

The Impact of the Clinical Miscoding on Inpatient Reimbursement

Roghayeh Ershad Sarabi, Ph.D.¹, Soodeh Shahsavari, Ph.D.², Ali Mohammadi, Ph.D.³

1- Assistant Professor, Department of Health Information Sciences, Faculty of Management and Medical Information Sciences, Kerman University of Medical Sciences, Kerman, Iran

2- Assistant Professor, Department of Health Information Technology, Faculty of Paramedical Sciences, Kermanshah University of Medical Sciences, Kermanshah, Iran

3- Assistant Professor, Department of Health Information Technology, Paramedical School, Kermanshah University of Medical Sciences, Kermanshah, Iran (Corresponding author; E-mail: a.mohammadi@kums.ac.ir)

Received: 16 December, 2019

Accepted: 20 February, 2020

ARTICLE INFO

Article type:

Original Article

Keywords:

Coding

Miscoding

Tariffs

Patient reimbursement

Abstract

Background: The purpose of this study was to investigate the rate of coding errors and its effect on the amount of correct reimbursement to patients.

Methods: This descriptive and cross-sectional study was performed in 2018. Research resources were records in compensation units in medical documents center of social security organization. A total of 546 records were reviewed of which, 118 records met the research criteria and were selected through census method. Instrument for data collection was a checklist composed of six parts. Data were collected by compensation unit coders.

Results: In total, 118 records met the inclusion criteria. The highest rate of documentation error was related to unconfirmed errors with 106 items and a coefficient of 3845.44. The cost issued to patients based on tariff codes with a coefficient of 9696.4 was estimated as 3684632000 Rials, which only 2416154000 Rials was reimbursed to the patients with the coefficient of 6358.3.

Conclusion: Since coding of diagnostic measures had a high percentage of errors, and the recording of services was not accepted, some proper policies must be adopted to reduce procedure miscoding.

Copyright: 2020 The Author(s); Published by Kerman University of Medical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Ershad Sarabi R, Shahsavari S, Mohammadi A. The Impact of the Clinical Miscoding on Inpatient Reimbursement. Journal of Kerman University of Medical Sciences, 2020; 27 (2): 169-176

Introduction

Throughout the world, health systems aim to increase the well-being of people in order to make their services responsive to patients and the general public (1). The overall level of human health has progressed dramatically using the primary health care strategy, and health indicators have improved. Nevertheless, one of the most important concerns of policymakers is establishing equity in health and access to

health services, establishing equity in the provision of financial burden and benefiting from a health care system, improving the quality of services, preserving the dignity of patients and ultimately reducing the share of out-of-pocket payment (2). Effective and significant achievements can be made by modifying the reimbursement mechanism in the hospital, especially when the cost of hospital services is one of the largest parts of total health care costs, regardless of the level of income

of countries (3). The main strategy to cope with these problems is not to allocate more funds and resources, but to adopt proper and scientific management practices for resources allocated. Therefore, it is imperative that hospitals be managed more economically for better management (4). Tariffs are important policy tools for intervening in the health services market by governments, and the values set for health services are a key component of resource allocation. The tariffs for health care in Iran are based on the US tariff system (Current Procedures Terminology). Health tariffs in Iran were updated and notarized by the Ministry of Health and Medical Education in 2014. The challenges of determining the rate of health care and their impact on the cost of measures are one of the important issues in the health and insurance system of the country. Providing any code for determining tariffs for the provided services should be based on documentation and rational reasons and their impact on the health and insurance system, and community members, taking into account quality, availability and accountability, and its impact on costs, according to beneficiaries (5). Medical records are one of the sources that play a key role in treating patients, medical research and planning at the national level. This source requires that standard code rules be used so that all users equally use rules, guidelines and standard definitions and that information can be used in health policies such as correct reimbursement to patients (6). The coding quality is related to the elements of reliability, validity, completeness and timeliness. Reliability refers to the extent to which the same results are achieved in repeating the efforts. Validity measures an agreement with a Standard Gold (7). Coding errors are an inseparable component of the coding element. Factors including lack of familiarity with coding rules, incomplete documentation, and deliberate presentation of wrong codes lead to the creation of more coding errors. These errors, in the first stage, cause injustice in terms of patient right, because the

