

Knowledge and attitudes of doctors in Basra Governorate regarding the international classification of diseases ICD-10

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Abstract

Background: The International Classification of Diseases, Tenth Revision (ICD-10), serves as a critical tool for standardizing health information globally. Despite its widespread adoption, there remains a gap in the understanding and application among healthcare providers, which can impact patient care and health system efficiency.

Methods: This descriptive, cross-sectional study evaluated the knowledge and attitudes of 67 healthcare professionals (27 specialists, 25 senior residents, 8 general practitioners, and 7 junior residents) from various medical settings in Basra. Participants responded to a questionnaire assessing their familiarity with and application of ICD-10, particularly in tasks such as death certification. Data were analyzed using SPSS version 26, employing the Chi-Square Test to

explore relationships between knowledge levels and demographic as well as professional variables.

Results: Although 61% of respondents reported familiarity with ICD-10, only 8% demonstrated 'Good' proficiency in its application. A notable 60% displayed 'Poor' proficiency, particularly in death certification procedures. Statistical analysis revealed no significant correlation between professional role or years of practice and ICD-10 knowledge levels (Chi-Square values = 14 and 5.5, P-values = 0.1 and 0.9, respectively). The primary source of ICD-10 knowledge was self-education (54%), with formal training programs contributing minimally (15%). Despite recognizing the importance of ICD-10, only 14.9% of doctors regularly applied these standards in their practice, with 68.7% having never participated in any formal ICD-10 training.

Conclusion: The study highlights a significant gap in the effective application of ICD-10 among medical professionals in Basra, underscoring a systemic issue in training and education. There is a critical need for comprehensive training programs and policy interventions to enhance the understanding and use of ICD-10 to improve clinical documentation, patient care, and health system management. These efforts should aim to bridge the disconnect between the perceived importance of ICD-10 and its practical implementation in healthcare settings.

Keywords: ICD-10, healthcare education, clinical documentation, professional training, medical coding standards

INTRODUCTION

As medical knowledge advances and healthcare landscapes evolves, the need for a universal language to classify health information continues to be paramount. The ultimate goal of enhanced patient care on a global scale pushed further the need for a comprehensive and consistent system for the standardization of diseases, medical conditions, and related health information. This led to the introduction of The International Classification of Diseases (ICD) which started humbly as a statistical tool [1], consequently evolved to be an indispensable tool used by healthcare professionals, researchers, and authorizing organizations. ICD objectifies in providing a common language for reporting and monitoring diseases and health conditions. It facilitates the organization, analysis, and interpretation of health data for various purposes, including clinical, epidemiological, and statistical use [2].

The history of The International Statistical Classification of Diseases and Related Health Problems (ICD) can be traced back to the French physician Jacques Bertillon who introduced the Bertillon Classification of Causes of Death [3, 4], which only had 179 causes of death [3]. However, the origins of a more global disease classification system are rooted in 1898, French physician Francois Bossier de Lacroix, aiming to assist fellow doctors in diagnosis, released a system categorizing ten major disease classes and 2,400 individual diseases [5]. Many countries started their own morbidity listings until the World Health Organization (WHO), in 1948, assumed the responsibility for disease reporting and subsequently rebranded the system as the International Statistical Classification of Diseases [2] which underwent revisions every 10 years [3]. As advancements in health sector increased, the number of codes increased with each revision, as did the opportunity of using the system for other purposes.

The continuous refinement led to the development of a detailed and professional edition, ICD-9, in the late 1970s which was then adopted globally in the 1980s [4]. However, leaders at the World Health Organization noticed the necessity for a more comprehensive revision in the near future to address the evolving changes in medical fields. This led, subsequently, to initiate the development of the tenth revision prior to the completion of the ICD-9 [2, 6]. ICD-10, which is also the final revision, got published in 1999 [7] and incorporated over 155,000 codes [4] to encompass a substantial array of new diagnoses, meeting the needs of international healthcare practitioners and making it a vital part of healthcare operations.

