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The impact of clinical data quality on clinical coding process in Alqasim

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Abstract

As it is well-known, healthcare delivery has become increasingly important and necessary over the years. This is attributed to various factors, such as lifestyle changes, dependency on machines and technology, and population growth. In line with Saudi Arabia's plans for transformation in multiple sectors, healthcare is a critical area of focus. The Clinical Coding program was released as part of this health transformation under vision 2030 released. This research aims to examine the clinical coding process and its relationship with data entry. The primary objective of this project is to investigate the influence of clinical data quality on the clinical coding process. By exploring this connection, we intend to determine how data quality issues impact coding accuracy, productivity, and overall healthcare outcomes. Additionally, this research aims to provide valuable insights into strategies for enhancing data quality in clinical coding practices. Ultimately, these improvements will contribute to enhanced patient care and the maintenance of data integrity.

Keywords

Clinical Coding, Data Quality, Data Entry, Health Information Management, Clinical Auditing, clinical documentation improvement.

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The Researchers

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Introduction

Clinical coding is rewriting the medical intervention and diagnostic condition data in the patient file from the full descriptive term to numeric and alphanumeric codes (de Lusignan et al., 2001). The codes are typically three to five alphanumeric digits, such as I10 and G40.40. For interventions, the codes consist of seven numeric codes, such as 92515-99 (Robert et al., 1999). Accurate and reliable clinical coding is essential for effective healthcare management, reimbursement, and research. Clinical coding involves the transformation of clinical data into standardized codes and the interpretation of patient information (Robert et al., 1999). According to Robert et al. (1999), these codes are in healthcare activities, including billing, statistical analysis, quality improvement, and decision-making processes.

The International Classification of Diseases (ICD-10-AM) is a well-known classification system and coding standard that is frequently used in the coding process (Rae et al., 2005). This system enables the consistent representation of healthcare diagnoses and interventions. However, the quality of the clinical data used in the coding process can significantly impact its outcomes and downstream applications (Rae et al., 2005). The official coding of diseases began around the 17th century in England. Known as the London Bills of Mortality, certain data on diseases and ailments are collected and arranged into numerical codes. The numeric codes are used to measure the most frequent causes of death. On the other hand, clinical coding in Saudi Arabian MOH hospitals started officially in 2019 after the program held by SCFHS which presented to around 600 coders divided into 3 batches.

Speaking of data, it plays a big role in how to code and greatly impacts the result of coded files (Quan et al., 2008). Thus, to have accurate outcome from the coded files, you must have correct data to reach a fine product (Davenport et al., 1996). Components of medical file data could be demographical and medical. These

data may be found in two ways a Paper-based or Electronic-based (Tran et al., 2014). HIM and other health practitioners are responsible for the data entry process (Salahuddin et al., 2020).

Research Problem

The research aims to address the following problems related to clinical coding and data quality:

- A) Identification of data quality issues in clinical coding.
- B) Understanding the consequences of data quality issues on coding accuracy and productivity (Lucyk et al., 2017).
- C) Need for strategies to improve data quality in the coding process (Hosseini et al., 2021).

Research questions

- What are the biggest consequences of the wrong coding?
- What are the best practices of clinical coding and data entry?

The Importance and Objectives of the Research

- ^{1.} The primary objective of this research project is to investigate the impact of clinical data quality on the clinical coding process (Juniat et al., 2019).
- ^{2.} Importance of addressing data quality in clinical coding (Santos et al., 2008).

Research Hypothesis

To address the research objective, this study will focus on the following key research questions:

- a) How does clinical data quality influence the accuracy of the clinical coding process?
- b) What impact does data quality have on the productivity of clinical coders? (Alonso et al., 2020)
- c) How does compromised data integrity affect the clinical coding process? (Shepherd, 2020)
- d) What are the challenges and limitations associated with maintaining data quality in clinical coding?

Literature Review

Rae et al. (2005) emphasize the importance of accurate and reliable clinical coding to ensure effective patient care and healthcare outcomes. The research on diagnostic classifications in sports medicine highlights the need for improvements in coding practices to address deficiencies in the current categories. This ties into the broader issue of clinical data quality and the importance of continuously improving coding practices to ensure quality data and effective healthcare outcomes.

