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FACTORS AFFECTING THE ACTIVATION OF MEDICAL CODING AND CLINICAL MEDICAL DOCUMENTATION FOR PATIENTS IN THE KINGDOM OF SAUDI ARABIA. (2023)

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ABSTRACT

Aim: This study aimed to determine the factors affecting the activation of medical coding in health facilities and the extent of its application with the required quality in the Kingdom of Saudi Arabia.

Method: This cross-sectional descriptive study in which a semi-structure interviews were conducted with all available clinical coders in Saudi Arabia. Both qualitative and quantitative data were collected and analyzed to achieve the study objectives.

Results: The sample size was 105 subjects, 40% male and 60% female, only 53.3% of respondents worked in hospitals using electronic medical records (EMR), while 46.7% used paper medical records. About 28% of respondents were dissatisfied with their clinical coding practices. Regulatory and clinical variables were found to be significantly associated with levels of satisfaction, namely, availability of clinical coding policies, and possession of EMR with coding scheme.

Conclusion: transition to ICD-10-AM is a major journey for hospitals. Top management should realize that having clinical coding policies, training, moving toward having EMR and encoding system could smooth this journey.

Background: Clinical coding of diseases has drawn a great attention nationally and internationally, as it is mandatory to move to the latest version of the International Classification of Disease, Version-10 (ICD-10).

Study Objectives: This study aims at providing a description for the current status of clinical coding, ICD-10-AM, practice in Saudi Arabia. Further, challenges and barriers for proper clinical coding from codes' perspectives are investigated.

Discussion: A full support of the high management, providing training, and applying clinical coding policies are important contributors to the satisfaction level of the clinical coders. A foster move toward digitizing the health care through implementing EMR and encoding system are also important for proper clinical coding practice.

Keywords: Clinical Coding, International Classification of Diseases, ICD-10 Vocabulary, Controlled.

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ICD – International Classification of Diseases

DF – Degrees of Freedom

PLIW – Personal Life Interference with Work

STD – Standard Deviation

1. Introduction

Medical coding is the process of converting disease, injury and procedure reports into numeric or alphanumeric designations (AHIMA, 2016). It consists of the primary function in the efficiency of the health facility. As such, the need for programmers to be familiar with task process code is important, so representing different clinical terms and nomenclature (DeAlmeida, 2012; Alakrawi, 2016) would have more benefits. Accordingly, it is recommended that clinical coders be qualified to handle the HIPAA set of codes. This includes the International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM); Current Procedural Terminology (CPT); Dental Procedures and Labeling Act (CDT); National Drug Codes (NDCs); and Healthcare Public Procedure Coding System (HCPCS) (AMA, 2014; CMS, n.d.). It should be noted that medical coding influences health reporting in the general context. The Saudi Health Authority has also used the ICD to report deaths to the World Health Organization (WHO) for several decades. However, the ICD is not used in the daily care process to report morbidity. On the recommendation of the World Health Organization, the Saudi Council for Health Services (representing the Saudi Ministry of Health) signed an agreement between the government of the Kingdom of Saudi Arabia and the government of the Commonwealth of Australia represented by the Ministry of Health and Aging to become a licensed country. In the use of the ICD-10-AM (6th Edition) and Related Australian Duplicate Diagnostic Groups (AR-DRGs) (ICD-10-AM and Department of Health, 2013)

For example, coding is used to investigate major causes of mortality and morbidity. Furthermore, a researcher like Al-Aqrawi (2016) has argued that one of the factors for raising funds for various diseases as well as healthcare services is medical coding. In this context, medical programmers should shorten the coding process as they report the data, which will be used as a baseline. However, because employees are not familiar with the process and questions regarding data accuracy, encrypted data in general appeared completely unused (Land, 2016).

ICD-10-AM adoption is usually expensive, requires more clinical programmers, and takes longer to code a single loop of care (Innes et al, 2000).

By reviewing the current status of Saudi hospitals, the obstacles and challenges that prevent hospitals from adopting the ICD will certainly provide insights as many Saudi hospitals are considered lagging in their journey to adopt the ICD-10-AM specifically the ICD coding system. Therefore, this study aims to assess the current status of clinical coding practice using ICD-10-AM in both government and private hospitals in Saudi Arabia. Current from the point of view of clinical programmers.