⁶ The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) was subsequently developed by the National Center for Health Statistics (NCHS), incorporating more codes and representing significant improvements. This involved the enhancement of code specificity, the generation of diagnosis/symptom combinations aimed at reducing the quantity of codes necessary for addressing a specific medical condition and the incorporation of supplementary information for the depiction of managed care and ambulatory encounters [4]. ³ The NCHS conducts a regular update of ICD-10-CM. However, various other nations have augmented ICD-10 by introducing more detailed codes, resulting in the release of country-specific versions like ICD-10-Canada [8].

One of the notable improvements in ICD-10-CM is the enhanced level of details, such as the involvement of new codes to differentiate between the types of diabetes, urging healthcare providers to record more crucial details such as noting any underlying condition or drug that may lead to the precipitation of diabetes [6]. Furthermore, ICD-10 utilizes a distinct coding system that is not used by the

previous versions as it employs alphanumeric instead of numeric codes. Every code¹ in ICD-10 begins with a letter (A–Z), succeeded by two numeric digits, a decimal point, and an additional digit (e.g., J21.0 denotes acute bronchiolitis due to respiratory syncytial virus). In contrast, ICD-9-CM codes¹ commence with three-digit numbers (001–999), followed by a decimal point and, if necessary, up to two additional digits (e.g., 466.11 represents acute bronchiolitis due to respiratory syncytial virus) [8].

ICD plays a pivotal role in modern healthcare, serving as a standardized framework that extends its influence across diverse domains within the medical field. For instance, ICD serves in generating hospital report cards that comprehensively assess various aspects of a hospital's performance, including patient outcomes, quality of care, and resource utilization [9]. Moreover, ICD information is commonly utilized¹³ by health researchers to investigate health services, mortality, and various other outcomes. For instance, a retrospective cohort study, aimed to examine the connections between² estimated glomerular filtration rate (eGFR) and the likelihood of hospitalization or mortality due to pneumonia, identified comorbid⁷ conditions using validated ICD-9-CM and ICD-10 coding algorithms [10].

Arising from the importance of routinely collecting hospital morbidity data that further potentiates the role of ICD-10 and its applications in the healthcare sector, many studies have assessed the coding and recording accuracy. Global administrative databases, including those in Iraq, are progressively adopting the ICD-10 system, which arises the necessity for validation of coding accuracy. This² cross-sectional statistical study was conducted to understand the trends, knowledge, and practices of physicians regarding the implementation of the ICD-10 system. It

serves as an evaluative study aimed at enhancing the functionality of the application, increasing awareness about its significance, and promoting its use in medical and statistical contexts.

14

METHODS

Study design and setting

This study employs a descriptive, cross-sectional design to investigate the knowledge and attitudes of doctors regarding the International Classification of Diseases, Tenth Revision (ICD-10). Conducted across various hospitals and health centers affiliated with the Basra Health Directorate, this research spans a period of 10 months, from November to the end of August. The target population comprises 67 doctors with varying affiliations, including specialists, general practitioners (GPs), senior residents, and junior residents.

Population and sample size selection

The inclusion criteria for participants are being a registered medical practitioner currently employed in a healthcare institution under the Basra Health Department. The sample size of 67 doctors was determined based on the feasibility of conducting thorough data collection within the study's timeframe and ensuring a representative mix of various medical practitioners in terms of specialization and experience level. This size is considered adequate for a preliminary assessment of knowledge and attitudes toward ICD-10 within the specified setting, allowing for meaningful analysis and generalization of findings to similar healthcare contexts.

Outcomes measurement

Outcomes of this study are measured based on participants' responses to an electronic questionnaire, designed to evaluate their knowledge and attitudes towards the ICD-10 coding system. The questionnaire comprises closed-ended questions only to capture comprehensive data. Knowledge levels are categorized into four groups based on correct answers: poor (<50%), acceptable (50%-59%), average (60-69%), and good ($\geq 70\%$).

Data collection

Data were collected using a questionnaire, distributed to participants to ensure convenience and increase response rates. The use of electronic distribution also aids in maintaining the confidentiality of responses.

Ethical considerations

Ethical approval was obtained from the Basrah Health Directorate before commencement.

Statistical analysis

Data analysis was conducted using SPSS version 26. The Chi-Square Test was utilized to evaluate the significance (P-Value) between compared categorical variables, specifically examining correlations between demographic factors and knowledge levels or attitudes towards ICD-10. This statistical approach allows for the identification of significant trends and discrepancies in knowledge and attitudes among different doctor groups within the study's population.