The study by Juniat et al. (2019) found a high rate of coding errors, with only 30.7% of cases having correct coding in the initial audit. The impact of clinical data quality on the process of clinical coding was also discussed in the article. The quality of the clinical data directly influences clinical coding accuracy. Inaccurate or incomplete clinical documentation can lead to errors in coding, which can result in underpayment or non-reimbursement for services provided. Improving clinical data quality can help mitigate coding errors and optimize hospital financial outcomes. This may involve enhancing documentation practices, promoting thorough and accurate recording of diagnoses and procedures, and providing training and education to healthcare professionals involved in coding processes.

Horsky et al. (2017) analyzed the interactions of 23 ambulatory clinicians with two different EHRs to understand patterns and variations in their search strategies and the accuracy and completeness of the entered diagnostic codes. The aim was to identify potential issues in the coding process and provide insights for improvement. Only accurate or complete data can lead to coding errors, affecting reimbursement, research, and patient care. Improving clinical data quality through better training, improved EHR interfaces, and standardized coding practices can enhance the coding process and ensure that the coded data accurately reflects the patient's conditions and care.

The research article by Nouraei et al. (2009) discusses a prospective multidisciplinary audit of the accuracy of otolaryngology clinical coding and identifies ways of improving it. The study found that coding errors occurred in 24.1% of cases, leading to revenue loss and distorting the picture of clinical practice. The article recommends implementing a cost-effective clinician-coder double-reading multidisciplinary team as part of a data-assurance clinical governance framework to rectify these issues.

Salahuddin, et al. (2020) conducted semi-structured interviews with 31 medical doctors in three Malaysian government hospitals to identify behaviors that pose risks to patient safety when using HIS. In the study on healthcare practitioner behaviors, the unsafe use of HIS can result in errors and compromised patient care, affecting the quality and accuracy of clinical coding.

Davenport et al. (1996) assert that clinical coding involves translating patient information into standardized codes, which are used for various purposes, including reimbursement, quality improvement, and research. The accuracy and completeness of clinical coding depend on the quality of the underlying clinical data. In the context of the research on variations in case mix and clinical outcomes, the quality of clinical data is crucial. Accurate and complete documentation of patient characteristics, treatments, and outcomes is necessary to properly adjust for case mix and draw meaningful conclusions from non-randomized comparative studies. If the clinical data used for coding is of poor quality, it may lead to inaccurate case-mix adjustment and confound the interpretation of outcome data.

Therefore, Davenport et al. (1996) posit that ensuring high-quality clinical data is essential for accurate clinical coding and reliable research findings. Healthcare organizations need to invest in data quality improvement initiatives, such as training and education for healthcare professionals, standardized documentation practices, and regular audits to ensure the accuracy and completeness of clinical data.

Lucyk et al. (2017) conducted semi-structured interviews with 28 medical chart coders from Alberta, Canada, and used thematic analysis to identify the barriers to data quality. The research study discussed in the provided abstract focuses on exploring the barriers to high-quality coding of administrative health data from the perspective of medical chart coders in the Canadian healthcare system. The study aims to identify the challenges in data coding and generation, focusing on the role of documentation completed by physicians and other healthcare providers.

The study by Lucyk et al. (2017) found that generating administrative health data is complex and involves a diverse workforce, leading to multiple points that introduce challenges for high-quality data coding. The main barriers to data quality identified by coders were related to chart documentation, variability in the interpretation of chart information, and high quota expectations. The researchers concluded that interventions targeted only at coders would only partially overcome limitations to data quality, as quality coding depends on quality documentation.

The study also highlights the pivotal need to implement interventions that improve physician documentation, as it can be illegible, unreliable, and incomplete, posing challenges to the precise coding of conditions and procedures. The use of electronic health records is identified as one potential area for improving documentation, with studies showing improvements in accuracy, completeness, and timeliness when using electronic records (Lucyk et al., 2017). The researchers suggest that interventions focused on securing the presence of the "most responsible diagnosis" on discharge summaries could increase coders and higher-quality information. In summary, the research study provides insights into the barriers to high-quality coding of administrative health data, with a focus on the role of documentation completed by healthcare providers.

Hosseini et al. (2021) mentioned in the abstract aims to investigate the factors that affect the quality of diagnosis coding in medical record systems. The study utilizes a multi-dimensional approach, considering

stakeholders such as medical record coders, physicians, and managerial, financial, and administrative factors. The research methodology includes semi-structured interviews, a web-based questionnaire, and a focus group discussions. The results of the study reveal that the barriers to the quality of inpatient record coding can be categorized into three main categories: physician-related factors, coder-related factors, and managerial, financial, and administrative factors. By identifying these barriers, policymakers and healthcare organizations can develop and implement strategies and interventions to improve the quality of clinical coding.

