ICD Classification of Autopsies Conducted for Deaths due to Trauma in Bhopal, Madhya Pradesh

Dr. Brinda Patel[1], Dr. Jayanthi Yadav[2]

[1]Assistant Professor, Dept. of Forensic Medicine & Toxicology, RKDF Medical College Hospital and Research Centre, Bhopal

[2]Additional Professor, Dept. of Forensic Medicine & Toxicology, AIIMS Bhopal, India.

Abstract

International Classification of Diseases (ICD) aims at systematic recording, analysis & comparison of mortality & morbidity data collected in different places & times. It facilitates evidence-based decision making. In India, in medico-legal cases, cause of death is mostly ascertained by autopsy surgeons but coding is done at The Office of Registration of Births & Deaths where proper attention to coding is not paid leading to poor utilisation of ICD-10. This paper aims at the possibility of mortality coding from autopsy itself. We retrospectively coded 160 trauma cases that were autopsied, according to Chapter-XX of ICD-10. The data were systematically analysed. 18.75% of the total cases could not be coded specifically. There were cases where unspecific code was allotted even when a lot of details were available. Based on difficulties faced during the study, suggestions were thought upon to make ICD coding easier & more practical.

Keywords: International Classification of Diseases, ICD-10, ICD coding, Medico-legal cases, Autopsy, Mortality data.

Introduction

The 10th revision of the International Statistical Classification of Diseases & Related Health Problems (1989) i.e., ICD-10 is the latest in the series that was formalized in 1893 as the Bertillon Classification or International List of Causes of Death.[1] The 11th edition of ICD was released on 18th June 2018; it was presented and accepted at the WHO World Health Assembly on 25th May 2019 but will come into effect only from 1st January 2022.[2] The purpose of ICD is the systematic recording, analysis, interpretation & comparison of mortality & morbidity data collected in different countries or areas & at different times.[3] The ICD translates the data into alphanumeric code, which permits easy

storage, retrieval & analysis of the data; hence providing a common language for reporting and monitoring diseases.[4] This allows the world to compare and share data in a consistent and standard way & also facilitates analysis and evidence-based decision-making.[5]

The original use of ICD-10 was to classify causes of mortality as recorded during the registration of death.[6] Later, its scope was extended to include diagnoses in morbidity [1]. All the external causes of morbidity & mortality are recorded in Chapters XIX & XX which are the largest chapters in ICD-10 & are hardly ever used to their full potential; therefore, the effort has been made to find out lacunae in ICD coding with the present system of autopsy reporting.[7] The external causes of morbidity & mortality are unnatural and are mostly included as medico-legal cases. In India, in medico-legal cases, the cause of death is mostly ascertained by the autopsy surgeons after the autopsy but coding is usually done at the office of registration of birth & death where proper attention to codes of the cause of death is not paid leading to poor utilisation of ICD-10.[8] This paper aims at the possibility of giving ICD-10 coding using the autopsy report & other documents and discusses the difficulties/advantages of this approach.[9]

Materials & Methods:

This is a retrospective study, for which data was collected in Department of Forensic Medicine & Toxicology, People's College of Medical Sciences & Research Centre, Bhopal (M.P.) & analysis of the data was undertaken in the Department of Forensic Medicine & Toxicology, AIIMS, Bhopal (M.P.). It includes all the cases of deaths due to any form of trauma that came to the mortuary for
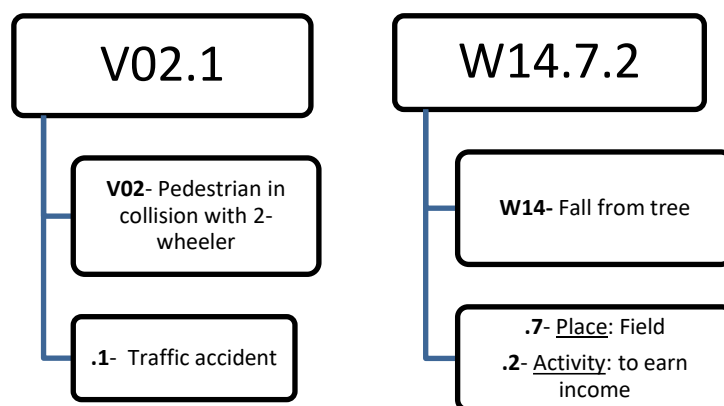
autopsy over a study period of 1.5 years i.e., from 1st January 2014 to 30th June 2015. There was a total of 160 such cases. All autopsies of decomposed bodies & deaths due to any cause other than trauma were excluded from the study.

