and enables sharing of data across multiple systems

more effectively [10]. It enables more effective searching of clinical records to support patient care, patient monitoring and risk management as well as the subsequent classification of data for administrative purposes and statistical analysis. The provision of better quality information for authorised health professionals helps improve the overall quality of patient care [11].

Clinical coding require a good knowledge of medical terminology, clinical documentation, legal aspect of health information and health data standard for effective coding practices. It requires knowledge of Classification convention and computer to ensure data management, usually as obtained through formal education and/or on the job training [5]. The basic task of clinical coding is to classify medical and health care concepts using a standardised classification. However, mortality events, outpatient episodes, reasons for visiting the health facility and population health studies constitute the central focus of clinical coding [12,13].

## 2. MATERIALS AND METHODS

The study adopted a survey research design. The study employs questionnaire in order to determine the opinion of the sampled population to isolate the interrelation of the variables. All health information personnel at the University of Calabar Teaching Hospital, Calabar and government hospitals in Calabar urban were used for the study. Four hospitals were purposively used for the study. These includes: Dr. Lawrence Memorial Hospital, Calabar; General hospital, Calabar; Federal Neuro Psychiatric hospital and University of Calabar Teaching Hospital, Calabar. Before the commencement of the study, ethical clearance was obtained from the ethical committee of the hospitals, and informed consent was obtained from health information personnel before they were enrolled in the study, and all the respondents consented to the study.

The sample for the study consisted of 100 respondents which were randomly selected from health information personnel in hospitals in Calabar urban, Cross River State, Nigeria. Simple random sampling technique was used and balloting was also adopted to give opportunity to everybody in the sample space to be selected to participate in the investigation. The distribution of the questionnaire was carried out, taking into consideration the size and number of health information professionals in such hospital. University of Calabar Teaching Hospital has 70 copies, Dr. Lawrence Memorial Hospital, Calabar – 3 copies; General Hospital Calabar - 15; Federal Neuro – Psychiatric, Hospital - 12.

The research instrument adopted for the study was a set of questionnaire which consisted of 16 items questions. The questionnaire was divided into two sections. Section A consist of questions on demographic data, while section B consist of questions on the research area. The 100 copies of the questionnaire were personally administered to the selected health information management personnel in the sampled hospitals for completion.

The completed 100 copies of the questionnaire were collected back, representing 100% and were analysed to facilitate a precise result of the investigation. The data collected were first presented in a tabular form to show the various questions from which the data were collected. The analysis of the data were firstly descriptive in nature and chi-square analysis was used to reveal the respondents view on each question. Discussion on the findings was carried out to have an understanding of the research problem. Simple percentage and chi –square were used to analyse the data.

## 3. DEMOGRAPHIC DATA OF RESPONDENTS

Table 1 shows the sex distribution of the respondents. The data revealed that 25 respondents, representing 25% were male and 75 respondents representing 75% were female. The result revealed that female respondents dominated the study.

**Table 1. Sex distribution of respondents**

| Sex | No. of respondents | Percentage (%) |
|---|---|---|
| Male | 25 | 25 |
| Female | 75 | 75 |
| Total | 100 | 100 |

*Source: Questionnaire*

Table 2 shows the age distribution of respondents. The data revealed that 30 respondents, representing 30% were between the age bracket of 18 – 30 years; 50 respondents representing 50%, were in the age bracket of 31 – 40 years; 20 respondents representing 20%, were within the age range of 41 years and above. The data revealed that, respondents in the age bracket of 31 – 40 years dominated the study.

**Table 2. Age distribution of respondents**

| Age | No. of respondents | Percentage (%) |
|---|---|---|
| 18 – 30 yrs. | 30 | 30 |
| 31 – 40 yrs. | 50 | 50 |
| 41 yrs + | 20 | 20 |
| Total | 100 | 100 |

*Source: Questionnaire*

**Table 3. Allocation of questionnaires by Hospital**

| Hospital | Total staff on roll | No. of assigned questionnaire |
|---|---|---|
| UCTH, Calabar | 105 | 70 |
| General Hospital, Calabar | 22 | 15 |
| Dr. Lawrence memorial Hospital, Calabar. | 6 | 3 |
| Federal Neuro – Psychiatric Hospital, Calabar | 15 | 12 |
| Total | 148 | 100 |

*Source: Questionnaire*

**Table 4. Religious background of the respondents**

| Religion | NO. of respondents | Percentage (%) |
|---|---|---|
| Christianity | 90 | 90% |
| African religion | 10 | 10% |
| Total | 100 | 100 |

*Source: Questionnaire*

Table 3 shows the questionnaire distribution according to hospitals. The data revealed that: University of Calabar, Teaching Hospital has 70 copies, representing 70%; General Hospital, Calabar, has 15 copies, representing 15%, Dr. Lawrence Memorial Hospital, Calabar, has 3 copies, representing 3%; and Federal Neuro – Psychiatric Hospital, Calabar has 12 copies, representing 12%.