RESULTS

A total of 67 healthcare professionals were included in this study. The largest groups are specialists (40.3%) and senior residents (37.3%). Most participants work in general hospitals (50.7%), followed by primary health care centers (29.9%), indicating a focus on generalist medical settings. Regarding tenure, there's a significant spread across experience levels, with 23.9% practicing for over 14 years and 31.3% between 2 and 4 years.

Table 1. Job description, Job institute, and Practicing tenure among the studied participants

Variables		No. (n= 67)	%
Job description	Junior Resident	7	10.4
	Senior Resident	25	37.3
	General Practitioner	8	11.9
	Specialist	27	40.3
Job institute	Primary Health Care Center	20	29.9
	Specialized Health Care Center	3	4.5
	General Hospital	34	50.7
	Health Directorate	5	7.5
	Others	5	7.5
Practicing tenure	< 2 years	4	6.0
	2-4 years	21	31.3

5-9 years	15	22.4
10-14 year	11	16.4
>14 year	16	23.9

Table 2 presents data on knowledge ¹² of the International Classification of Diseases, 10th Revision (ICD-10), and their proficiency in using it for death certification. A majority (61%) are familiar with ICD-10, yet a substantial portion (60%) shows poor proficiency in applying it to death certificates, with only 8% rated as 'Good'. The primary source of ICD-10 knowledge is self-education (54%), with smaller contributions from training courses (15%), friends (12%), and other sources (19%).

Table 2. Knowledge-related data analysis among the studied participants

Variables		No. (n= 67)	%
Knowledge about ICD-10	Yes	41	61.0
	No	26	39.0
Knowledge about Writing the death certificate according to ICD-10 among doctors.	Bad	40	60.0
	Acceptable	13	19.0
	Fair	9	13.0
	Good	5	8.0
Source of Information about ICD-10	Self-education	36	54.0
	Friends	8	12.0
	Training courses	10	15.0

Others	13	19.0
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Table 3 shows the distribution of knowledge levels across different doctor affiliations. A notable finding is the high proportion of specialists (55.56%) and general practitioners (87.5%) rated with 'Bad' knowledge. In contrast, 'Good' knowledge is relatively rare across all categories. The analysis, featuring a Chi-Square value of 14 and a P value of 0.1, indicates no statistically significant association between doctors' affiliations and knowledge levels.

Table 3. Association between doctors' affiliations and degree of knowledge

Variables	Good	Moderate	Acceptable	Bad	Total
Specialist	3 (11.12%)	6 (22.23%)	3 (11.12%)	15 (55.56%)	27 (40.3%)
General Practitioner	0 (0.0%)	0 (0.0%)	1 (12.5%)	7 (87.5%)	8 (11.94%)
Senior Resident	2 (8.0%)	1 (4.0%)	9 (36.0%)	13 (52.0%)	25 (37.31%)
Junior Resident	0 (0.0%)	2 (28.57%)	0 (0.0%)	5 (71.43%)	7 (10.45%)

- Chi-Square: 14
- P value 0.1

Table 4 assesses the relationship between the practicing years and knowledge levels. The data indicates a trend where the majority of doctors across all practicing years predominantly fall into the 'Bad' knowledge category, with those practicing for 2-5 years and 10-15 years showing particularly high percentages (66.66% and 66.67%, respectively) in this category. Notably, no doctors with 5-10 years of experience were rated as having 'Good' or 'Moderate' knowledge.

The statistical analysis yields a Chi-Square value of 5.5 and a P value of 0.9, suggesting that there is no statistically significant association between the length of practice and knowledge levels among doctors.