All the required data for coding was collected from the history/ details provided in the police inquest papers & the autopsy report. We retrospectively attempted coding all cases according to the guidelines of chapter XX of ICD-10 & results were systematically compiled & tabulated. The data was analysed, all pros & cons of the system during this process were noted. Suggestions were thought upon so that ICD coding can be implemented more practically.

The cases where any parameter required to code is not available are taken to be non-specific/ unspecified for the study. All the cases where numeric '9' was used at the 3rd, 4th and/ or 5th character position in the allotted alpha-numeric code, were taken as unspecified; as in ICD-10 numeric '9' is allotted to codes at the above-mentioned positions where no additional information is available.

2.1 Chapter XX codes

• V01-X59 – Accidents.

➢ V01-V99 – Transport Accidents.

➢ W00-X59 – Other external causes of accidental injury.

• X60-X84 – Intentional self-harm.

• X85-Y09 – Assault.

• Y10-Y34 – Event of undetermined intent.

• Place & Activity coding for codes from W00-Y34 is written in form of numeric after decimal as 3rd and 4th character respectively.

_____

V02.1	W14.7.2

V02- Pedestrian in collision with 2-wheeler

.1- Traffic accident

W14- Fall from tree

.7- Place: Field
.2- Activity: to earn income

Results & Discussion:

Table1: Percentage of unspecified codes allocated

	Specified	Unspecified	Total
Accident	116 (80%)	29 (20%)	145
Suicide	5 (100%)	0	5
Homicide	9 (90%)	1 (10%)	10
TOTAL	130 (81.25%)	30 (18.75%)	160

Table 2: Coding based on Circumstances of death

	Specified	Unspecified	Total
Road-Traffic Accidents (RTA)	44 (83.02%)	9 (16.98%)	53
Fall from Height (FFH)	15 (75%)	5 (25%)	20
Railway accidents	5 (71.43%)	2 (28.57%)	7
Electrocution	1 (7.7%)	12 (92.3%)	13
Burns (Flame, scalds, chemical, electric)	58 (78.4%)	16 (21.6%)	74

Table 3: Circumstances of death due to Burns

	Specified	Unspecified	Total
Flame burns	**53 (92.98%)**	4 (7.02%)	57
Scalds	3 (100%)	0	3
Chemical burns	1 (100%)	0	1
Total Burn cases	58 (78.4%)	16 (21.6%)	74

Table 4: Coding of Burn cases as per manner of death

	Specified	Unspecified	Total
Accident	50 (76.9%)	15 (23.07%)	65(87.84%)
Suicide	3 (100%)	0	3 (4.05%)
Homicide	5 (83.3%)	1 (16.6%)	6 (8.1%)
Total	58 (78.4%)	16 (21.6%)	74

A good classification system for coding deaths due to trauma is intended to provide relevant information for injury prevention. A high degree of specificity in mortality data & improvements in the documentation of circumstances of an injury-causing event is essential for injury prevention purposes. Obvious gaps existed between the ideal and the reality in classifying injury-related deaths in the study. Overall, 81.25% of cases could be coded specifically. The remaining 18.75% could not be allocated a specific code **(Tabel-1)**.

Various circumstances of death were studied and cases were classified into separate groups **(Tabel-2)**. Deaths due to Road-Traffic Accidents/RTA could be coded most specifically i.e., in 83.02% cases followed by deaths due to Burns (78.4%). In deaths due to RTAs, a brief history is generally taken before autopsy which helps in mortality coding, still, a few factors need to be specifically asked keeping ICD coding in mind as they can lead to the case being coded unspecified. Specific codes could be allocated in the majority of burn cases because mostly were hospitalised cases and detailed case histories with relevant details were readily available. But the information regarding the place or the activity was not available in those cases.

In many cases, especially in RTAs, the ICD-10 coding guidelines are so specific that for every detail in history taking a specific code can be coded. But the specificity of coding is not put to use when proper history regarding all the information required is not elicited. In India, a brief history in autopsy requisition form or the panchnama, or history is taken from relatives/ near and dear ones during autopsy are not taken keeping ICD-10 coding in mind. It is merely taken to correlate the injuries sustained on the body with the incidence.

