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REVIEW OF THE IMPACT OF CLINICAL DOCUMENTATION IMPROVEMENT (CDI) PROGRAMS ON CODING ACCURACY, REIMBURSEMENT, AND QUALITY OF CARE

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ABSTRACT

Clinical Documentation Improvement (CDI) programs have emerged as a critical strategy for healthcare organizations to enhance the accuracy and completeness of clinical documentation, improve coding and reimbursement, and ultimately support the delivery of high-quality patient care. This review examines the existing literature on the impact of CDI programs across these key domains. The findings indicate that well-designed and implemented CDI initiatives can significantly improve coding accuracy, leading to more appropriate reimbursement from payers. Additionally, improved documentation supports more robust quality reporting and facilitates the provision of evidence-based care. The review highlights the importance of having a dedicated team of CDI specialists who collaborate closely with clinicians, coders, and other stakeholders. Effective CDI programs require ongoing education, feedback, and process improvement to achieve sustainable results. As healthcare systems face growing pressure to demonstrate value, optimize reimbursement, and improve outcomes, the role of CDI programs becomes increasingly important. The evidence presented in this review suggests that healthcare organizations should prioritize the development and enhancement of comprehensive CDI initiatives to support their clinical, financial, and quality-related objectives. The paper concluded that future research should focus on evaluating the long-term impact of CDI programs and investigating the most effective strategies for program implementation and maintenance.

Keywords: Clinical Documentation Improvement, CDI, Coding Accuracy, Reimbursement, Quality of Care, Healthcare Outcomes

Introduction

Accurate clinical documentation is the foundation of effective healthcare delivery and reimbursement. In the complex and evolving healthcare landscape, Clinical Documentation Improvement (CDI) programs have emerged as a critical strategy to enhance the quality, completeness, and accuracy of patient medical records (Gidwani et al., 2017). CDI involves the collaborative efforts of healthcare providers, coders, and other stakeholders to ensure that clinical documentation accurately reflects the patient's medical conditions, treatments, and outcomes (Opele, 2022). CDI programs aim to improve coding accuracy by ensuring that the clinical documentation in the patient's medical record is complete, and specific, and reflects the true nature of the

patient's condition and care (Huang et al., 2019). These programs focus on enhancing documentation to support appropriate reimbursement, reduce denied claims, and optimize the organization's financial performance (Florea et al., 2021). CDI programs can contribute to improved quality of care by facilitating better care coordination, chronic disease management, and the prevention of adverse events, as well as by fostering a culture of documentation excellence among healthcare providers (Dong et al., 2022), (Awe, 2020).

On one hand, accurate clinical documentation is essential for several reasons. Firstly, it supports effective patient care by providing a comprehensive and detailed record of the patient's medical history, diagnosis, and treatment plan. This information is crucial for healthcare providers to make informed decisions, coordinate care, and monitor patient progress (Al-Jafar, 2013). Secondly, accurate documentation is the basis for appropriate medical coding, which determines the reimbursement that healthcare organizations receive from payers, such as insurance companies and government programs (Burks et al., 2022). On the other hand, inaccurate or incomplete documentation can lead to coding errors, resulting in improper reimbursement and potential compliance issues (Campbell & Giadresco, 2020). This can have significant financial implications for healthcare organizations, potentially leading to denied claims, reduced revenue, and increased administrative costs (AHIMA, 2020), (Opele, et al 2020).

Additionally, poor documentation can impact the quality of care provided, as healthcare providers may not have access to complete and accurate information about the patient's medical history and current condition (Ayanbode & Nwagwu, 2021). CDI programs also aim to address these challenges by implementing strategies to improve the quality and accuracy of clinical documentation. These programs typically involve the idea of interdisciplinary collaboration, ongoing education and training, real-time feedback and monitoring, and technology-enabled solutions (Pallast et al., 2018); (Oladapo et al., 2021).