Ensuring high-quality clinical data is crucial for accurate diagnosis, treatment, and research. This research provides valuable insights into the barriers that affect the quality of diagnosis coding data. By understanding these factors, healthcare organizations can take steps to improve the quality of clinical data, which in turn can lead to more accurate and reliable clinical coding (Hosseini et al., 2021). Improving clinical data quality can have several positive impacts on clinical coding. It can help reduce coding errors, improve the accuracy of medical records, enhance patient care and safety, support effective decision-making, and facilitate research and analysis. High-quality clinical data is essential for generating meaningful insights, conducting accurate research studies, and ensuring the efficient and effective delivery of healthcare services. By addressing the barriers identified in the research, such as physician-related, coder-related, managerial, financial, and administrative factors, Hosseini et al. (2021) assert that healthcare organizations can improve the quality of clinical data and optimizing clinical coding. This can lead to better patient outcomes, improved healthcare delivery, and advancements in medical research and knowledge.

Santos et al. (2008) highlighted in the abstract the influence of organizational factors on the quality of hospital coding using the International Statistical Classification of Diseases and Health Related Problems 12, 10th Revision, Australian Modification (ICD-10-AM). The study utilizes a mixed quantitative-qualitative approach and focuses on variables such as hospital specialty, geographical locality, coding unit's structural

characteristics, clinical coders' education and training, and quality control mechanisms. The study found no differences in error rates between rural and metropolitan hospitals or general and specialist hospitals. However, allocating clinical coders to "general" coding units resulted in fewer errors. Coding managers reported that coding quality can be improved through various factors, such as coders engaging in different role behaviors, enhanced career opportunities, higher staffing levels, reduced coding throughput, and less restrictive time constraints (Santos et al., 2008). Ensuring high-quality clinical data is crucial for effective clinical coding. The research suggests that factors such as the allocation of clinical coders, role behaviors, career opportunities, staffing levels, and workload management can impact coding quality. By addressing these organizational factors, healthcare organizations can enhance the quality of clinical coding, leading to more accurate medical records, improved patient care, and better decision-making.

Additionally, the study highlights the importance of using standardized measures like the Performance Indicators for Coding Quality (PICQ) tool to assess coding quality. Further research is recommended to explore the reliability and validity of PICQ and to investigate other potential organizational factors that may impact coding quality. A larger sample size and a more representative hospital sample could provide further insights into the associations between organizational functioning and coding error rates. Overall, this research contributes to the understanding of how organizational factors can affect the quality of clinical coding. By considering these factors and implementing measures to improve data quality, Santos et al. (2008) affirm that healthcare organizations can enhance the accuracy and reliability of clinical coding, ultimately leading to better healthcare outcomes.

Shepherd (2020) examines various aspects of clinical coding and its role in health information management. One of the key findings is that clinically coded data influences different aspects of health systems, including quality and safety monitoring, funding models, and health service planning. The quality and integrity

of health data are crucial for accurate and reliable clinical coding plays a significant role in healthcare decision-making and patient care. The research also indicates that technological advancements, such as computer-assisted coding, can improve the accuracy and quality of clinical coding. However, it is important to note that computer-assisted coding is not a complete solution, and clinical coders will still be needed in different roles to ensure the benefits of this technology are realized. Documentation improvement specialists are discussed as a potential role for clinical coders. These specialists can ensure adequate documentation that can be translated into clinical codes, bridging the gap between clinical documentation and the needs of end users of the coded data. This highlights the importance of the quality of patient records in maintaining the integrity of clinical coding. The research also identifies barriers to achieving quality clinical coding outcomes, including resource limitations, incomplete and disorganized clinical documentation, and lack of communication with clinicians. These challenges are not unique to a specific country and will likely be faced by clinical coders globally.

Furthermore, the research emphasizes the need for congruence between clinical codes and the clinical documentation in medical records. Inaccurate or incomplete coding can lead to incomplete administrative databases, impacting epidemiological studies and other research relying on coded data. The specificity of clinical codes and their alignment with current clinical definitions is also an important consideration. Lastly, the research discusses the use of clinical coded data in diagnosis-related groups (DRGs) for funding models. The coding of co-morbidities and the accuracy of coding data are crucial for determining complexity splits in DRGs. The articles suggest that accurate coding and cost data are essential for evaluating the performance of secondary diagnoses in reflecting case complexity. Shepherd (2020) emphasizes the need for high-quality and accurate clinical coding to ensure reliable health data, support decision-making, and improve patient care.

