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The Role of Medical Coding in Light of The Quality of Health Data to Serve Patients

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Abstract:
Medical coding has become a crucial foundation for health data quality worldwide. In Saudi Arabia, the integration of medical coding into the healthcare system is becoming increasingly significant, in line with Vision 2030. This study aims to examine how medical coding influences data quality and patient care through a systematic review of a survey of 85 professionals in medical coding-related departments. This study was conducted at King Fahd Armed Forces Hospital in Jeddah during the period from January to May 2024. The results highlight that the accuracy of medical coding improves patient care, eliminates medical errors, and enhances communication between healthcare providers. Furthermore, the results showed that over 90% of the respondents agreed that medical coding is essential for improving data accuracy, facilitating information access, and supporting decision-making. However, there is still high demand for the continuous coder training since it is essential for the high-quality of patient data. Overall, the findings indicate that medical coding contributes to patient safety and, advancement of patient-centered healthcare delivery in Saudi Arabia.

Keywords: Medical Coding, Health care quality, service quality, medical service, integration.

Introduction:

ICD use is not only intended for mortality analysis. Among ICD's other goals include standardizing services and resource efficiency, as well as morbidity reimbursement for illnesses and techniques. For the purpose of identifying particular therapeutic encounters, coding causes of morbidity is even more crucial. Clinical coders must assign the right ICD code by reviewing clinical data, main diagnosis, and lab and radiology results in patient charts, which provide a thorough description of all diseases and procedures. **[3]** To provide a valid code, a thorough and unambiguous description of the illness is required. The intensity of care has a substantial impact on the associated cost of care, Using standardized and accepted alphanumeric numbers to reflect healthcare service occurrences is the goal of clinical coding. Every event is linked to particular services and is projected to need a certain amount of resources. **[2]** The many stakeholders in the healthcare services therefore anticipate and acknowledge the clinical efforts and costs. In the past, causes of death were first noted in England in 1837 and then flourished in the US in 1933. **[4], [6]** It was imperative to standardize the reasons of death because disparities were frequently noted. The United Nations assigned the World Health Organization to oversee the International Classification of Diseases (ICD) in 1946 as a result of the growing demand. ICD management, including updating and maintaining modifications, falls within WHO's purview. **[5]**

Computer-Assisted Coding (CAC) assigns the appropriate ICD codes for diseases and procedures by using Natural Language Process (NLP) techniques to detect specific terminologies used to denote diseases and operations from patient files in the Electronic Health Record. **[9], [10]** Additionally, CAC can assess the context of defined terms to determine if they are coded. To improve the correctness of the assigned code and the need for codes, or to evaluate the missing coding events, human coders must nevertheless examine the suggested codes produced by CAC. Clinical coders benefit from CAC's increased productivity and coding accuracy. CAC is incorporated into the workflow of these systems and may bring the pertinent documents and information, allowing the clinical coders to access the information more quickly. **[11], [12]**

and comorbidity is tracked and reported in addition to primary code assignment. **[4], [7]**
A healthcare facility's Diagnosis-Related Group (DRG), which is the single payment they will receive for each clinical visit, is determined by assigning ICD codes. Later, the severity scale was added to DRG in order to curb the growing expense of medical care. **[2], [6]** Therefore, ICD coding serves as a platform and foundation for evaluating the effectiveness and quality of services rendered, which is correlated with the intensity of services, as well as a way to recoup costs from third parties. In terms of the knowledge and abilities of coding practice, clinical coding calls for particular professional competences. **[7], [8]** For health information management professionals, the newer version of ICD—which is thought to be more clinically focused than earlier versions—requires rigorous training in addition to formal schooling.

Source: https://www.astera.com/type/blog/healthcare-data-integration/

Figure 1: Health Care Data Integration

to record all comorbidities and previous conditions. Physicians need to understand the requirements for clinical documentation in order to improve the quality of their documentation. **[12], [13]** For instance, doctors might require additional time and information to produce a discharge narrative that accurately reflects the

This eliminates the need for the coders to retrieve data from various modules and health information systems. The quality of coding practice depends on a number of factors. The primary challenges for clinical coders, according to Shepheard's latest research, are inadequate clinical documentation, maintaining clinical case definition, and the need

investigates the connection between medical coding and the quality of health data. It draws attention to present procedures, difficulties, and chances to improve coding systems in order to benefit patients and medical professionals.