Chapter-XX codes are mainly used for mortality coding in ICD-10 which require circumstantial history/ facts, which is not recorded anywhere unless specific effort is made to note it down keeping in mind the ICD-10 requirement at autopsy room. Also, the mortality coding for ICD-10 is done at the office of registration of birth and death by coders who do not take into account the history part of the autopsy report. When the certifier provides more complete information, such as in a case of death due to head injury to a motorcyclist in collision with a bus, only then can the coder give a specific ICD-10 code as V24.4(motorcycle rider injured in collision with heavy transport vehicle or bus). Therefore, the proportion of injury deaths with unspecified external cause codes can be used as an indicator of the level of sufficiency & specificity of the information reported by certifiers on the death certificate for external causes of death.

There are two injury prevention implications in examining the proportion of unspecified external causes. If a country has a large number of injury deaths coded as ICD-10 code X59, there would be compensatory effects on the number of deaths due to other specific external causes, such as motor vehicle crashes. Several studies conducted in the past have dealt with the reporting of unspecified injuries. This has implications in the formation of national prevention policies. Based on the manner of death suicide & homicide were coded better & easily as compared to accidents because fewer details are required to code them specifically. Accidental deaths form the major chunk of preventable deaths. If that data is skewed, there will be major implications. Most of the medico-legal cases due to RTA/ railway accidents/ burns etc are coded non-specifically for accidental cases. The accidental deaths are classified in very much detail in ICD-10 & require many small details

_____

like the position of the victim on the vehicle, exact place of the accident etc which was not always available **(Table-1).**

Only 1 out of 13 cases of death due to electrocution (7.7%) could be allocated a specific code. They were the group with the highest number of cases being allocated an unspecific code **(Tabel-2)**. This was because information regarding the place/ site of the incident was not available in most of the cases and only the activity being performed while the incident occurred was specified. Of the 74 causes of death due to burns, accidental cases comprised of the majority cases but could be coded least specifically whereas, 4.05% cases were of suicidal burns and all could be allotted a specific code **(Tabel-4)**. In India, where most cases of burns come with a history of burns due to falling of kerosene chimney or chimney catching fire accidentally, a more detailed circumstantial classification in ICD-10 for burn injuries will also help in formulating preventative protocols in such cases.

Deaths due to burns were further classified into 3 groups based on circumstances **(Table-3)**. 57 out of 74 cases were of flame burns, of which 53 (92.9%) were allocated a specific code. All cases of scalds & chemical burns could be coded specifically **(Tabel-3).** Coding of deaths due to flame burns involving kerosene stoves was found to be most difficult because they could be coded under 2 separate codes; X02, which is code for burns involving stove and X04 for burns involving highly inflammable accelerants like kerosene etc. They were ultimately coded under X02 as the involvement of the stove was considered a more important factor in those particular cases.

Few cases were coded as unspecified even when detailed history was known as their specific codes were not available in the ICD manual, like deaths due to cooking oil catching fire, death due to fall from a piece of

machinery, alcohol influence as an important factor leading to an incident, in case electrician working on the roof of a customer's house falls & dies, there is a dilemma as bodily injuries are that of fall, but it is an electric current which led to the fall. Place code for electric pole/ tower could not be found & activity codes for many cases are not specified especially people falling from balconies & also that for thief/robber.

The various factors that lead to a case being coded as unspecified could be summarised as:

• Lack of specific information regarding the circumstances that led to the event.

• Inadequate documenting of relevant data.

• Incompleteness or errors during the death certification & coding process [9].

• Coder's inability to comprehend guidelines of ICD.

• Some difficulty for the coder to understand the terminology used in ICD like traffic/ non-traffic accidents/ transport accidents.

• In cases when unidentified bodies are recovered and no history is forthcoming from police &/or eyewitnesses; in such cases lack of history is a serious limitation.

• The high number of deaths being coded as unspecified would bias comparisons of mortality between 2 mechanisms & would affect international comparisons as well.

3.1 Advantages of ICD-10 coding at the autopsy room:

• The autopsy report provides history as well as details of injuries on the body. In many cases, the autopsy surgeon also provides the manner of the death. This makes coding easy and much more effective.

• Prospective coding of the cases can be more rewarding.

_____

- Appropriate coding helps frame specific prevention policies to reduce mortalities.

- Road traffic accidents & flame burns are described in great detail in the ICD-10 and those details required for coding are available at the autopsy room to the autopsy surgeon.

3.2 Disadvantages of the ICD-10 coding system

- If insufficient information is reported for an injury-related death, an 'unspecified' external cause will be coded which leads to an underestimation of any particular cause.
- Some aspects require country-specific variations to develop region-specific preventative measures.
- Coders are technicians and not doctors, not understanding the data as well as the importance of it (not trained properly).
- The ICD guidelines are quite complicated to understand in few instances.
- In few instances like RTA, a case will be coded as unspecified even if any little detail is missing as too many details are needed to code them specifically.
- Circumstantial details/ history is not written over reports routinely. This leads to insufficient reporting and hence unspecific coding.