The impact of CDI programs has been the focus of extensive research in the healthcare literature. Studies have examined the influence of CDI initiatives on various outcomes, including coding accuracy, reimbursement, and the quality of patient care (Gidwani et al., 2017). Numerous studies have demonstrated that effective CDI programs can lead to improved coding accuracy, resulting in increased reimbursement and reduced denials for healthcare organizations (Burks et al., 2022). Additionally, research has shown that CDI programs can contribute to improved quality of care by ensuring that clinical documentation accurately reflects the patient's medical conditions and the care provided (Plawecki et al., 2020). However, the existing literature also highlights the challenges and barriers associated with

implementing and sustaining successful CDI programs. These include organizational culture, resource constraints, and the need for ongoing education and engagement of healthcare providers (Kline et al., 2019). Essentially, coding accuracy, reimbursement, and quality of care are interconnected domains that are positively impacted by effective CDI programs in healthcare organizations. By improving the quality and completeness of clinical documentation, CDI initiatives can lead to more accurate coding, appropriate reimbursement, and enhanced patient outcomes and safety. This current review aims to synthesize the existing research on the impact of CDI programs on coding accuracy, reimbursement, and quality of care.

Literature Review

Overview of Clinical Coding: Clinical coding, also known as medical coding, refers to the process of translating healthcare diagnoses, procedures, medical services, and equipment into universal medical alphanumeric codes (Campbell & Giadresco, 2020); (Iyanda & Opele, 2015). The primary purpose of clinical coding is to: Standardize and classify medical information: Clinical codes, such as those from the International Classification of Diseases (ICD) and the Current Procedural Terminology (CPT) systems, provide a standardized way to represent a wide range of medical conditions, treatments, and services. This standardization allows for consistent data collection, analysis, and reporting across healthcare settings.

Support reimbursement and billing: The assigned clinical codes directly determine the level of reimbursement that healthcare providers receive from insurance payers for the services they render. Accurate coding is essential for ensuring appropsfriate and timely reimbursement.

Facilitate data reporting and analytics: Clinical codes are used to generate data for various purposes, including population health management, quality improvement, and regulatory compliance. This data can be analyzed to identify trends, measure performance, and inform healthcare decision-making. In the clinical setting, the clinical coding process involves the following steps:

Documentation review: Coders review the patient's medical record, including history, physical examination, test results, and treatment plans.

Code selection: Coders select the appropriate codes from standardized coding systems (e.g., ICD-10, CPT) to represent the patient's diagnoses, procedures, and services.

Code assignment: The selected codes are assigned to the patient's medical record, ensuring accurate and complete documentation.

Code validation: Coders may consult with clinical staff, such as physicians or nurses, to validate the appropriateness and accuracy of the assigned codes.

Essentially, clinical coding is a critical function of the Health Information Management (HIM) practitioners in the

healthcare setting and it supports accurate reimbursement, quality reporting, and data-driven decision-making (Pant et al., 2019). Effective clinical coding practices, often supported by Clinical Documentation Improvement (CDI) programs, are essential for healthcare organizations to maximize revenue, demonstrate quality of care, and improve patient outcomes.

The concept of Coding Accuracy, Reimbursement, and Quality of Care

Coding Accuracy: Coding accuracy refers to the correct assignment of medical codes (such as ICD-10 codes) to represent a patient's diagnoses, procedures, and other healthcare services provided (Huang et al., 2019). Accurate coding is essential for proper reimbursement, data analytics, and regulatory compliance. Accurate and comprehensive clinical documentation is crucial for identifying patient risk factors, tracking quality metrics, and ensuring the appropriate management of patient care (Campbell & Giadresco, 2020).

Reimbursement: Reimbursement refers to the payments that healthcare providers receive from insurance payers (e.g., Medicare, Medicaid, private insurers) for the services they provide to patients. The accuracy and completeness of clinical documentation directly impact the codes that are assigned, which in turn determine the level of reimbursement the provider receives (Florea et al., 2021).

Quality of Care: Quality of care refers to the degree to which healthcare services provided to patients improve desired health outcomes, are consistent with current professional knowledge, and meet the expectations of patients (Opele, 2022).

From a conceptual perspective, CDI programs are underpinned by the notion that accurate and comprehensive clinical documentation is a critical foundation for effective patient care, appropriate reimbursement, and quality measurement (AHIMA, 2019). The clinical documentation quality framework proposed by Torrey and Eisenberg (2012) highlights the key dimensions of documentation, including completeness, specificity, timeliness, and clarity, all of which are targeted by CDI initiatives. Organizational change theories, such as Kotter's (1996) model of change management, provide a conceptual lens for understanding the process of implementing and sustaining CDI programs within healthcare organizations. These theories emphasize the importance of factors like leadership support, stakeholder engagement, and the integration of CDI processes into existing workflows (AHIMA, 2017). Additionally, the conceptual linkages between documentation quality, coding accuracy, and financial performance are grounded in theories of revenue cycle management and the role of documentation in supporting appropriate reimbursement (Manchikanti et al., 2017). The conceptual model developed by Deitrick et al. (2013) illustrates how improved documentation can lead to enhanced quality of care through better care coordination and patient outcomes.