Table 4. Association between doctors' practicing years and degree of knowledge

Variables	Good	Moderate	Acceptable	Bad	Total (n= 67)
<2 years	2 (12.5%)	4 (25.0%)	3 (18.75%)	7 (43.75%)	16 (23.88%)
2-5 years	1 (6.66%)	2 (13.34%)	2 (13.34%)	10 (66.66%)	15 (22.38%)
5-10 years	0	0	1 (25.0%)	3 (75.0%)	4 (5.97%)
10-15 year	1 (4.76%)	2 (9.53%)	4 (19.04%)	14 (66.67%)	21 (31.35%)
>15 year	1 (9.09%)	1 (9.09%)	3 (27.27%)	6 (54.55%)	11 (16.42%)

- Chi-Square: 5.5
- P value 0.9

Table 5 provides an insightful analysis into various aspects of death certificate management among 67 doctors. A significant portion of the participants (53.7%) have written fewer than 50 death certificates, indicating a moderate level of experience with this responsibility among the majority. Notably, a substantial majority (68.6%) express discontent with writing death certificates, which correlates closely with the participation rate in training programs regarding the ICD (68.7% not participating).

The perception of the importance of accurately writing a death certificate is overwhelmingly medicolegal (91%), though a small fraction recognize broader implications including health promotion and planning. Despite 61.2% of doctors being aware of ICD-10, only 14.9% actively apply it in practice, with a notable interest in learning more about ICD-10 among 31.3% of respondents.

Concerning convenience and attitudes towards ICD-10's importance, 65.7% find it important, with 23.9% deeming it very important. The primary reason cited for the lack of contentment in writing death certificates is that it's seen as 'Not My Job' (50.7%).

Table 5. Death Certificates related information analysis

Variables		No. (n= 67)	%
Number of written death certificates	None	8	11.9
	<50	36	53.7
	50-100	12	17.9
	>100	11	16.4

Contentment regarding writing the Death Certificate	Yes	21	31.3
	No	46	68.6
Participation ratio in training program regarding the ICD	Yes	21	31.3
	No	46	68.7
Importance of writing a Death Certificate accurately	Medicolegal	61	91
	Medicolegal, Health promotion	2	3
	Planning	3	4.5
	Planning, Medicolegal, and Health Promotion	1	1.5
Knowledge about the International Classification of Disease (ICD-10)	Yes	41	61.2
	No	26	38.8
ICD-10 Program Application in Practice	Yes	10	14.9
	Partially	16	23.9
	No	41	61.2
Are you interested in ICD-10	Yes	21	31.3
	Partially	20	29.9
	No	26	38.8
convenience with ICD-10 importance	important	44	65.7
	not important	7	10.4
	very important	16	23.9
Reasons of Lack of Contentment Regarding Writing the Death Certificate	Difficulty of the Certificate	2	3.0
	Not My Job	34	50.7

Others	13	19.4
Useless Instructions	8	11.9

DISCUSSION

This study aimed ² to assess the knowledge and attitudes of medical professionals in Basra regarding the International Classification of Diseases (ICD) and its applications. Our findings reveal a nuanced picture of both the challenges and the perceptions among healthcare providers related to the ICD. This study ⁷ did not find a statistically significant correlation between the degree of specialization, years of service, and knowledge levels about ICD-10. This lack of correlation could indicate that the gaps in knowledge and training are systemic, affecting medical professionals across various stages of their careers and areas of specialization. This finding is significant as it suggests that interventions to improve ICD-10 knowledge should be widespread and not targeted only at early-career doctors or specific specialties.

Knowledge and training

The majority of participants displayed a poor level of knowledge about ICD-10, with 60% categorized under "bad" in their understanding. This aligns with concerns in the literature about insufficient training and awareness of ICD among healthcare providers globally [11, 12]. Despite the critical role of ICD in healthcare documentation, billing, and epidemiological research, the study data suggest that current training mechanisms, such as training courses (attended by only 15% of participants), are inadequate. This is corroborated by the fact that the primary source of information about ICD-10 for 54% of doctors was self-education. Such a reliance

on self-learning might not provide the comprehensive knowledge required to effectively use ICD-10 in clinical practice. In addition, the study revealed a lack of significant association between both job descriptions (Junior Resident, Senior Resident, General Practitioner, Specialist) and years of experience (<2 years, 2-5 years, 5-10 years, 10-15 years, >15 years) with the knowledge levels of ICD-10 among healthcare professionals, indicated by p-values of 0.1 and 0.9, respectively. These findings suggest a universally present gap in ICD-10 knowledge across different professional roles and levels of experience, underscoring a systemic issue in education and training rather than isolated deficiencies. Previous research aligns with our results, revealing doctors' concerns and perceived benefits regarding ICD-10 usage. Concerns highlighted in earlier studies include issues with the software's readiness and completeness, the extensive time and accuracy required for documentation, the challenge doctors face in acquiring new skills related to software use, and a noticeable deficiency in training [13].

