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**Diagnosis with ICD coding on discharge and death: A medical record-based study on patients admitted in a Medical College and Hospital of West Bengal, India.**

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**Abstract**

**Introduction:** Medical records of hospitals are primary and basic source of health information. It provides background and clinical diagnosis, treatment undertaken, complications, length of stay, laboratory date etc. which plays important role in planning health care services. International Classification of Diseases (ICD) helps in managing health information, data standardization, and classification of patients' health information maintaining uniformity globally.

**Objectives:** To find out the socio-demographics, proportion of records with final diagnosis and ICD coding.

**Materials and Methods:** It was an analysis of one-month secondary data, 3002 in number from Medical Records Department of a Medical College of Eastern India. Along with this, two key informants (KI), one medical and non-medical were interviewed. UCINET was used for framework analysis to identify and depict patterns in-between and across variables and themes within scope of ICD coding.

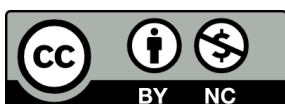
**Results:** Mean age of participants was 53.03±15.89 years, 2407 (80.18%) received medical management and 595 (19.82%) undergone surgical interference. In 164 records ICD coding was missing, among them 131 left against medical advice, 24 died during hospital stay and 9 patients were discharged as cured. In thematic analysis of gaps, concerns and solutions some consensus was found as, lack of corroboration, no linkage between prescriber and coder, manpower shortage, need of training and so on.

**Conclusions:** ICD is one of the most scientific, universally acceptable and important classification systems having overarching applicability. Interdepartmental collaborative record updation by trained manpower is very much needed for making the hospital record keeping system more sound and stringent.

**Keywords:** medical records, international classification of diseases, India, hospitals, health care

**INTRODUCTION**

Medical records are an important source of health information. It is the systematic documentation of the patient's personal and social data, history of his or her ailment, clinical findings, investigations, diagnosis, treatment given, account of following up and outcome.<sup>1</sup> Medical Records is defined as "a clear, concise and accurate history of a patient's life and illness, which is written from a medical view point". Mc Gibbon defined Medical Record as "a clinical, administrative, scientific and legal document which is related to patient care, in which sufficient data is recorded, which is written in sequence of events, to justify the diagnosis, and warrant treatment and end results".<sup>1,2</sup>



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A good medical record serves the interest of the medical practitioner as well as his patients. The key to dispensability of most of the medical negligence claim rest with the quality of the medical records. Record maintenance is the only way for the doctor to prove that the treatment was carried out properly.<sup>3</sup>

Medical record is indispensable from the standpoint of the patient, the doctor, the hospital and for medical education and research. Classically the medical record of a patient contains the documents arranged in the following sequence:<sup>4,5</sup>

- Forms of admission, final outcome report
- Case sheet comprising of: medical history, clinical findings, investigation ordered, treatment instituted, progress reports, consent form for surgery or specialized procedures, anesthesia check record, if applicable, notes on surgical/special procedure, if applicable, lab reports in chronological sequence of their ordering, films along with their reports.

In each of the medical records International Code Number is assigned to the diagnosis based on "International Classification of Disease (ICD)" issued by the World Health Organization.<sup>6</sup> This is to bring about accuracy, uniformity and standardization in the reporting of the diseases by the various hospitals and making it conducive to storage, retrieval, and analysis of medical data. ICD classifies diseases according to their etiology, pathology, clinical manifestations, and anatomical location in a systematic fashion, using coding to represent diseases. ICD updates usually once a decade, still the 10th Revision of the International Classification of Diseases (ICD-10) was implemented by January 1, 1993.<sup>7,8</sup>

Various studies have shown that despite standing on verge of ICD-11, there are many gaps in following coding all over the world. They have found accuracy of coding to range from 68% to 85% and developing countries like, India lies at lower stratum. There are paucity of studies exploring application, accuracy and verification of agreement of ICD coding in the eastern part of India.<sup>8</sup>

In this backdrop the current study was conducted to find out the socio-demographics, proportion of records with final diagnosis and ICD coding along with pattern of effects of variable on coding of records in-patients of a tertiary level hospital of Eastern India.

## MATERIALS AND METHODS

**Study type and Design:** It was a Descriptive, Institutional medical record-based study

**Study setting:** The study was conducted in the Medical Record Department (MRD) of a Medical College and Hospital that delivers patient care, medical and allied education, research, training activities and running since 2006. The MRD maintains records of in-patients which undergo regular audit.