records are checked after the patient's discharge and cost payment by the patient. In the next stage, the errors prolong the time of examining records and codes and delay the reimbursement of resources by insurance companies to hospitals, which will put these centers' managers at high risk. Many of the documentation problems arise from the lack of understanding of physicians about the coding method and the effect of documentation on coding (8). One of the important questions in developing a health system plan for a country is how to determine the extent to which the goals are achieved. The development of such a plan requires continuous monitoring and ensuring the movement within the determined framework. Assessing the actual situation and evaluating it based on the desired results and providing it to the managers and policymakers can be useful in advancing goals and objectives (9). Considering that correct and timely reimbursement to patients will result in more satisfaction and proper and accurate planning, and considering the fact that coding is necessary in the management of reimbursement for provided services and monitoring of the health system, the present study was designed to investigate the rate of coding errors and its effect on the amount of correct reimbursement to patients.

Materials and Methods

Study design and data source

This descriptive cross-sectional study was conducted in 2018. The research sources included the medical records referred to the Compensation Unit at the Medical Documentation Center of Social Security Organization. The medical records were selected which had additional costs requests, in which surgical services were recorded and the record was coded by the service provider. Also, the records that did not include global codes and included non-surgical and

counseling cases were excluded from the study. To investigate the errors, the codes of the actions taken in the indirect treatment and the cost of the services, all paid by the patient, were recorded according to the codes provided. Then, at the time of the patient's referral, the original codes were also recorded for reimbursement to the compensation unit at the medical records center, where records were re-assigned and encoded by coders. The amount of reimbursement is determined by codes provided by coders. If there is a conflict between the codes provided in the treatment centers and the compensation unit, an error occurs and coding errors cause a change in the relative value and paid costs, which are not reversible.

Measurement tool

Data collection instrument was a checklist, the validity of which was confirmed by six experts (two health information managers, two physicians, two insurance coding experts). Data were collected from 25 records using the original checklist and then the modifications were made and the final checklist was designed. The checklist included patient information and how to provide the service, physician information, type of procedure, and procedure categorization based on the book of tariffs for diagnostic surgical procedures approved by the Ministry of Health and Medical Education of the Islamic Republic of Iran, their numbers, codes and their coefficients for surgical measures and modification codes requested by health centers, their numbers, code numbers and coefficients for the surgical measures and modification codes approved in the medical records unit, the coding errors in the two wards of surgery and anesthesia, the type of error and the relative value associated with that error.

Access to data was allowed based on the letter of introduction (No.15676) sent by Kermanshah University of

Medical Sciences to the Medical Documentation Center of the Social Security Organization and coordination with the officials of that organization. Also the ethical considerations were done to observe privacy principles on the use of data and not mentioning the name of hospital, patients and experts. The ethical code no. KUMS. REC. 2015.264 was adopted in the Ethical Committee.

Limitation

Problems and limitations of investigating the medical records were related to the lack of coding of data obtained from some records. In these records, a total sum was taken from the patient for hospital, surgical and anesthetic services and no code was given for surgical and anesthetic procedures; thus these records were excluded from the study according to the research criteria.

Results

The studied records were related to hospitalized patients and first day when services were provided. In total, 118 records met the inclusion criteria. All of these patients had been admitted to the hospital electronically. Most of the indirect treatment records (95percent) belonged to private hospitals, 61percent of which were specialized.

The most frequent reasons of referrals were problems of nervous system (24 patients), the musculoskeletal system (21 patients), female reproductive system and the eye and adnexa (19 patients), the coverage system (11 patients), the digestive tract (10 patients), cardiovascular system (5 patients), urinary system (4 patients), male reproductive system and hearing system (2 patients) and respiratory system (1 patient). Endocrine, blood and lymph referrals were not available in the records that had been selected based on the research criteria.

Table 1. Miscoding of the tariff and modification codes

Body system	Tariff codes				Modification codes			
	Agreement* Count (%)	Number of miscoding	coefficient	cost (Rial)	Agreement* Count (%)	number of miscoding	coefficient	cost (Rial)
integumentary system	6 (20)	18	451	171380000	7 (22.1)	7	16.115	43760800
musculoskeletal	11 (20.8)	28	1.712	270598000	16 (40)	3	57.22	8576600
respiratory	0 (0)	1	6.12	4788000	2 (50)	2	7.1	4066000
cardiovascular	2 (20)	5	8.353	134444000	6 (54.5)	2	2.47	17936000
digestive	4 (30.8)	3	2.146	55556000	9 (31)	8	4.138	52592000
urinary	3 (33.3)	5	5.103	39330000	7 (53.8)	3	5.7	2850000
male genitalia	1 (50)	2	4.23	8892000	0 (0)	1	2	760000
female genitalia	8 (25.8)	12	360	136800000	13 (28.3)	15	97.169	64588600
nervous	28 (41.8)	23	5.584	222110000	27 (34.6)	18	82.505	192211600
ocular	10 (26.3)	17	7.498	189506000	17 (34)	8	24.92	35051200
hearing	1 (20)	3	3.92	35074000	2 (40)	2	33	12540000
total	28.6	114	1.3338	1268478000	35.1	62	94.91	346157200