1.1 Background

Clinical coding of diseases has drawn a great attention nationally and internationally, as it is mandatory to move to the latest version of the International Classification of Disease, Version-10 (ICD-10).

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1.2 Research Question(s)

This research aims to answer the following research questions:

1- What are the factors affecting the non-application of medical coding in health facilities?

2- What are the difficulties that affect the application of medical coding according to the required standards and quality?

3- What are the factors affecting incomplete clinical documentation of patient data?

1.3 Aim of the Study

The study aims to identify the factors and challenges that affect the quality of medical coding and clinical documentation of patient data, and the obstacles that medical coders may face while working in hospitals in the Kingdom of Saudi Arabia.

1.4 Objectives

This study aims to provide a description of the current state of clinical coding.
ICD-10-AM, and clinical medical documentation of patient data practiced in the Kingdom of Saudi Arabia. Furthermore, challenges and barriers to appropriate clinical coding are investigated from a code's perspective.

2. Conceptual Framework

Conceptual framework illustrates what you expect to find through your research. It defines the relevant variables for your study and maps out how they might relate to each other. You should construct conceptual framework before you begin collecting data.

3. Literature Review

The research literature demonstrates that coding requires a thorough knowledge of medical terminology, procedures in surgery, as well as the multiple systems of the coding process (Moar & Rogers, 2011). In this context, medical coders are expected to be more productive when it comes to efficiency. Although, according to Nouaei (2013), determining coding competence for clinicians doing coding is not a common practice and depends on their diverse background, and thus, skills may be. For example, medical programmers Moar and Rogers (2011) with a background in anatomy have been seen to accurately implement the multiple coding scheme. As such, Nuray et al (2009) and Moar and Rogers (2011) show that in fact clinicians, because they have a good background, have a better background in coding compared to administrative staff. For example, research on the efficiency and accuracy of coding to suit administrative competency requirements in health care has taken off (Godbey-Miller, 2016). Consequently, many healthcare organizations as a result have created new coding metrics to monitor the coding productivity of programmers (Bower-Jernigan, 2014; Godbey-Miller, 2016). In a study conducted by Alkraiji et al, (2013) it was found that the health data standards approved by the Saudi health care system are only few, and therefore a broader adoption can be achieved by suggesting some administrative, technical, educational and governmental initiatives. In addition to these challenges, the digitization of health care services and the partnership between public and private health care providers have added an additional burden and prompted the adoption of such ICD-10 clinical standards (Tzitzivacos, 2007). Therefore, identifying challenges and suggesting initiatives related specifically to ICD-10-AM is of particular importance to the Saudi context, where there is diversity in the type of healthcare providers (Ministry of Health, Military, Education, Specialists, and private providers), and there is no organization to oversee standards and clinical terminology of the state.

It is important to train both clinical programmers and clinicians, and to understand the competencies of current clinical programmers as well as the shortcomings of clinical

documentation to design and deliver training courses (Folie et al., 2009, Ross, 2013, DeAlmeida et al, 2014, Rahmatullah et al. 2014).

Conversely, factors related to the background of medical coders as well as education and training can influence the quality and productivity of coding. In a survey conducted by the American Academy of Professional Programmers (AAPC, 2010), the group generalized that: (1) most programmers get paid consistently, and wages change depending on background; (2) Programmers generally refer to positive relationship with physicians; (3) Offices prefer emphatic programmers, (4) Doctors consistently practice coding obligations; (5) Consistency risk is the biggest problem for programmers; and (6) more programmers working on Physicians' exercises than some other places (AAPC, 2010). After the review is put into setup, differences in coding may exist due to the different qualities of their education, their relationship to their clinical specialists, and the level of clinical coders demonstrated in managerial abilities with any form of charging and approval. Furthermore, 10% of clinical programmers who responded accounted for more than 18 hours of non-code work, compared to 27% who spent 3-5 hours each week performing such tasks (HCPro, 2011). This study indicates that including the programmer in more regulatory tasks can negatively affect crypto profitability.