**Study duration:** Three months (September-November, 2023)

**Study population/units:** The work was on medical records of all in-patients with every possible consequence, discharged or died in the month of July, 2023. Medical officer in-charge and head clerks

were considered as study population.

**Sampling design:** According to in-charge of the MRD, all the data are electronically recorded once received in the section. According to them, the totally updated data was up to month of July, 2023. Considering the completeness all medical records were obtained for the month of July, 2023 by total enumeration.

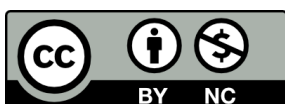
**Study tool and techniques:** pre-designed schedule were filled up with medical records containing socio-demographics, data pertaining to diagnosis and final outcome including International Classification of ICD coding. The officials were undergone with Key Informant Interviews (KII) with KII guide.

**Calculation of sample size:** The Medical Record Department of this tertiary care setting receives approximately 3000 in-patient records monthly. Therefore, the total number of records was estimated to consider was minimum 3000. For the month under study total 3002 records were obtained. Officials by total enumeration were two in number.

**Data management:** Written permission was obtained from the Principal of the Medical College and in-charge of the Medical Record Department. Visits were done during working hours of the MRD and data were collected from the department sitting inside in consideration of data privacy and safety. Data were entered in MS Excel spread sheet and descriptive statistics was used for analysis like as, mean, standard deviation, proportion and bar diagram, pie chart were used for presentation. UCINET analytical technology (trial version) has been used for network analysis after analyzing the framework from KIIs and generation of codes and categories.<sup>9</sup>

## RESULTS

There were total 3002 medical records obtained during study period. Age distribution was 53.03±15.89 years (mean±SD), ranging from 8-99 years. Majority, 1624 (54.09%) were male and 2091 (69.65%) had urban background. Among the study participants 2418 (80.55%) were married. Out of the total secondary data as found, 2407 (80.18%) received conservative management in various broad and super-specialty departments. Out of total admission, 286 patients were after initial screening in emergency department were admitted in any of the surgical units but following diagnostic work-up they got conservative management. Out of total 1740 patients who were treated in medicine and various allied IPDs, 1138 (65.40%) had final diagnosis of chronic kidney disease, with or without hypertension and diabetes, 89 had diseases related to cardiovascular system (acute coronary syndrome, MI, heart block, hypertensive emergencies, Left ventricular failure etc.), 91 had central nervous system disorders (Cerebrovascular accidents, anxiety disorders, parkinsonism, seizure disorders etc.), 68 had diseases related to respiratory system (asthma, COPD, pleural effusion) and so on. Among the 881 surgical in-patients, gall bladder disease was majority, 415 (47.10%), 55 patients were posted for operations of different malignancies which is much alarming. Other patients were found with various problems like as, appendicitis, renal stone, abdominal perforation etc. Regarding final outcomes as obtained from the records, 2769 (92.24%) were cured at the time of



discharge. In the month under study 124 (4.13%) patients died over various departments. [Table 1] It was found that in 164 (5.46%) records ICD coding was missing. Among them 131(79.9%) left against medical advice, 24 (14.6%) died during hospital stay and 9 (5.5%) patients were discharged as cured.

Two key informant interviews (KII) were conducted on medical officer in-charge of MRD section and head clerk who remains in overall charge of technical details of the entire procedure of receipt of records in department. Within a thematic framework, gaps, concerns and suggested solutions were classified and summarized. These two interviewees work in this field in close collaboration and follow same professional practice. One very vital area of ambiguity emerged out as the KIs stated that for patients who die in hospital, for them no ICD coding is done. Whereas record shows out of 124 deaths ICD coding was missing in 24 cases. The result of the framework analysis is summed in Table 2 and Figure 1.

## DISCUSSION

The medical records when documented together and compiled give statistics for improvement in quality of health care provision and act as a tool for measuring the potency of services provided as well as the areas needing improvement in the hospital services.

The current study was conducted over one month medical records of a medical college hospital situated in a metropolitan city. Similar study was conducted by Gehlawat M et al. from Telangana in a medical college<sup>1</sup>, Verma S et al. from Superspeciality hospital in NCR for three months<sup>2</sup>; though their data was lesser than the current study. Regarding socio-demographic data as obtained in present study had similarities with Tyagi A from Haryana<sup>3</sup> but they had more patient admitted in surgical departments in the month when that study was done. Mean age of the patients was much lower in study by Gehlawat M et al. than the present study.<sup>1</sup> Study by Barua PK et al. from Bangladesh also showed completeness of medical records as that of the current study but they also assessed existing medical record keeping practices and problems associated with medical record keeping practices of the record keeping personnel.<sup>4</sup>