Table 1 shows that the agreement between the requested and approved tariff codes was 28.6 percent and the agreement between the requested modification codes and approved tariff codes was 35.1 percent. In tariff codes, the highest and the lowest agreement were observed for the nervous (41.8 percent) and the respiratory systems (0 percent), respectively. Additionally, in terms of modification codes, the highest and lowest agreements were observed for the cardiovascular system (54.5 percent) and the male reproductive system (0 percent). The number of coding errors, the coefficient of errors and its

resulting costs for the modification and tariff codes have been shown in Table 1.

In the reimbursement error for tariff and modification codes, the error coefficient is 3.6358.18 with 1268478000 Rials and 63.2449 with 346157200 Rials, respectively. These costs for tariff codes were 550164000 and 718314000 Rials in the first and second six months of the year, respectively. Also, with regards to the modification codes, 183209400 and 162947800 Rials were obtained in the first and second six months of the year, respectively (Table 2).

Table 2. Reimbursement errors for tariff and modification codes

Codes	half of the year	requested			approved				Diff*
		count	coefficient	cost (Rials)	count	percent	coefficient	cost (Rials)	
Tariff	First	125	9.4755	1807242000	76	61	1.3308	1257078000	550164000
	second	135	5.494	1877390000	70	52	2.305	1159076000	718314000
	Total	260	4.9696	3684632000	146	56.15	3.6358	2416154000	1268478000
Modification	First	160	45.1811	688351000	120	75	32.1329	505141600	183209400
	second	141	12.1549	588665600	119	84	31.112	425717800	162947800
	Total	301	57.336	1277016600	239	79.40	63.2449	930159400	346857200

* Difference between requested and confirmed costs

In 2017, 56.15 percent of the tariff codes and 79.40 percent of the modification codes were approved. In the first six months of the year, 61 percent of tariff codes were approved, and this figure was 52 percent in the second half of the year. As it can be seen, the approval percentage in the first six months is higher than the overall average and lower than that in the second six months. It is observed that 75 percent of the modification codes were confirmed in the first six months and this figure was increased to 84 percent in the second six months. The confirmation percentage of approved codes was lower and

higher than the overall average in the first six months and the second six months, respectively.

The number of tariff code errors was higher in surgical procedures. The most errors in the tariff codes among the three error modes of the wrong, additional and minor errors were due to additional coding error in surgical procedures, which had coefficient of 545. In modification codes, the highest error was due to the additional errors in surgical procedures with a coefficient of 51. In the tariff codes of anesthetic measures, the highest error was due to the additional errors with a coefficient of 13, and the coefficient of 45 in the modification codes.

Table 3. Information about miscoding among the three error modes of the wrong, additional and minor errors

Codes	Action	half of the year	minor			additional			wrong		
			cost (Rials)	coefficient	error (count)	cost (Rials)	coefficient	additional	cost (Rials)	coefficient	error (count)
Tariff	surgery	first	4560000	12	1	450596400	78.1185	34	122512000	322.4	18
		second	0	0	0	604162000	1589.9	36	84588000	222.6	12
		total	4560000	12	1	1054758400	68.2775	70	207100000	545	30
	anesthetize	first	2280000	6	1	11780000	31	7	0	0	0
		second	0	0	0	6004000	8.15	6	0	0	0
		total	2280000	6	1	17784000	8.46	13	0	0	0
modification	surgery	first	88399400	232.63	17	244313400	642.93	27	0	0	0
		second	54822600	144.27	12	194810800	512.66	24	3040000	8	1
		total	143222000	9.376	29	439124200	59.1155	51	3040000	8	1
	anesthetize	first	1900000	5	3	46405600	12.122	27	0	0	0
		second	3420000	9	2	29260000	77	18	0	0	0
		total	5320000	14	5	75665600	12.199	45	0	0	0

Based on the existing records in 2017, the total number of errors occurred due to the wrong type of documentation was 125 cases with a coefficient of 4344.14. The highest rate of documentation error was related to unconfirmed errors with

106 items and a coefficient of 3845.44. As it can be seen in table 4, the errors and coefficients were higher in the first six months (69 cases with a coefficient of 2014.32), and the same rate was 56 in the second six months with a coefficient of 2239.82.