Table 4 shows the religious background of the respondents. It is observe from the table that 90 respondents, representing 90% are Christian; 10 respondents, representing 10% are engage in traditional African religion. However, Christians dominated the study as observed from the data.

## 4. RESULTS

### 4.1 Hypothesis One

**Ho:** That, hospitals in Calabar urban do not adhere to clinical coding practices.

**$H_1$:** That, hospitals in Calabar urban adhere to clinical coding practices.

Question 7: Do hospitals in Calabar urban adhere to clinical coding practices? was used to test the hypothesis at 0.05 level of significance.

**Table 5. Observed (o) and (e) expected frequency table in relation to question 7**

| Variables | Yes | (E) | No | (E) | Total |
|---|---|---|---|---|---|
| Male | 18 | (22) | 7 | (3) | 25 |
| Female | 70 | (66) | 5 | (9) | 75 |
| Total | 88 | (88) | 12 | (12) | 100 |

*Source: Questionnaire*

To obtain the $E = \frac{CT \times RT}{GT}$

Where CT = column total,
RT = row total and
GT = grand total
(C – 1)(R – 1)
(2 – 1) (2 – 1)
1 1

Level of significance at 0.05 = 3.84

$$X^2 = \frac{(18-22)^2}{22} + \frac{(70-66)^2}{66} + \frac{(7-3)^2}{3} + \frac{(5-9)^2}{9}$$

$$= \frac{(-4)^2}{22} + \frac{(6)^2}{66} + \frac{(4)^2}{3} + \frac{(-4)^2}{9}$$

$$= 0.73 + 0.33 + 5.33 + 1.78$$

$$= 8.17 \text{ calculated value}$$

Decision rule of acceptance or rejection

When the calculated chi – square ($X^2$) value is greater or equals to critical table value reject the Null hypothesis and accept alternative hypothesis. If the tabulated $X^2$ value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis. Since the calculated value 8.17 is higher than the table value 3.84, $H_o$ is therefore rejected and $H_i$ accepted. This mean that, hospitals in Calabar urban adhere to clinical coding practices.

## 4.2 Hypothesis Two

**Ho:** That, hospitals in Calabar urban do not have trained staff to carry out clinical coding.

**$H_1$:** That, hospitals in Calabar urban have trained staff to carry out clinical coding.

Question 9: Does your hospital have trained staff to carry out clinical coding? was used to test the hypothesis at 0.05 level of significance.

**Table 6. Observed (o) and (e) expected frequency table in relation to question 9**

| Variables | Yes | (E) | No | (E) | Total |
|---|---|---|---|---|---|
| Male | 16 | (21) | 9 | (4) | 25 |
| Female | 68 | (63) | 7 | (12) | 75 |
| Total | 84 | (84) | 16 | (16) | 100 |

*Source: Questionnaire*

Level of significance at 0.05 = 3.84

$$X^2 = \frac{(16-21)^2}{21} + \frac{(68-63)^2}{63} + \frac{(9-4)^2}{4} + \frac{(7-12)^2}{12}$$

$$= 1.19 + 0.40 + 6.25 + 2.08$$

$$= 10.02 \text{ calculated value}$$

Since the calculated value 10.02 is higher than the table value 3.84, $H_o$ is therefore rejected and $H_i$ accepted. This implies that, hospitals in Calabar urban have trained staff to carry out clinical coding.

## 4.3 Hypothesis Three

**Ho:** That, clinical coding do not impact positively on the quality of health care services provided in hospitals in Calabar urban, Cross River State.

**$H_1$:** That, clinical coding impact positively on the quality of health care services provided in hospitals in Calabar urban, Cross River State.

Question 12: Does clinical coding impact positively on the quality of health care services provided in hospitals in Calabar urban, Cross River State? was used to test the hypothesis at 0.05 level of significance.