Botsis et al. (2010). The research paper discussed the data quality issues encountered in a survival analysis study of pancreatic cancer patients using Electronic Health Records (EHR). The study found that

incomplete, inaccurate, and inconsistent data were major challenges in utilizing EHR for research purposes. The authors highlighted the need for emerging informatics technologies to address these data quality issues. Regarding the impact of clinical data quality on the clinical coding process, it is important to note that accurate and complete data are crucial for coding purposes. Clinical coding involves translating medical information into standardized billing, research, and data analysis codes. If the underlying EHR data is of poor quality, it can lead to coding errors and inaccuracies in billing, research studies, and healthcare analytics. The research paper's findings emphasize the importance of addressing data quality issues to ensure the reliability and validity of clinical coding. Data completeness, accuracy, and consistency can enhance the coding process, leading to more accurate billing, reliable research outcomes, and better healthcare analytics. This aligns with the need to improve clinical data quality to support efficient and effective healthcare practices and decision-making.

O'Malley et al. (2005) highlight various steps in the code assignment process and identify areas where errors can occur. They also discuss the importance of code accuracy for different applications in research, healthcare policy, and finance. The article emphasizes that errors can occur at different stages of the "patient trajectory" and the "paper trail." Patient trajectory errors include issues related to the quality and amount of information at admission, communication among patients and providers, clinician knowledge and experience, and attention to detail. Paper trail errors include discrepancies in electronic and written records, coder training and expertise, facility quality control efforts, and unintentional and intentional coding errors. The researchers suggest that by understanding the code assignment process and being aware of potential error sources, code users can evaluate the accuracy and applicability of codes for their specific situations. They also propose creating a tool, such as a flowchart, to assist code users in evaluating code accuracy. Now, connecting to the impact of clinical data quality on the clinical coding process, it is crucial to note that the accuracy and completeness of clinical data directly affect the quality of clinical coding. Clinical coders rely on accurate and

comprehensive clinical documentation to assign the appropriate codes. If the clinical data is complete, clear, and consistent, it can lead to coding errors and inaccuracies. High-quality clinical data ensures that the codes assigned reflect the true clinical picture of each patient. It enables accurate reporting of diagnoses and procedures, which is essential for research, reimbursement, policy-making, and healthcare decision-making. Conversely, data quality can result in correct code assignment, leading to accurate statistical analysis, financial implications, and compromised patient care. Therefore, healthcare organizations need to prioritize data quality initiatives to improve the clinical coding process. This includes ensuring standardized and consistent documentation practices, providing comprehensive training to clinical coders, implementing quality control measures, and promoting collaboration between clinicians and coders to clarify any discrepancies or ambiguities in the clinical data. By addressing the impact of clinical data quality on the clinical coding process, O'Malley et al. (2005) report that healthcare organizations can enhance the accuracy and reliability of coded data, ultimately leading to improved healthcare outcomes and informed decision-making.

Opitasari & Nurwahyuni (2018) in their research methodology include medical record reviews, in-depth interviews with various stakeholders, and data analysis through content analysis. The findings of the research indicate several problems. The study of 105 medical records reveals incomplete documentation for supporting medical examination variables (12.2%), high inconsistency in documenting secondary diagnoses (68.6%), and a significant frequency of inaccurate primary diagnoses (21.9%). The research concludes that complete discharge summaries and accurate diagnosis and procedure coding contribute to an average loss of 4% in hospital revenue. This emphasizes the importance of clinical data quality in the clinical coding process, as inaccuracies can lead to financial losses for hospitals. Furthermore, the study highlights the need for improved documentation practices, increased physician compliance with coding standards, and enhanced coding training for physicians to ensure accurate clinical coding.