In the current study setting both manual and electronic record keeping are practiced and “Gemini India” software is used for electronic record keeping. In some settings there has been documentation of usage of ‘Harrini Technosys Version 1.0.25’, Singh S et al.<sup>5</sup> from Haryana also found keeping of both forms of records in their hospital, whereas in Chittagong Medical College Hospital they keep manual records only.<sup>4</sup> Orwa B from Kenya also found centralized paper-based medical records management system in their hospital under study.<sup>6</sup>

In terms of ICD coding the current study found sound coding mechanism in the setting. This was in accordance with Souza J et al. who emphasized importance of universal coding.<sup>7</sup> Korwisi B et al. evaluated its implementation in chronic pain cases and it was done in phased manner guiding physicians in stepwise diagnosis following ICD-11.<sup>8</sup> Still on extensive literature review studies on status of universality in diagnosis following ICD is lacking in South-East

Asia.

The study was conducted in Medical Records Section which is one of the most vital and place of maintenance of maximum confidentiality for a hospital as these are direct evidences of status of patient management, considered useful evidence by the courts as it is accepted that documentation of facts during the course of treatment of a patient is genuine and unbiased.<sup>10</sup> It has revealed a picture of socio-demographics of the patients treated in this hospital which can be considered for extrapolation on the other medical colleges in similar settings. Status of ICD coding with so much totality which has been assessed here has a novelty. Along with these the record maintenance, retrieval, storage, preservation and how long to maintain have been conceptualized and these can be utilized for future research direction. Still the study was conducted on one month’s record which will miss a lot seasonal variability of diseases, if any, trend of disease pattern etc. Being a group exercise inter-observer variation could be there; still the data were collected in a pre-designed proforma to minimize this. The study has not assessed training level of the people who are doing data management in the MRD. In the section itself there were display of various governmental and medical council orders related to record maintenance but compliance to these have not been explored.

## CONCLUSION

In MRD despite a system of record management in place both electronically as well as manually on receipt from various in-patient departments, some coding is getting missed. This might be attributed mainly to training gaps of newly passed out medical graduates, lack of interdepartmental liaison, manpower shortage, confusion or absence of definitive diagnosis and so on. Mandatory and continuous in-service training of the prescribers on medical certification of cause of death (MCCD) and ICD coding are expected to act as doable solution.

## CONFLICT OF INTEREST

Not Declared

## FUNDING

Not declared

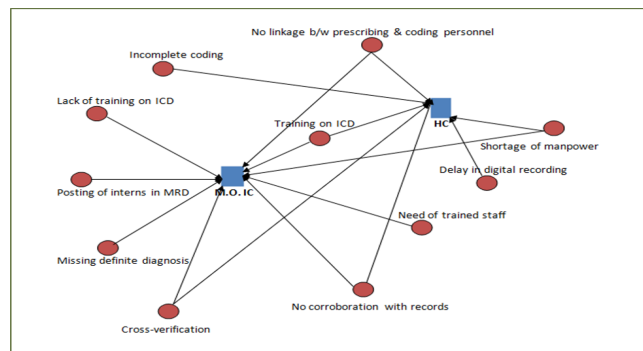


Figure 1: Framework analysis of relationship of codes with interviewees.

Table 1: Baseline characteristics of medical records reviewed

(n=3002)

Variable (s)		No. (%)
Sex	Male	1624 (54.09)
	Female	1378 (45.91)
Residence	Urban	2091 (69.65)
	Rural	911 (30.35)
Marital status	Married	2418 (80.55)
	Unmarried	77
	Single	195
	Divorced	45
Nature of treatment received	Widow	267
	Conservative	2407 (80.18)
Final outcome	Surgical	595
	Cured	2769 (92.24)
	Death	124
	DAMA/LAMA	96
	Referred out	13

Table 2: Codes and categories from KIIs

Codes and categories	In-charge doctor	Head clerk
<b>Category 1: Gaps</b>		
Incomplete coding	0	1
No corroboration with records	1	1
Delay in digital recording	0	1
Missing definitive diagnosis	1	0
<b>Category 2: Concerns</b>	0	0
Lack of training on ICD coding	1	0
No linkage between prescribing and coding persons	1	1
Shortage of manpower	1	1
<b>Category 3: Possible solutions</b>	0	0
More trained manpower in MRD section	1	0
Cross-verification with doctors	1	1
Training on ICD coding	1	1
Posting of interns in MRD	1	0

[0=not mentioned by interviewee & 1=mentioned by interviewee]



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