Table 4. Documentation errors and their coefficient

errors	first			half of the year second			Total		
	costs (Rials)	coefficient	count	costs (Rials)	coefficient	count	costs (Rials)	coefficient	Count
not registered	3610000	9.5	1	6536000	17.2	1	10146000	26.7	2
Illegible	0	0	0	0	0	0	0	0	0
Not approved	669187600	1761.02	58	792079600	2084.42	48	1461267200	3845.44	106
Inconsistent	126844000	333.8	10	52516000	138.2	7	179360000	472	17
Vague	0	0	0	0	0	0	0	0	0
total	99641600	2104.32	69	851131600	2239.82	56	1650773200	4344.14	125

Discussion

The challenges of determining the rate of healthcare services and their impact on the costs of measures are one of the important issues in the country's health and insurance systems. The weaknesses, strengths and errors involved in determining the tariffs, documentation of the provided services and the allocation of the correct code for the provided services should be considered. Providing any code for determining service tariffs should be based on the documentation and rational reasons and their impact on the health system, insurance system and community members by taking into account the quality, availability and accountability, and its impact on costs, according to the views of beneficiaries (5). The purpose of this study was to investigate patient reimbursement errors caused by coding errors due to the incomplete, inconsistent, ambiguous documentation as well as requesting incorrect codes and those that were requested additionally. In this study, 260 tariff codes and 301 modification codes were recorded in 118 patient records. Also, in order to reimburse patients, 146 tariff codes and 239 modification codes related to surgical procedures and anesthesia were approved. The results of the study showed there was agreement only in 28.6 percent of tariff codes and 35.1 percent of modification codes. These results indicate that coding of diagnostic measures is accompanied by a high

percentage of errors, and the recording of services is not accepted as being accurate. The existence of such errors imposes most additional costs to patients who have paid extra for treatment. The costs charged to patients for tariff codes with a coefficient of 9696.4 was estimated as 3684632000 Rials, which only 2416154000 Rials was reimbursed to patients with the coefficient of 6358.3. In the Cheng's research, 16 percent of the 752 studied cases had variations in tariff codes and 575300 dollars additional cost had been requested (10). In the present study, cost of patients for modification codes with a coefficient of 3360.57 was estimated as 1277016600 Rials which 930159400 Rials was reimbursed to patients with a coefficient of 2449.63. In this study, three types of errors including wrong, additional and low errors were considered with regard to the modification and tariffs codes. Based on the findings, the most common type of error for surgical tariff and modification codes was the request for additional code, and tariff and modification codes included 70 and 51 additional codes respectively. The coefficient of error of the additional tariff codes were respectively 2875.68 and 46.8 in surgical and anesthetic procedures with estimated costs of 1054758400 and 17784000 Rials, respectively. Also, requests for the additional code (related to the basic anesthetic code), was the most type of error for the anesthetic tariff and the request for additional

modification code was also the most common type of anesthesia error. The coefficient of error in additional modification codes in surgical and anesthetic procedures was estimated to be 1155.59 and 199.12 with estimated costs of 439124200 and 75665600 Rials, respectively. In a study, Karami *et al.*, reported that the request for additional modification codes and an additional request for anesthesia K were among the causes of deductions (11). Mohammadi *et al.* reported that the highest percentage of deductions was allocated to the cost of anesthesia in the admission wards (8). In Khorrami study, the most deductions related to surgical departments (4). In Heywood *et al.* research, coding errors in surgical departments of the public hospitals in the northwest of England led to a difference in tariff calculation of up to 5,255 pounds per admission(12) . In Cheema *et al.* study, coding errors lead to imposition of a total of 10176 pounds extra costs (13). According to the results of the present study, the most frequent coding errors (additional code and wrong code) based on the tariff classification system were related to the systems that had the most referrals (nervous system and musculoskeletal system). According to the above findings, it can be concluded that the probability of occurrence of coding errors is higher in cases with higher referral rate. This reveals the necessity of paying more attention to close monitoring of physicians practice in the specialties with the highest referrals. In addition, in areas of high referrals, training physicians with regards to coding matters is more important and hospital managers should put special emphasis on this issue and make efficient decisions for these issues. Also, the high deductions in surgical wards can be attributed to the lack of training on documentation and