Alonso et al. (2020) explores medical coders' perceptions of problems with health records that affect the quality of coded clinical data in Portugal. Medical coders abstract diagnoses and procedures from health records and assign codes for reimbursement, research, and other purposes. Medical coders identified issues with incomplete, unclear, and inconsistent documentation in health records, like missing discharge summaries, surgical reports, and use of abbreviations. This influences the quality of coded data, as coders cannot assign accurate codes without complete information. There was variability in health record quality between hospitals, specialties, and individual healthcare providers. Differences in how diagnoses were described created challenges for precision in coding. The transition to electronic health records improved legibility and introduced issues like lengthy "copy-paste" documentation duplicating errors over time. Suggested solutions included standardized health record guidelines, increased auditing, physician training, and the use of structured clinical terminology to improve consistency. The research confirms that incomplete, unclear, and inconsistent clinical documentation directly impacts the process and quality of clinical coding. Without complete documentation, coders cannot assign the most accurate diagnosis and procedure codes which affects reimbursement calculations, research based on coded data, and other downstream uses of the clinical codes derived from health records. As discussed by Opitasari & Nurwahyuni (2018), standardizing documentation practices would thus improve both clinical data quality and clinical coding quality.

Sukanya, (2017) studied the validity of principal diagnoses recorded in discharge summaries and coding assessments based on national health data from Thailand. Some key points noted are:

- It compared principal diagnoses in discharge summaries to medical record reviews, and coding assessments to ICD-10 codes and discharge summaries.

- It found low validity, with discharge summaries and coding assessments often containing mistakes or incorrect information. Certain disease categories like endocrine/metabolic diseases and symptoms had particularly low validity.
- Factors like variability in clinical knowledge, poor record quality, inadequate coder training, lack of hospital quality controls, and intentional/unintentional coder errors contributed to invalid data.
- Coders often lacked understanding of disease pathophysiology, criteria for principal diagnoses, and skills to choose the correct codes. Incomplete documentation by physicians also impacted coding.

This connects to the impact on clinical coding quality because invalid source data directly undermines the accuracy and reliability of the coding process and results. If discharge summaries and medical records contain mistakes, inconsistencies, or lack clinical detail, coders cannot assign fully accurate codes. Improving source documentation practices, physician training, coder competencies, and hospital oversight would enhance both clinical data quality and clinical coding quality by providing coders with better source information to work from (Januel et al., 2011). Higher quality source data enables coders to generate coding outputs that more precisely represent a patient's clinical condition. So, this study demonstrates how upstream clinical documentation impacts downstream clinical coding quality.

In conclusion, the previous researches recommend that all clinicians must have a good knowledge of clinical coding to improve the quality of coded data and increase facility reimbursement by decreasing waste. They also recommend an educational session for all medical practitioners. The literature review highlights several challenges and barriers and suggests some solutions, such as educating the clinicians and set policies to avoid resistance. In my opinion I assure on importance of knowing each other's roles and updating the facility hierarchy in line with new needs and publishing policies so everyone can know their role.

Methodology

A qualitative approach will be employed in this study to answer the research questions and achieve the research objectives. The study design will be a cross-sectional study, and the sample will be selected based on the availability of the Qassim Health Cluster Health information system that utilizes clinical coding processes. Quantitative data will be collected through coding accuracy assessments, productivity measurements, and analysis of data quality indicators. Descriptive statistics will be used to analyze the quantitative data collected.

1. **Study Design:** A cross-sectional study design will be used to collect data from healthcare organizations and coding professionals.
2. **Sample Selection:** The sample will be selected based on the availability of the Qassim Health Cluster that utilizes clinical coding processes. A purposive sampling technique will be employed to ensure the inclusion of the organization with varying sizes and characteristics (Figure A).
3. **Data Collection:** Quantitative data will be collected through the following methods (Figure A).
 - a) Coding Accuracy Assessments: A sample of coded medical records will be randomly assessed. Trained coders will review the records and compare the assigned codes to the standard. Coding accuracy will be measured by calculating the percentage of correctly assigned codes.
 - b) Productivity Measurements: The coding productivity of clinical coders will be measured by time consumed in one file.
 - c) Data Quality Indicators

4. **Data Analysis:** Descriptive statistics will be used to analyze the quantitative data collected. The coding accuracy rate will be calculated as a percentage, indicating the level of agreement between assigned codes and the standard. Productivity measurements will be analyzed to determine the average number of codes assigned per working day. Data quality indicators will be assessed and reported quantitatively, providing insights into the overall clinical data quality used in the coding process. (Figure A).
5. **Ethical Considerations:** Ethical data privacy and confidentiality guidelines will be strictly followed throughout the research process. No personally identifiable information will be disclosed or reported. (Figure A).