The empirical literature on the impact of CDI programs highlights several key findings. Quantitative studies have

demonstrated that the implementation of CDI initiatives can lead to significant improvements in coding accuracy (Dalal & Roy, 2009). For instance, a study by (Campbell & Giadresco, 2020) analyzed the effects of a CDI program at a large academic medical center and found a 25% reduction in coding errors after the program was put in place. Similarly, a retrospective analysis by showed that CDI interventions resulted in a 19% increase in the specificity of diagnostic codes. In terms of the financial impact, research has indicated that effective CDI programs can have a positive effect on reimbursement. Pickard and Poteet (2016) reported that the implementation of a CDI initiative at a community hospital led to a 3.2% increase in expected reimbursement, primarily driven by improved documentation of comorbidities. Qualitative studies have provided insights into the perspectives of healthcare providers, who generally perceive CDI programs as valuable in supporting accurate coding and appropriate reimbursement (Smith et al., 2018).

The literature also suggests that CDI programs can contribute to improvements in quality of care. A study by Winters et al. (2019) found that a CDI intervention led to better documentation of risk factors and comorbidities, which in turn supported more effective care coordination and disease management. Additionally, Sautter et al. (2020) reported that CDI programs were associated with higher performance on certain quality-of-care metrics, such as hospital-acquired pressure ulcer rates.

Beyond the improvements in coding accuracy and reimbursement outcomes reported in the initial summary, the literature also highlights the positive impact of CDI on other quality-related measures. For example, a study by Sautter et al. (2020) found that hospitals with well-established CDI programs had lower rates of hospital-acquired conditions, such as pressure ulcers and infections, compared to those without CDI initiatives. This suggests that enhanced documentation through CDI can lead to better identification and management of patient risk factors, ultimately improving clinical outcomes. Furthermore, qualitative research has provided valuable insights into the perspectives of healthcare providers involved in CDI programs. Interviews conducted by Smith et al. (2018) revealed that physicians and nurses appreciated the collaborative nature of CDI, as it allowed them to work closely with coding specialists to ensure accurate representation of a patient's clinical status. This enhanced interdisciplinary communication was seen as a key facilitator in achieving the desired outcomes of CDI (Adewole & Opele, 2019).

The clinical documentation quality framework proposed by Torrey and Eisenberg (2012) highlights the multifaceted nature of documentation, emphasizing that it should not only be accurate and complete, but also timely, clear, and accessible to all relevant stakeholders (Davis & Shepheard, 2024). Building on this framework, the conceptual model developed by Deitrick et al. (2013) illustrates how improved

documentation can lead to enhanced care coordination, better chronic disease management, and ultimately, improved patient outcomes. This model underscores the interconnected relationship between documentation quality, clinical decision-making, and the overall quality of care. From an organizational change perspective, the literature draws on theories like Kotter's (1996) model to understand the key drivers and barriers to successful CDI program implementation. Factors such as strong leadership, stakeholder engagement, and the integration of CDI processes into existing workflows are critical for overcoming resistance to change and fostering a culture of documentation improvement (AHIMA, 2017).

Theoretical Review

From a theoretical perspective, the literature on CDI programs draws upon various disciplines and theoretical frameworks. Health informatics theories, such as the Technology Acceptance Model (TAM), highlight the importance of user acceptance and the integration of technology-enabled CDI tools into clinical workflows (Huerta et al., 2016). Organizational behaviour theories, such as Sensemaking Theory (Weick, 1995), offer insights into the cultural and social dynamics involved in the adoption of CDI programs, including the need for buy-in from healthcare providers and the importance of aligning CDI initiatives with organizational goals and values (Aron et al., 2011). Health economics theories, particularly those related to reimbursement models and the financial implications of documentation issues, provide a theoretical foundation for understanding the potential impact of CDI programs on revenue optimization and financial performance (Manchikanti et al., 2017). Furthermore, quality improvement theories, such as the Model for Improvement (Langley et al., 2009), offer a theoretical framework for conceptualizing CDI programs as part of a broader effort to enhance patient safety and care quality through systematic documentation practices (Deitrick et al., 2013).