Medical terminology, wording, and ordering frameworks can be used in electronic health record frameworks as well as regulatory applications. According to Ginn Angelo (2012) - "Altogether, the vocabulary and formulas, moreover, the frameworks of the system give the basic, natural clinical language of the future state" of eHIM; Understanding is electronic, focused, far-reaching, longitudinal, open and authoritative (AHIMA, 2003; AHIMA, 2016; Gianna Angelo; 2012). Notwithstanding this, some frameworks of terminology, formulation, and characterization are only appropriate for specific applications or purposes, for example, documentation of clinical considerations, disclosure of public welfare, information architecture for electronic health records, health data interoperability and interoperability (HIE) (Houser and Meadow)), 2017).

In a previous report by AHIMA, it was found that the social and economic factors of programmers as much influence the quality of coding as efficiency. An investigation distributed

by AHIMA suggested that programmer credits significantly affect the accuracy and efficiency of coding (AHIMA, 2016).

A similar report suggested that instructions and long periods of engagement are important determinants of coding profitability (AHIMA, 2016). The unpredictability of asset acquisition plans can lead to poor cryptography (Nuray et al., 2013). An adjustment in the asset group class as a base result in a more prominent monetary impact than a coding adjustment within a similar classification (Moar and Rogers, 2011). Furthermore, documentation chaos, especially with regard to diseases and simultaneous entanglement, Background information to enhance support for Medicare research that delivers clinical coding because it has an immediate impact on individual well-being outcomes as well as that of the population. With the rapid transformation of welfare data innovation, there is a growing interest in robust and information-based decision-making systems (Houser and Meadow, 2017).

A review of the relevant literature reveals that the shortage of clinical programmers is a major challenge for ICD-10 adoption. In a study conducted by (Farhan et al, 2005)

The encoded clinical information required to make such a decision must be reliable and accessible to clients in a state of dynamism. Along these lines, this research paper aims to identify tidal coding patterns and different components that can influence coding quality and efficiency with two important focuses: (1) the nature of encoded clinical information. and (2) clinical coding efficiency.

4. Methods

This cross-sectional descriptive study in which a semi-structure interviews were conducted with all available clinical coders in Saudi Arabia. Both qualitative and quantitative data were collected and analyzed to achieve the study objectives.

Study Design: This study aims at providing a description for the current status of clinical coding, ICD-10-AM, practice in Saudi Arabia. Further, challenges and barriers for proper clinical coding from codes' perspectives are investigated.

Study area: This study was conducted in different hospitals and different regions, Kingdom of Saudi Arabia. Medical records departments, medical coding units, doctors and nursing were targeted. To reach the largest to help us in scientific research.

Sampling technique: The sampling technique used in this study was to create an electronic questionnaire containing a set of questions and send it electronically for easy access to most hospitals in all regions of the Kingdom of Saudi Arabia.

Data Collection methods, instruments used, measurements:

A cross-sectional design was used by conducting a semi-structured interview with clinical programmers in government hospitals. Qualitative and quantitative data were collected to assess the state of coding practice in Saudi Arabia. Sample/Participants: All clinical programmers were contacted. Contact with key coding people and consulting with the Saudi Health Authority for health professionals revealed an estimated population size of clinical coders in Saudi Arabia. Although the authors attempt to approach all clinical coders available in the country, sampling is likely to be a non-probability sampling technique, especially convenience sampling. The study was conducted in the medical records departments (Coding Department) in government hospitals.

Measurement/Tools: The tool was developed based on a comprehensive literature review. This tool includes questions that address different aspects of the hypothesized model (Fig. 1). The tool consists of (1-15) closed questions and one (16) open question. They are categorized into four

parts, as follows: Part one collects information on respondents' sociodemographic characteristics and job satisfaction; Part 2 collects data based on the organizational structure; Part 3 collects data based on clinical makeup. Part 4 contains the coding policies and the last question consists of an open question that gives the respondent an opportunity to detect any variable not mentioned that may contribute to the study objectives. In order to test the apparent validity of the instrument, firstly, two students and the study doctor in charge of the study examined the instrument to verify its apparent validity, and then a pilot study was conducted to test the validity and reliability of the instrument and its publication. The structured interview was conducted to 3 clinical programmers (similar to the final sample) and the De Vaus validation method was used to test the validity of both the individual questions and the structured interview as a whole (De Vaus, 2014). Furthermore, the structural interview was assessed for its flow and ability to retain respondent interest and interest. The transition from question to question seemed reasonably smooth as no comments were made in this regard and similar techniques and questions were used in the literature.