clinical coding for surgical residents. Fakhry *et al.* revealed that surgical residents did not receive any training in documentation and clinical coding, and nearly half of them failed to give correct response to the questions asked about documentation and coding. This reveals the urgent need for inclusion of educational programs into the programs designed for surgical residents (14) . One of the aims of this study was to compare the error rate after implementation of health system reform plan. In line with this goal, the results showed that the number of requested codes and their coefficients in the second six months was more than the first six months; while the approval rate for these codes was lower than that in the first six months of the year. The requested modification codes and their coefficients were also higher in the first six months of the year, but the approval rate for these codes in the second six months was more than that of the first six months. It should be mentioned that one of the objectives of the healthcare development plan is the reduction of out-of-pocket patient payments (15). According to the results of the recent study, it seems that the coding errors of tariff and modification codes are still significant, and further studies are necessary to reduce and prevent such errors.

Acknowledgment

The authors of this paper would like to acknowledge Kermanshah University of Medical Sciences for funding the project (Grant number 15676, 14/4/2015).

Conflict of interest

The authors declare no conflict of interest.

References

- Murray CJ, Frenk J. A framework for assessing the performance of health systems. *Bulletin of the world Health Organization*. 2000;78(6):717-31.
- Nazari R, Amini J, Bahaalipour Mouziraji F, Akbari S. A comparative study on patient satisfaction with hospital services in Amol. *The Journal of Urmia Nursing and Midwifery Faculty*. 2011;9(3):188-95.
- Mathauer I, Wittenbecher F. Hospital payment systems based on diagnosis-related groups: experiences in low-and middle-income countries. *Bulletin of the World Health Organization*. 2013;91:746-56A.
- Khorrmy F, Hosseini Eshpala R, Baniasadi T, Azarmehr N, Mohammady F. Prioritizing insurance deductions factors of Shahid Mohammadi hospital inpatients records using Shannon Entropy, Bandar Abbas, Iran. *Bimonthly Journal of Hormozgan University of Medical Sciences*. 2013;17(1):77-82.
- Rahsidian A, Doshmangir L. Substitution of 'California'book, the First Clinical and Diagnosis Tariff Reference book in Iran: Expert's View Points. *Medicine and cultivation Research Journal*. 2013;22(3):59-78.
- AlipourJ, Karimi A, Erfannia L, Shahrakipour M, Hayavi HMH, Kadkhoda A, et al. Reliability of medical diagnosis with international classification of diseases 10th version in 2011. 2013.
- Abdelhak M, Grostick S, Hanken M, Gacobs E. *Health Information Management of a Strategic Resource*. 4, editor. Philadelphia: Elsevier; 2012.
- Mohammadi A, AziziAA, Cheraghbaigi R, Mohammadi R, Zaret J, Valinejadi A. Analyzing the deductions applied by the medical services and social security organization insurance toward receivable bills by University Hospitals of Khorramabad. 2013.
- Tabibi S MM. *Strategic Planing*. 4 ed: Termeh; 2012.
- Cheng P, Gilchrist A, Robinson KM, Paul L. The risk and consequences of clinical miscoding due to inadequate medical documentation: a case study of the impact on health services funding. *Health Information Management Journal*. 2009;38(1):35-46.
- Karami M, Moini M, Safdari R. Impact of hospital deductions imposed by the social security insurance on patient's teaching hospitals of Kashan. *The Journal of Urmia Nursing and Midwifery Faculty*. 2011;8(4):220-8.
- Heywood NA, Gill MD, Charlwood N, Brindle R KC, Allen N. Improving accuracy of clinical coding in surgery: collaboration is key. *Journal of Surgical Research*. 2016;204(2):490-5.
- Cheema ZA KS. Implications of miscoding urological procedures in an era of financial austerity—'Every Penny Counts'. *JRSM* 2015;6(6).
- Fakhry SM, Robinson L, Hendershot K, Reines HD. Surgical residents' knowledge of documentation and coding for professional services: an opportunity for a focused educational offering. *The American journal of surgery*. 2007;194(2):263-7.
- Rezaei S, Arab M. Effects of the New Health Reform Plan on the Performance Indicators of Hamedan University Hospitals. *Journal of School of Public Health and Institute of Public Health Research*. 2016;14(2):51-60.