Objective of the Study:
The main objective of the study is to evaluate the role of medical or clinical coding for maintaining quality health data and serve the patients better.

Research Methodology
Research Design
This research uses a systematic review approach to investigate how medical coding improves the quality of health data and how it affects patient care in the Saudi healthcare system. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed during the review process to guarantee rigor and transparency.

Sources of Data
The research had touched a lot many of available data sources as relevant studies conducted in the past. Some of the important sources of data are PubMed, Scopus, Web of Science, Google Scholar and even Saudi Digital Library.

Specific Keywords Used
Some of the important keywords used to search for the relevant information were “Medical coding”, “Health data quality”, “Patient care”, “ICD-10”, “SNOMED CT”, “Saudi Arabia healthcare”, “EHR integration”, and clinical documentation. Boolean operators and MeSH terms were applied to refine results.

Inclusion and Exclusion Criteria
Inclusion Criteria
a. peer-reviewed papers released from 2015 to 2025
b. Research on the healthcare systems of Saudi Arabia or similar countries
c. Publications that address patient outcomes, data quality, and medical coding
Exclusion Criteria:
a. Publications written in languages other than Arabic or English

patient's condition throughout hospitalization and treatment. In a tertiary hospital, just 60% of medical records were properly coded and documented. According to a different study, the likelihood of improper classification is 215 times higher in instances with incomplete discharge reports. Clinical coders also have trouble staying up to date with the most recent definitions of clinical cases. The recent clinical malnutrition case definition and the inconsistent assignment of malnutrition codes were emphasized by Phillips and his colleagues. **[8], [11], [3]**
The validity of ICD-10 codes is unaffected by the traits of coders or coding locations. Directors of Health Information Management (HIM), on the other hand, ought to make sure that suitable regulations are in place to encourage proper coding practices. ICD adoption and health information management department policies, which are critical to effective coding practice, would require sufficient planning and preparation in order to have appropriate policies. **[7], [11], [19]**
When an effort is made to improve the quality of clinical coding or a new version of the ICD is released, scenario planning is a procedure to follow.The purpose of clinical scenarios is to mimic real-world situations, such as patients with heart illness or digestive disorders. Clinical coding is thought to be more accurate and of higher quality when using the Computer-Assisted Coding (CAC) system. For many healthcare organizations, however, ineffective CAC systems are a major obstacle since they must provide the highest quality of integrated data in their electronic system in order to get past their coding errors. **[16], [17]**
Medical coding is becoming more and more important in the context of Saudi Arabia's quickly changing healthcare system, which is being fueled by Vision 2030 and digital transformation projects. Good coded data helps with clinical decision-making, improves patient safety, and makes resource allocation more effective. It also serves as the foundation for performance benchmarking, insurance claims processing, and national health surveillance. However, the precision, consistency, and integration of medical coding with electronic health record (EHR) systems determine how effective it is. With a focus on its effects on patient care in Saudi Arabia, this review

Result and Discussion

The approval rate for participation in a survey entitled (The Role of Medical Coding in Light of the Quality of Health Data for Patient Service) was 98.8%. The percentage of male and female participants was of different ages, from 25 to 35 years old (because it is the appropriate age group for work). Their age percentage was distributed as follows: from 25-35 years old, it was 6.59%, from 36-46 years old, their percentage was 27.1%, and from 47 to 60 years old, their percentage was 7.1%. The percentage of males was 35.7%, while the percentage of females was 64.3%, and their academic qualifications were as follows: Health Diploma 46.4%, Bachelor's 28.6%, training courses in the field of medical coding 13.1%, other 11.9%. As for the participants' responses to the survey questions, they were as follows:

Through the questionnaire, the following table was created:

b. Studies that are unrelated to coding or the quality of health data;

c. Editorials, opinion pieces, and non-peer-reviewed sources

Data Extraction

The researcher had screened all the relevant studies on the basis of titles and abstracts included and then reached out to full text manuscripts. After this comprehensive tabulation is done to segregate the studies. This extraction included:

- Coding systems used (e.g., ICD-10-AM, SNOMED CT)
- Impact on data quality metrics (accuracy, completeness, timeliness)
- Effects on patient care (diagnostic precision, treatment planning, continuity of care)

A thematic analysis was performed in order to find recurrent themes, difficulties, and innovations. The results were combined to make inferences regarding the present situation and prospects of medical coding in Saudi Arabia.