Death certificate knowledge among doctors

Concerning the knowledge about writing death certificates according to ICD-10 among doctors, only 8% of the respondents demonstrated a "good" understanding of the process, while a significant majority, 60%, were categorized as having "bad" knowledge. This striking discrepancy is not merely a reflection of individual competency but hints at systemic issues within medical education and ongoing professional development. Regarding contentment with writing death certificates, the data showed distinct levels of satisfaction among respondents. Specifically, 58% of doctors expressed contentment with the process, while 31% did not feel content, and 11% were neutral. These figures underscore a significant portion of the medical professionals feeling either dissatisfied or ambivalent about their role in this critical

documentation task. The reasons for lack of contentment with writing death certificates were varied, with the most significant being the perceived difficulty of the certificate, cited by 51% of those who expressed discontent. Other reasons included feeling that it's not part of one's job (19%), useless instructions (15%), and other unspecified reasons (15%). These percentages reflect the diverse challenges faced by practitioners in fulfilling this duty, from issues of clarity and relevance to perceptions of the task's importance within their professional responsibilities.

Death certificate serves as a crucial document with multifaceted implications across various domains, encompassing legal, societal, and public health realms. Its significance reverberates through legal proceedings, both civil and criminal, where it stands as pivotal evidence in courts of law [14]. The ability to accurately complete death certificates according to ICD-10 is crucial for several reasons. Firstly, it ensures the correct statistical recording of mortality rates and causes, which is vital for public health surveillance, resource allocation, and epidemiological studies. Secondly, it affects families directly, influencing decisions on inheritance, insurance, and sometimes even criminal investigations [15-17]. Therefore, the observed lack of proficiency among doctors in Basra carries significant implications for both healthcare quality and public health management.

Insights on ICD-10 training, application, interest, and perceived importance among medical professionals

The nuanced findings from the study on ICD-10 reveal critical insights into the complex dynamics between medical professionals and the adoption of the International Classification of Diseases, Tenth Revision (ICD-10). The notably low rate of participation in ICD-10 training programs is a stark indicator of the existing

gaps in education and professional development. Only 18% of respondents reported having participated in such training, underscoring a pervasive lack of formal education on the coding system. This deficit likely contributes to the reported challenges in applying ICD-10 in clinical settings, where a mere 15% of practitioners fully incorporate this system into their practice. Additionally, aligning with our observations, past studies have noted healthcare providers and coding professionals' negative perceptions towards utilizing ICD-10. This reluctance stems from the insufficient number of skilled coding professionals and the challenges of navigating a sophisticated coding system, leading to frustration among some healthcare providers [18, 19]. Consequently, it is crucial to provide consistent training for healthcare professionals (HCPs) in the utilization of ICD-10 whenever implementing a new health technology system. Hence, stakeholders and hospital managers must ensure the recruitment and ongoing training of coding professionals to swiftly and effectively integrate the system. For physicians, nurses, and midwives, transitioning to ICD-10 entails modifying the documentation of patients' medical histories and diagnoses [20, 21].

Moreover, the split in interest towards the ICD-10 program—31% interested, 39% not interested, and 30% partially interested—reflects a broader issue of engagement and perception among healthcare providers. This variance in interest levels could stem from several factors, including the perceived complexity of the coding system, its relevance to individual clinical practices, and the overarching culture within healthcare settings that may not prioritize administrative accuracy as part of clinical excellence. Despite these challenges, the acknowledgment of ICD-10's importance by a majority (66%) of respondents is a positive indicator. It suggests a foundational recognition of the value that accurate and standardized

coding brings to the healthcare ecosystem, from enhancing patient care to facilitating global health surveillance.