Reliability Assessment: The reliability of the developed survey was assessed by reporting the result of Cronbach's alpha analysis. The resulting data were analyzed by applying different statistical approaches. That is, the descriptive analysis to describe the results of the demographic data of respondents and their hospitals and was generated through questions 1 - 15. This includes frequencies, percentage, and means. Furthermore, inferential statistics were used and the P-value is considered significant if it is less than 0.05.

4.1. Data Analysis

SPSS version 26 was used to process the data. Metadata was processed by frequency and percentage. Difference test such as one-way analysis of variance (ANOVA) and t-test Were used to note differences in Challenges to Medical Coding (ICD-10-AM).

5. Results

Initially, all prospective clinical coders (105 clinical coders) were from government hospitals and in all geographical regions of the kingdom (central, southern, northern, eastern and western regions). All survey questions were mandatory except for the open question, and only 55 of the total respondents answered the open question. The response rate was 100%. Cronbach's alpha score for the total number of items in the survey = 0.810. The final sample size was 105 subjects, 40% male, 17.1% diploma, 63.8% bachelor's, 18.1% master's and above. English literacy levels were 42.9% intermediate, 53.3% advanced and the remaining 3.8% elementary. 22.1% of the sample were for people working in a secondary hospital (100 beds or less), while 10.6% of people worked in tertiary hospitals (200 beds) and 67.3 worked in hospitals (more than 200 beds). Of those surveyed, 53.3% of their hospitals had paper electronic health records. 46.7% had a fully electronic health record.

As a coding practitioner, 19.6% of the sample were using ICD-10-AM for disease coding by hospital software, while 55.9% of programmers were using electronic coding software, e.g., (3M program), and the remaining portion (24.5%) were using the five AMC books. Regarding the training received by the clinical code. 66.3% stated that they had received face-to-face training, 16.3% had online courses, 10.6% had no training at all while 6.7 had no medical coding course. Regarding the effectiveness of Internet-based training, 83.7% believe that the Internet can be an effective way to obtain ICD training, while 16.3% do not consider it effective.

Regarding the availability of policies regulating the practice of clinical coding, 34.6% of the sample revealed that they had no policy at all; 16.3% said they had a policy regulating only incomplete diagnoses. 33.7% reported that they have policies regulating the coding process, incomplete diagnosis, terminology standards, and coding quality. 15.4% of the people surveyed admitted that they had policies for the following: coding process, incomplete diagnosis, terminology criteria, and incentives/punishment.

Regarding the impact of current documentation on coding quality, 73.1% of subjects experienced: lack of adequate discharge summary, failure to identify primary and secondary diagnoses, and

lack of specific diagnosis. While 62.5% of people admitted that the lack of a proper dump summary and unspecified diagnosis are the only major documentation problems they face when writing code. On the other hand, 10.7% revealed that there is no specific diagnosis and that all documentation issues are presented and that their current documentation affects their coding quality. While 57.7% admitted that doctor writing is not clear in paper medical records, which may affect the quality of medical coding and waste time.

Regarding whether clinical coders feel valued and that the hospital uses coding more, 38.6% of respondents confirmed that their hospitals did not take coding results to support other clinical decision-making. While 31.7% indicated that their hospitals are taking more measures. Ninety percent of respondents believe that having a professional body in the country to oversee and regulate coding practice is a good solution to improving coding practice. As for satisfaction, 55.4% were significantly satisfied, 36.6% were dissatisfied, and only 8% were unable to decide whether or not they were satisfied with current clinical coding practices.