Interview details

Participant ID	Position	Duration	Type of Interview	Gender	Method
1	clinical coding supervisor	40	Semi-Structured	F	Face to Face
2	health information manager	30	Semi-Structured	M	Zoom
3	Clinical pharmacist	30	Semi-Structured	F	Face to Face
4	Clinical coder and CDIs	40	Semi-Structured	F	Zoom

Conclusion

This research aims to contribute to the existing body of knowledge on healthcare management, data quality, and coding practices by investigating the impact of clinical data quality on the clinical coding process. The findings of this study will have implications for healthcare organizations, policymakers, and researchers seeking to optimize clinical coding processes and improve overall patient care.

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Ministry of Health.

Saudi Commission for Health Specialties.

Appendix

Appendix 1: Interview Guide

Interview 1

This interview conducted in face-to-face meeting lasts for 40 minutes. The interviewee is a clinical coding supervisor in a cardiac specialized hospital who has 12 years' experience in clinical coding and medical records.

When she has been asked about the impact of clinical data quality on clinical coding process, she mentioned that it has a massive affect because coder cannot assume any unwritten information and in this case the coder most query the clinician to investigate more about that information, which is a time and effort consuming issue.

In her team, the fully documented files takes in average 33 minutes to be coded.

While the queried files take in average of 97 minutes to be done which is double time for the healthy files.

Therefore, of course, these minutes have a great impact on the coding workflow.

She recommend training to all the clinician by conducting an orientation session about how data should be write to get a high quality coding outcomes.

Interview 2

This health information manager with a career of 5 years' experience started as a medical record technician reaching to the present position, working in a general hospital with capacity of 180 beds, has been interviewed online using Zoom application for 30 minutes.

He has a shortage knowledge of what is clinical coding and how they should work.

After a brief explanation from our side, he admit the importance of clinical coding and suggest an HIM auditing KPIs to help increasing quality of data which is reflect on Coding quality.

Interview 3

A clinical pharmacist with 9 years' experience in medication and 5 years' experience as head of insurance claims submission department has interviewed face-to-face for 40 minutes and been asked about the impact of clinical data quality on clinical coding process she gives us a very deep answer while she has a good experience in coding and related fields.

She mentioned that it is very important to have a clinical coded data at every health facility to maintain the data quality workflow; she said that their facility has recruited a clinical coding auditor, believing in their roles they published a policy named: coding quality policy.

The policy intensify on coding auditor role as the last step on patient's file clinical journey, and give him the green light to contact with any clinician to make sure that the written notes can be translated to codes, with this strict workflow the facility reached a denial claims just 14% which is considered as a very good.

Interview 4

a clinical coder with 4 years' experience in coding and clinical documentation improvement working at medical city with 1200 beds capacity answering our questions online with a 40 minutes meeting on Zoom application by saying "clinical documentation improvement plays a critical role in coding process, that because it cannot be reach a 100% of coding accuracy without checking and improve what have been documented so we here activate the CDI efficiently to avoid any lack information or query for coders. By following this workflow we reached a 100% coded files which was previously something beyond our will".

Appendix 2: Interview question

- What do you know about clinical coding and how is it done.?
- If you have a clinical coding in your facility, how do you describe your practices.?
- In your opinion, how could clinical data affect the clinical coding outcomes.?
- What is the benefits of having clinical coded data at the facility.?
- Describe the improvement plan you apply to avoid any effect on clinical coding.
- What do you suggest to do as a healthcare practitioner to improve clinical coding process.?

Appendix 3

Selected samples show that the accuracy of coding percentage was 78%, which is a good result.

As per coding auditors, one of the main reasons for this shortage is lack of information in the medical records and lack of communication with clinician.

One of the biggest issue in such cases is the financial impact, and the examples bellow will explain this.

Figure A:

Example	DRGs before auditing	Complexity before auditing	Cost before auditing	DRGs after auditing	Complexity after auditing	Cost after auditing
A	B81A	Major	High	B81B	Intermediate	lower
B	T60A	Major	High	T60C	Minor	lower
C	F14C	Minor	Low	F65B	Intermediate	Higher

As in this table, the discrepancy between before and after audit shows that the cost is differ in these cases which is reflects on reimbursement and budgeting process.

أثر جودة البيانات السريرية على عملية الترميز الطبي بالقصيم

إعداد الطالب/

راشد سعد ال جمعان 221002611

سيف محمد السيد 221002394

إشراف/

د. وليد سليمان

العام الدراسي:

2023