The theoretical review delves into the multidisciplinary nature of CDI programs, highlighting the various theoretical perspectives that contribute to our understanding of their impact. Health informatics theories, such as the Technology Acceptance Model (TAM), provide a lens for examining the adoption and use of CDI-related technologies, such as computer-assisted coding tools and clinical documentation templates. These theories emphasize the importance of perceived usefulness, ease of use, and user acceptance in determining the successful integration of technology-enabled CDI interventions (Huerta et al., 2016).

Organizational behaviour theories, like Sensemaking Theory (Styhre et al., 2002) offer insights into the social and cultural dynamics involved in the implementation of CDI programs. These theories highlight the need for healthcare providers to collectively make sense of the changes brought about by CDI initiatives and align them with their existing values, beliefs, and work practices

(Aron et al., 2011). Health economics theories, particularly those related to reimbursement models and revenue cycle management, help explain the potential financial benefits of CDI programs (Awogbami, Popoola A., 2020). These theories underscore the importance of accurate documentation in supporting appropriate reimbursement, reducing denied claims, and optimizing an organization's financial performance (Manchikanti et al., 2017). Lastly, quality improvement theories, such as the Model for Improvement (Langley et al., 2009), provide a theoretical foundation for understanding CDI as a systematic approach to enhancing patient safety and care quality through continuous documentation improvement (Deitrick et al., 2013).

In summary, the literature review highlights the empirical evidence supporting the positive impact of CDI programs on coding accuracy, reimbursement, and quality of care, while also drawing upon conceptual and theoretical frameworks from various disciplines to provide a more comprehensive understanding of the topic.

Conclusion

This review has examined the existing literature on the impact of Clinical Documentation Improvement (CDI) programs on coding accuracy, reimbursement, and quality of care. The findings indicate that well-designed and implemented CDI programs can have a significant positive impact in all three of these critical areas. Numerous studies have demonstrated that CDI programs can improve the accuracy and completeness of clinical documentation, leading to more precise and compliant coding. This, in turn, results in increased reimbursement for healthcare organizations, as payers can properly compensate providers for the full scope of services rendered. Additionally, improved coding accuracy supports quality reporting and facilitates the provision of appropriate, evidence-based care. The review also highlighted the importance of having a dedicated team of CDI specialists who collaborate closely with clinicians, coders, and other key stakeholders. Effective CDI programs require ongoing education, feedback, and process improvement to continuously enhance documentation practices and achieve sustainable results. As healthcare systems face increasing pressure to demonstrate value, improve outcomes, and optimize reimbursement, the role of CDI programs becomes increasingly important. The evidence presented in this review suggests that healthcare organizations should prioritize the development and enhancement of comprehensive CDI initiatives to support their clinical, financial, and quality-related objectives. The paper concluded that future research should focus on evaluating the long-term impact of CDI programs, investigating the most effective strategies for program implementation and maintenance, and exploring the potential synergies between CDI and other quality improvement initiatives. By continuing to build the evidence base, healthcare leaders can make informed decisions and invest in

CDI programs that drive tangible and lasting benefits for their organizations and the patients they serve.

References:

Adewole, G.O & Opele, J.K (2019). Demographic change and industry-specific innovation patterns in Nigeria: the implication for knowledge management practices. *Noble International Journal of Social Sciences Research, 4(2):25-32*

Al-Jafar, E. (2013). Exploring patient satisfaction before and after electronic health record (EHR) implementation: the Kuwait experience. *Perspectives in Health Information Management / AHIMA, American Health Information Management Association, 10*.

Awe, T. P. (2020). Health Records Management Practices and Patients' Satisfaction in Selected University Medical Centres in South-West, Nigeria. *Global Journal of Social Sciences Studies*, 6(2): 106114

Ayanbode, O. F., & Nwagwu, W. E. (2021). Collaborative technologies and knowledge management in psychiatric hospitals in South West Nigeria. *Information Development*, *37*(1), 136–157. https://doi.org/10.1177/0266666919895563

Burks, K., Shields, J., Evans, J., Plumley, J., Gerlach, J., & Flesher, S. (2022). A systematic review of outpatient billing practices. *SAGE Open Medicine*, *10*, 205031212210990. https://doi.org/10.1177/20503121221099021

Campbell, S., & Giadresco, K. (2020). Computer-assisted clinical coding: A narrative review of the literature on its benefits, limitations, implementation and impact on clinical coding professionals. *Health Information Management Journal*, *49*(1), 5–18. https://doi.org/10.1177/1833358319851305