The question	Yes	No	I don't know
Do you think medical coding helps improve the accuracy of patient health data?	94.1%	1%	4.9%
Does medical coding facilitate access to medical information when needed?	92.9%	1.5%	5.6%
Do you think that the quality of health data depends greatly on the accuracy of medical coding	90.6%	4.7%	4.7%
Does good medical coding reduce medical errors?	80%	8.2%	11.8%
Does medical coding contribute to improving long-term patient monitoring?	89.4%	6%	4.6%
Does medical coding help speed up the delivery of healthcare services to patients	91.7%	1.2%	7.1%
Do you think that lack of experience in medical coding may negatively impact the quality of health data?	91.7%	7.3%	1%
Can medically coding better support clinical decision be making?	88.2%	5.9%	5.9%
Does medical coding help improve communication between healthcare providers	90.6%	4.7%	4.7%
Does medical coding help reduce costs resulting from errors or inaccurate data	90.6%	1.2%	8.2%
Do you think continuous training for medical coders is necessary to ensure the quality of health data?	94.1%	1%	4.9%
Do you agree that medical coding is an essential element in improving patient data integrity	97.6%	1.2%	1.2%

(94.1%), No (8.2%), I don't know (4.9%). Question 2: Does medical coding facilitate access

Question 1: Do you think medical coding helps improve the accuracy of patient health data? Yes

In conclusion, the findings of this study support the vital role of medical coding in healthcare data integrity and the advancement of healthcare services in Saudi Arabia. Coding accuracy will enhance diagnostic accuracy, eliminate medical errors, and reduce associated costs, potentially improving patient monitoring and leading to better treatment outcomes. Addressing these issues requires improving clinical documentation and investment in coders' development, and the integration of innovative solutions such as AI-assisted coding systems and Computer-Assisted Coding.

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to medical information when needed? Yes (92.9%), No (1.5%), I don't know (5.6%). Question 3: Do you think the quality of health data depends largely on the accuracy of medical coding? Yes (90.6%), No (4.7%), Question 4: Does good medical coding reduce medical errors? Yes 80%, No 8.2%, I don't know 11.8%. Question 5: Does medical coding contribute to improving long-term patient monitoring? Yes 89.4%, No 6%, I don't know 4.6%. Question 6: Does medical coding help speed up the delivery of healthcare services to patients? Yes 91.7%, No 1.2%, I don't know 7.1%. Question 7: Do you believe that a lack of expertise in medical coding may negatively impact the quality of health data? Yes 91.7% No 7.3% I don't know 1%. Question 8: Can medical coding support better clinical decision-making? Yes 88.2% No I don't know (same percentage) 5.9%. Question 9: Does medical coding help improve communication between healthcare providers? Yes 90.6% No I don't know 4.7% (same percentage). Question 10: Does medical coding contribute to reducing costs resulting from errors or inaccurate data? Yes 90.6%, No 1.2%, and I don't know 8.2%. Question 11: Do you believe that ongoing training for medical coders is necessary to ensure the quality of health data? Yes 94.1%, No 1%, and I don't know 4.9%. Final Question: Do you agree that medical coding is an essential element in improving the integrity of patient data? Yes 97.6%, No 1.2%, and I don't know 1.2%.The number of participants (related to medical coding and related departments) reached 85 people.

It is clear that the quality of health data for medical coding and serve the patients better. depends on several key factors:

1. Medical coding accuracy, at 90.6%, positively impacts the quality of health data.
2. Fewer medical errors, at 80%, positively impacts it.
3. Lack of experience among medical coders negatively impacts it, at 91.7%.
4. Continuous training for coders positively impacts it, at 94.1%.
5- Reducing costs resulting from medical errors, at 90.6%, positively impacts it.

Conclusion

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