A mean-difference analysis of respondents' satisfaction levels with clinical coding practices reveals significant differences between females and males in their levels of satisfaction, with male participants being more satisfied than females ($t = -3.3$, $p < 0.05$). On the other hand, no significant differences in satisfaction were detected based on the purpose of coding, online training and the presence of a professional body regulating clinical coding in the country. There was a significant difference in satisfaction levels for clinical coders based on whether hospitals were using coding for more clinical decision support functions. The group of respondents who disclosed that their hospitals use the clinical codes generated had a higher level of satisfaction compared to the other group

($M = 5.1$, $M = 3.9$, $P < 0.05$, respectively) Moreover, there was a statistically significant difference in satisfaction levels between the group receiving training compared to no training ($M = 4.9$, $M = 3.7$, $p = < 0.05$, res.

for example). Notably, there were no significant differences between the group that received face-to-face training and online training ($P > 0.05$) Performing a regression analysis reveals that profession composition (education, English literacy, presence of a professional body) has no

significant effect on clinical programmers' satisfaction (R Square = 0.066, P = 0.2) on organizational structure (use of ICD, availability of coding courses). , type of training, effectiveness of internet-based training, hospital beds, type of medical record and availability of policies) were found to influence and can predict clinical programmers satisfaction levels (R Square = 0.2, p = 0.01) and implementation of policies was the most important variable in this construct. (B = 0.05, P value = 0.01).

Clinical structure (purpose of disease, documentation effect, and electromagnetic radiation effect) had a prognostic effect J was significant (R Square = 0.194, p = 0.001) and the strongest variable effect was the effect of EMR on clinical coding practices (B = 0.151, P value = 0.001).

For the open question about the challenges facing clinical coders in Saudi Arabia, only 55% of respondents answered with 62% of the answers revealing the importance of proper clinical documentation. On the other hand, 11% of participants addressed the problems of physician blurring in paper medical records and physicians not responding to an explanation. Finally, 27% of participants mentioned the need for more developmental courses for some accurate diagnostics and a professional assistant to improve clinical coding practices and expertise.

Measure	Item	Percentag
Gender	Female	60 %
	Male	40 %
Education	Diploma	18.1%
	Bachelor	63.8%
	Master & above	18.1%
English Literacy	Intermediate	42.9%
	Advanced	53.3%
	Beginner	3.8%

Hospital / Bed	100 beds	22.1%
	200 beds	10.6%
	More than 200 beds	67.3%
edical Record Type	Paper Record	46.7%
	Electronic Record	53.3%

Model Summary

Mode	R	R Square	Adjusted R Squa	Std. Error of the Esti

ANOVA[a]

Model		Sum of Squa	Df	Mean Squa	F	Sig
	Regressi	5.420	1	5.420	7.58	.007
	Residua	73.628	103	.715		
	Total	79.048	104			

a. Dependent Variable: VAR00001

b. Predictors: (Constant), 4- / Qualificationالمؤهل

1	.262[a]	.069	.060	.84548

a. Predictors: (Constant), 4- / Qualificationالمؤهل

Coefficients[a]

Model		Unstandardized Coefficien		Standardized Co	t	Sig
		B	Std. Erro	Beta		
	(Constant)	3.183	.403		7.88	.000
	/ Qualificationالمؤهل	-.364	.132	-.262	-2.75	.007

a. Dependent Variable: VAR00001

Model Summary

Mo	R	R Squ	Adjusted R S	Std. Error of the
1	.195	.038	-.053	.89460

a. Predictors: (C التخصص ,Specialization / نوع التدريب الذي تلقيته في الترميز الطبي / Years of experience in Medical coding train سنوات الخبرة في الترميز الطبي / هل تعتقد أن الإنترنت يمكن أن يكون وسيلة فعالة للحصول على التدريب في التصنيف medica / Do you think the Internet can be an effective way to get training in اض / هل تتوافر السياسات التي تنظم ممارسات الترميز السريري ICD / Are there policies regulating clinical coding p ما هو نوع السجلات الطبية في المستشفى / What kind of medical records are in the ما هو نوع الترميز الطبي لتصنيف الامراض ICD-10-AM / What type of medical classification is used, المستشفى / عدد الاسرة بالمستشفى The number of beds in the مستوى معرفة القراءة والكتابة باللغة الإنجليزية / English liter

ANOVA[a]