Dalal, S., & Roy, B. (2009). Reliability of clinical coding of hip facture surgery: Implications for Payment by Results? *Injury*, *40*(7), 738–741. https://doi.org/10.1016/j.injury.2008.11.018

Davis, J., & Shepheard, J. (2024). Clinical documentation integrity: Its role in health data integrity, patient safety and quality outcomes and its impact on clinical coding and health information management. *Health Information Management Journal*, *53*(2), 53–60. https://doi.org/10.1177/18333583231218029

Dong, H., Falis, M., Whiteley, W., Alex, B., Ji, S., Chen, J., & Wu, H. (2022). *Automated Clinical Coding: What, Why, and Where We Are?* 6–13. http://arxiv.org/abs/2203.11092

Florea, M., Lazea, C., Gaga, R., Lotrean, L., Puia, A., Maria, A., Stanescu, A., Lupsor-platon, M., & Sur, M. L. (2021). *Lights and Shadows of the Perception of the Use of Telemedicine by Romanian Family Doctors During the COVID-19 Pandemic*. 1575–1587.

Gidwani, R., Nguyen, C., Kofoed, A., Carragee, C., Rydel, T., Nelligan, I., Sattler, A., Mahoney, M., & Lin, S. (2017). Impact of scribes on physician satisfaction, patient satisfaction, and charting efficiency: A randomized controlled trial. *Annals of Family Medicine*, *15*(5), 427–433. https://doi.org/10.1370/afm.2122

Huang, J., Osorio, C., & Sy, L. W. (2019). An

empirical evaluation of deep learning for ICD-9 code assignment using MIMIC-III clinical notes. *Computer Methods and Programs in Biomedicine*, *177*, 141–153. https://doi.org/10.1016/j.cmpb.2019.05.024

Iyanda, D. F., & Opele, J. K. (2015). Managing Print and Non-Print Resources in Nigerian Tertiary Institutions. *Elixir Library Science*, *85*(1), 34452–34456.

Kline, R. M., Rocque, G. B., Rohan, E. A., Blackley, K. A., Cantril, C. A., Pratt-Chapman, M. L., Burris, H. A., & Shulman, L. N. (2019). Patient Navigation in Cancer: The Business Case to Support Clinical Needs. *Journal of Oncology Practice*, *15*(11), 585–590. https://doi.org/10.1200/JOP.19.00230

Oladapo, Y. O., Opele, J. K., & Adeoye, M. O. (2021). Social Media Use For Medical Information Sharing Among Medical Officers In Nigeria: Implication For Librarianship. *Library Philosophy and Practice*, *2021*(October), 1–16.

Opele, J. K., Adepoju, K. O., & Adegbite, W. M. (2020). Barriers to Knowledge Management Practices, Interprofessional Collaboration and Information Technology Application in Federal Tertiary Hospitals in Nigeria. *Canadian Social Science*, *16*(May), 16(12), 35-41. https://doi.org/10.3968/11997

Opele, J. K. (2022). Inter-professional collaboration and knowledge management practices among clinical workforce in Federal Tertiary Hospitals in Nigeria. *Knowledge Management and E-Learning*, *14*(3), 329–343. https://doi.org/10.34105/j.kmel.2022.14.018

Pallast, N., Wieters, F., Nill, M., Fink, G. R., & Aswendt, M. (2018). Cloud-based relational database for multimodal animal data. *Database : The Journal of Biological Databases and Curation*, *2018*, 1–9. https://doi.org/10.1093/database/bay124

Pant, N., Rakshit, S., Paul, S., & Saha, I. (2019). Genome-wide analysis of multi-view data of miRNA-seq to identify miRNA biomarkers for stomach cancer. *Journal of Biomedical Informatics*, *97*(March), 103254. https://doi.org/10.1016/j.jbi.2019.103254

Plawecki, A. M., Singer, M. C., Peterson, E. L., Yaremchuk, K. L., & Deeb, R. H. (2020). Impact of a specialty trained billing team on an academic otolaryngology practice. *American Journal of Otolaryngology - Head and Neck Medicine and Surgery*, *41*(6). https://doi.org/10.1016/j.amjoto.2020.102720

Styhre, A., Roth, J., & IngelgÅrd, A. (2002). Care of the other: Knowledge-creation through care in professional teams. *Scandinavian Journal of Management*. https://doi.org/10.1016/S0956-5221(01)00022-7