CONCLUSION

In conclusion, while the importance of ICD-10 is widely recognized among medical professionals in Basra, there is a significant gap in knowledge and application. This study highlights the need for comprehensive strategies to enhance the understanding and use of ICD-10, ensuring it can fully contribute to improving patient care, healthcare management, and epidemiological research. Furthermore, understanding the impact of organizational and systemic factors on the adoption of ICD-10 could inform strategies to enhance its implementation across healthcare settings.

Disclosure

None

References

1. Wood PH. Applications of the International Classification of Diseases. *World Health Stat Q*. 1990;43(4):263-8.
2. Coding Complexity: US Health Care Gets Ready For The Coming Of ICD-10. 2011;30(5):968-74.
3. O'Malley KJ, Cook KF, Price MD, Wildes KR, Hurdle JF, Ashton CM. Measuring diagnoses: ICD code accuracy. *Health services research*. 2005;40(5 Pt 2):1620-39.
4. Topaz M, Shafran-Topaz L, Bowles KH. ICD-9 to ICD-10: evolution, revolution, and current debates in the United States. *Perspectives in health information management*. 2013;10(Spring):1d.
5. Jetté N, Quan H, Hemmelgarn B, Drosler S, Maass C, Moskal L, et al. The development, evolution, and modifications of ICD-10: challenges to the international comparability of morbidity data. *Medical care*. 2010;48(12):1105-10.
6. Bowie MJ. *Understanding ICD-10-CM and ICD-10-PCS: A Worktext-2020*: Cengage Learning; 2020.
7. WHO. *International Statistical Classification of Diseases and Related Health Problems, 10th Revision: Instruction Manual*. 2011;Volume 2.
8. Quan H, Li B, Duncan Saunders L, Parsons GA, Nilsson CI, Alibhai A, et al. Assessing Validity of ICD-9-CM and ICD-10 Administrative Data in Recording Clinical Conditions in a Unique Dually Coded Database. 2008;43(4):1424-41.
9. Glance LG, Dick AW, Osler TM, Mukamel DB. Accuracy of hospital report cards based on administrative data. *Health services research*. 2006;41(4 Pt 1):1413-37.
10. James MT, Quan H, Tonelli M, Manns BJ, Faris P, Laupland KB, et al. CKD and Risk of Hospitalization and Death With Pneumonia. *American Journal of Kidney Diseases*. 2009;54(1):24-32.
11. Wing TL. ICD-10 medical coding: The role of perioperative services in addressing implementation challenges. *AORN journal*. 2016;103(2):177-88.
12. Liebovitz DM, Fahrenbach J. Counterpoint: Is ICD-10 diagnosis coding important in the era of big data? *No. Chest*. 2018;153(5):1095-8.
13. Watzlaf V, Alkarwi Z, Meyers S, Sheridan P. Physicians' outlook on ICD-10-CM/PCS and its effect on their practice. *Perspectives in health information management*. 2015;12(Winter).
14. Brooks EG, Reed KD. Principles and pitfalls: a guide to death certification. *Clinical medicine & research*. 2015;13(2):74-82.
15. Casey-Lockyer M, Heick RJ, Mertzluft CE, Yard EE, Wolkin AF, Noe RS, et al. Deaths associated with hurricane sandy—October–november 2012. *Morbidity and Mortality Weekly Report*. 2013;62(20):393.
16. Myers KA, Farquhar DR. Improving the accuracy of death certification. *Cmaj*. 1998;158(10):1317-23.
17. Thornton RG, editor *Death certificates*. Baylor University Medical Center Proceedings; 2006: Taylor & Francis.
18. Meyer H. Coding complexity: US health care gets ready for the coming of ICD-10. *Health Affairs*. 2011;30(5):968-74.
19. Schwieters J. Strategies for dealing with the national coding shortage. *Healthcare Financial Management*. 2010;64(4):36-9.
20. Organization WH. *Making every baby count: audit and review of stillbirths and neonatal deaths*. 2016.
21. Sanders TB, Bowens FM, Pierce W, Stasher-Booker B, Thompson EQ, Jones WA. The road to ICD-10-CM/PCS implementation: forecasting the transition for providers, payers, and other healthcare organizations. *Perspectives in health information management/AHIMA, American Health Information Management Association*. 2012;9(Winter).