Model		Sum of Squa	df	Mean Squa	F	Sig
	Regressi	3.019	9	.335	.419	.922
	Residua	76.029	95	.800		
	Total	79.048	104			

a. Dependent Variable: VAR00001

b. Predictors: (Co التخصص, Specialization / نوع التدريب الذي تلقيته في الترميز الطبي /Medical coding training
ات الخبرة في الترميز الطبي, Years of experience in medical coding / هل تعتقد أن الإنترنت يمكن أن يكون وسيلة فعالة
لى التدريب في التصنيف الدولي للأمراض / Do you think the Internet can be an effective way to get training in
ICD-10-هل تتوافر السياسات التي تنظم ممارسات الترميز السريري / Are there policies regulating clinical coding
pra ما هو نوع السجلات الطبية في المستشفى, What kind of medical records are in the hospital / ما هو نوع الترميز
ف الامراض ICD-10-AM المستخدم في المستشفى, What type of medical classification is used / عدد الاسرة بالمستشفى
/ English literacy level مستوى معرفة القراءة والكتابة باللغة الإنجليزية/ The number of beds in the hospital

Coefficients[a]

Model		Unstandardized Coefficier		Standardized Co	t	Sig
		B	Std. Erro	Beta		
	(Constant)	2.192	.780		2.81	.006
	عرفة القراءة والكتابة باللغة الإنجليزية / English literacy level	-.023	.169	-.015	-.13	.894

السجلات الطبية في المستشفى / What kind of medical records are hospital	-.031	.190	-.018	-.16	.873
بالمستشفى / The number of beds in the hospital	-.178	.115	-.170	-1.54	.126
دريب الذي تلقيته في الترميز الطبي /Medical coding training t	-.075	.098	-.086	-.758	.450
الترميز الطبي لتصنيف الامراض-ICD ستخدم في المستشفى / What type of medical classification is u	.078	.122	.071	.641	.523
ن الإنترنت يمكن أن يكون وسيلة فعالة ي التدريب في التصنيف الدولي للأمراض / Do you think the Internet can effective way to get training in AM	.099	.251	.042	.393	.695
السياسات التي تنظم ممارسات الترميز / Are there policies regulating clinical coding practice	.006	.075	.008	.077	.939
برة في الترميز الطبي / Years of experience in medical co	-.003	.096	-.003	-.032	.975
خصص / Specialization	.051	.064	.084	.799	.426

a. Dependent Variable: VAR00001

6. Discussion

One hundred and five clinical programmers participated in this study and they work in government hospitals in the Kingdom of Saudi Arabia. The aim of this study was the factors affecting the activation of medical coding and its application with the required quality in the Kingdom of Saudi Arabia, where there is an urgent need for more clinical coders locally and internationally (Australian Institute of Health and Welfare (AIHW), 2010). The study model identifies the factors affecting the activation of medical coding and the extent of its application with the required quality in the Kingdom of Saudi Arabia by proposing a model that aims to predict the satisfaction levels of clinical programmers based on three main structures: profession, organizational, and clinical. The composition of the profession covers the professional qualifications of the programmer (qualifications (education, literacy in English). This construct measures what challenges a medical coder may face and reduce the quality of medical coding. How can clinical programmer skills contribute to and predict levels of satisfaction with practicing clinical coding? This effect fails Building in making a significant impact on clinical programmers' satisfaction levels, the results of this construct are similar to the study (Hennessy et al, 2010), which showed that characteristics of clinical programmers did not influence coding practice. In contrast, (Ross, 2013) stated that education is an important factor and that Clinical programmers with prior advanced knowledge tended to be more satisfied compared to the other cohorts. Interestingly, the male participants were more satisfied than the female. This effect persisted even after a bootstrap analysis was performed and the median was used instead of the median. This could only contribute to may for the fact The most advanced English respondents were in the female group compared to males. One report found that English language skills are positively correlated with clinical coding practice, live d English constitutes the core competency of clinical programmers (Department of Health & Human Services, 2015).