**Table 7. Observed (o) and (e) expected frequency table in relation to question 13**

| Variables | Yes | (E) | No | (E) | Total |
|---|---|---|---|---|---|
| Tertiary hospital | 65 | (60) | 10 | (15) | 75 |
| Secondary hospitals | 15 | (20) | 10 | (5) | 25 |
| Total | 80 | (80) | 20 | (20) | 100 |

*Source: Questionnaire*

Level of significance at 0.05 = 3.84

$$X^2 = \frac{(65 - 60)^2}{60} + \frac{(15 - 20)^2}{20} + \frac{(10 - 15)^2}{15} + \frac{(10 - 5)^2}{5}$$

$$= 0.42 + 1.25 + 1.67 + 5$$

$$= 8.34 \text{ calculated value}$$

Since the calculated value 8.34 is higher than the table value 3.84, $H_o$ is therefore rejected and $H_i$ accepted. This implies that, clinical coding impact positively on the quality of health care services provided in hospitals in Calabar urban, Cross River State, Nigeria.

## 5. DISCUSSION

The aim of this study is to investigate ''clinical coding practices and its impact on the quality of healthcare services in Hospitals in Calabar urban, Cross River State, Nigeria. The research problem and the objective of the study were identified, three research questions were postulated which resulted in three hypotheses. Related literatures were carried out to know what other authors have said in relation to the problem under investigation. The result of the study in hypothesis one revealed that, hospitals in Calabar urban adhere to clinical coding practices. The hospitals have ICD coding manuals, trained staff and computers for coding activities.

The result of hypothesis one however shows that accurate Clinical Coding better reflects the pattern of practice of Clinicians and provides a sound basis for the decision making process. High quality coding allows for: Assessment of health care needs, the sharing between healthcare organisations and clinicians of standardised records, effective resource management, Medical and clinical audits to be carried out more easily, and ease of use in epidemiological study [14,15].

Hypothesis 2 was to test whether hospitals in Calabar urban have trained staff to carry out clinical coding. The result revealed that hospitals in Calabar urban have trained staff to carry out clinical coding. Clinical coding is a training process of acquiring knowledge that basically enhance the assigning of numerical digits to represent several descriptive attributes of disease conditions or operative procedures. That, except someone has to undergo serous training, such an individual cannot code medical and related health problem [16].

The result of hypothesis three revealed that, clinical coding impact positively on the quality of health care services provided in hospitals in Calabar urban, Cross River State, Nigeria. This result is in line with some studies which revealed that the use of codes has expanded from classifying morbidity and mortality information for statistical purposes to diverse sets of applications, including research, administration, epidemiology, and health services [6,17]. ICD codes have proven incredibly helpful for research and policymaking, etc. They observed that, without coding, health care research, day – to – day operation and management of the health institutions cannot be effectively executed.

Good clinical coding enhance efficient research activities. Thus, institutions are to ensure that staff engage in coding and indexing of health problems adhere strictly to the coding practices when coding [18,4]. The result of the study has shown an interesting outcome, which may in turn permit further studies on the research problem.

## 6. CONCLUSION

This study was intended to investigate ''clinical coding practices and its impact on the quality of healthcare services in Hospitals in Calabar urban, Cross River State, Nigeria. The various parameter for the study were initiated and literature review carried out to enable the researcher have an insight of the research problem. A well prepared questionnaire was printed and 100 copies administered to respondents in the sampled hospitals in Calabar urban for completion. The 100 copies of the questionnaire were collected back and data extracted for testing of hypotheses.

The result revealed that; some of the hospitals in Calabar urban adhere to clinical coding practices; clinical coding impact positively on the quality of health services provided in hospitals in Calabar urban, and clinical coding enhance research activities. Based on the above, the

following recommendations were proffer for the identified problems.

## 7. RECOMMENDATIONS

The following recommendations were suggested to provide a solution to the identified problems.

i). The institutions should provide financial incentives to motivate the staff in Health Information Management Department who are engage in coding and indexing activities in the Hospitals, particularly, General hospital and University of Calabar Teaching hospital, to enable them be efficient in their duties.
ii). Staff in Health Information Management Department should develop good attitude that will promote clinical coding.
iii). There should be occasional training/ re – training of staff in Health Information Management Department to acquaint them of recent development in clinical coding which will in turn improve their attitude to work.
iv). Coding and indexing materials should be provided to enable the coding staff be very efficient and to avoid accumulation of work due to lack of materials.
v). A computer – assisted coding system should be introduce to enhance accuracy in the coding and indexing of health problems.

## CONSENT AND ETHICAL APPROVAL

Ethical clearance was obtained from the ethical committee of the hospitals, and informed consent was obtained from health information personnel before they were enrolled in the study, and all the respondents consented to the study.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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*Peer-review history:*
*The peer review history for this paper can be accessed here:*
*http://www.sciencedomain.org/review-history/27714*