3.3 Recommendations:

Suggestions are given in data collection to make the ICD coding easy & practically possible.

- Efforts are needed to be made to educate the data collectors to report sufficient information required for specific coding.
- Regular training for coders/ technicians.
- ICD Coding can be included in the curriculum to educate people involved in this process to improve the quality of reporting consecutively to improve coding.
- Proper history must be taken, keeping ICD-10 coding in mind.

- Doctors also need to be aware that correct & appropriate data entry is essential as it has consequences on an international scale.
- Writing circumstantial details/history in the report should be encouraged.
- Some alternate classification systems for India can also be developed as the focus on certain aspects varies from country to country. E.g.: NCIS in Australia.

Conclusion:

This paper analyses the usefulness of chapter XX coding using autopsy reports & other relevant documents by the autopsy surgeon.[10] Though the study was done retrospectively where proper history as per ICD requirement was not elicited but still in a good number of cases proper ICD coding could be done. A prospective study keeping in mind the history-taking as per ICD requirement would be more effective.[11] It also enables proper ICD-10 coding which is not possible at the office of registration of births & deaths where stakeholders giving proper history are not available.[12]

ICD is one of the oldest and most accepted classification systems worldwide. There are frequent updates in the classification system but little is known about the current quality of cause-of-death reporting.[13] The need of the hour is to do better data collection & reporting along with the development of an alternate coding system prioritised according to the needs of India can improve the quality of coding tremendously.[14]

References:

1. World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization, 1992.
2. John D Langley, David J Chalmers. Coding the circumstances of injury:

_____

ICD-10 a step forward or backwards? Injury Prevention. 1999; 5:247–253.

3. Mclaughlin E, Annest JL, Fingerhut LA, et al. Recommended framework for presenting injury mortality data. MMWR Recommendations & Reports. 2002; 46:1-30, http://www.cdc.gov/ nchs/ about/otheract/ice/matrix10.html

4. Fingerhut LA, Mclaughlin E. Classifying and counting injury. In: Rivara FP, Cummings P, Koipsell TD, Grossman DC, Maier RV, eds. Injury control: A guide to research & program evaluation. Cambridge: Cambridge University Press, 2001:15-31.

5. Harrison JE. Injury classification: balancing continuity & utility. Inj Contr Saf Promot 2002; 7:51-63.

6. Anderson RN, Minino AM, Fingerhut LA, et al. Deaths: injuries, 2001. National Vital Statistics. 2007; 4:57-60.

7. T H Lu, S Walker, R N Anderson, K McKenzie, C Bjorkenstam, W H Hou. Proportion of injury deaths with unspecified external cause codes: a comparison of Australia, Sweden, Taiwan and the US. Injury Prevention 2007;13:276–281.

8. Romano PS, Mclaughlin E. Unspecified injuries on death certificates: a source of bias in injury research. Am J Epidemiol 1992; 136: 863-72.

9. Tsung-Hsueh Lu, Philippe Lunetta, Sue Walker. Quality of cause-of-death reporting using ICD-10 drowning codes: a descriptive study of 69 countries. BMC Medical Research Methodology. 2010, 10:30. http://www.biomedcentral.com/1471-2288/10/30

10. Illing G, Lessig R, Stang A. Analysis of Coding Quality of Death Certificates and Autopsy Rates in Chemnitz: 2010-2013. Gesundheitswesen. 2019 Jan 21. DOI: 10.1055/a-0820-3452. Reports. Vol 52(21), Hyattsville, MD: National Centre for Health Statistics, 2004.

11. Cragle DL, Fetcher A. Risk factors associated with the classification of unspecified and/ or unexplained causes of death in an occupational cohort. Am J Public Health 1992;82:455-7.

12. Hanzlick R. Quality assuarance review of death certificates: a pilot study. Am J Forensic Med Patholo 2005; 26:63-5.

13. Tsung-Hsueh Lu, Meng-Chih Lee, Meng-Chih Chou. Accuracy of code of death coding in Taiwan: types of miscoding and effects on mortality statistics. International Journal of Epidemiology. 2000; 29:336-343.

14. L A Fingerhut, M Warner. The ICD-10 injury mortality diagnosis matrix. Injury Prevention 2006; 12:24–29.