The second structure is the organizational structure that measures organization and health information management efforts to achieve best practice clinical coding. This construct also

measures the impact of seven factors: ICD use, availability of coding courses, type of training, effectiveness of Internet-based training, type of hospital family, type of medical record, and availability of clinical coding policies. This construct correlates with an increased level of satisfaction of clinical programmers. Furthermore, there are significant differences in satisfaction levels based on the type of medical record, availability of training courses, availability of clinical coding policies, and use of ICD results in other procedures. These results are consistent with previous work by (Foley et al, 2009; Houser et al, 2013; Rousse, 2013; Rahmathulla, 2014), in which training has been shown to be necessary for clinical programmers to reduce the challenges of coding practice. and enhances clinical programmers' satisfaction levels. Furthermore, the results of this study are similar to those of (De Lusignan, 2005), which confirm that implementing appropriate clinical coding policies ultimately leads to increased levels of satisfaction, and thus improved clinical coding practice. In addition, using the clinical coding result to make more decisions positively affects levels of satisfaction. This can be attributed to programmers feeling that their work is useful and appreciated for their organizations.

The third construct evaluates clinical factors, which contains three factors: coding system availability, morbidity coding purposes, and clinicians' clinical documentation. As mentioned in the results section, this construct was found to significantly influence and enhance satisfaction levels for clinical programmers. Remarkably, having an electronic medical record (EMR) with a coding system outweighs the importance of other factors, namely coding for the purpose of morbidity and the quality of clinical documentation. This can be interpreted as having an easy-to-use automated coding system supporting the coding practice that would help clinical programmers to monitor and enhance the clinical codes generated. Evidence from the literature supports this finding because the coding system is positively correlated with satisfaction levels for clinical encoders (De Lusignan, 2005). However, it was revealed that the rate of implementation of the health information system in Saudi Arabia is low and slow (Hasnain et al, 2014). It was also revealed that the widespread adoption of electronic medical record (EMR) systems would enrich the healthcare environment with improved healthcare data. For the last

question (the open question) about the challenges facing clinical coders in Saudi Arabia, only 52% of respondents answered and described the challenges they face in practicing coding that mainly contributed to the weakness of the clinical study.

On the other hand, most respondents (38% of all respondents) mentioned the need for organizational support such as providing training, hiring more coding staff, and establishing policies to regulate their practices. Finally, a large portion of the responses highlight the importance of assistance by expert clinical coders to provide handy advice to improve clinical coding practice and expertise. The results of the open question are consistent with the evidence available in the literature (De Lusignan, 2005). This study has some limitations related to its descriptive nature of the electronic study. Therefore, generalization of results should be treated with caution. Furthermore, some respondents work in ICD-10 hospitals and this may affect their choice, as they do not currently fully code by ICD-10-AM for all clinical encounters. Therefore, future work should discuss coding practice after the full implementation of the ICD-10-AM and investigate the impact of having policies and coding systems in place.

6.1. Conclusions

The adoption of the International Classification of Diseases (ICD), the Australian version (ICD-10-AM) is inevitable for every health care institution in the Kingdom of Saudi Arabia, after the announcement of Vision 2030, which aspires to transform the health facility into a government holding company, and after the Saudi Health Insurance Council stipulated not to Acceptance of financial claims for patients only through an approved medical codec and with the codes ICD-10-AM, this is a challenge and support for medical coding. This study revealed the need for more efforts towards appropriate clinical coding practice in Saudi Arabia, as it is one of the few studies conducted to evaluate current clinical coding practices in Saudi Arabia. This study targeted all clinical programmers available in the Kingdom of Saudi Arabia and from all regions. With the aim of providing a comprehensive picture of the current situation to identify critical success factors that can influence clinical coding practice from the point of view of clinical programmers. It has been found that improving coding practice and delivering accurate coding is associated with several factors. Specifically, regulatory and clinical structures are closely related to the satisfaction of clinical programmers and underpin their coding practice. The most important contributors are the availability of policies regulating the practice of clinical coding as well as the existence of an adequate coding system. Finally, the development of KPIs for clinical coders can reveal challenges and shortcomings in the practice of clinical coding.

7. Declarations

In the next sections, the author should declare all individuals who contributed to this research project, scientific and ethical approvals, the funding agencies, and a list of abbreviations used in the research.

7.1 Scientific and Ethics approval

Ethical approval:

This study will be subject to the approval of the Ethics Review Board at King Fahd Specialist Hospital in Buraidah and the Scientific Research Unit at the University of Hail.

No funding.

7.2 Sources of Funding

NO FUNDING.

8. References

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9. Appendix :

Ethical approval letter: A copy of the ethical approval for scientific research is attached.