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Views of Health Information Management Staff on the Medical Coding Software in Mashhad, Iran

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Abstract. Systematic evaluation of Health Information Technology (HIT) and users' views leads to the modification and development of these technologies in accordance with their needs. The purpose of this study was to investigate the views of Health Information Management (HIM) staff on the quality of medical coding software. A descriptive cross-sectional study was conducted between May to July 2016 in 26 hospitals (academic and non-academic) in Mashhad, north-eastern Iran. The study population consisted of the chairs of HIM departments and medical coders (58 staff). Data were collected through a valid and reliable questionnaire. The data were analyzed using the SPSS version 16.0. From the views of staff, the advantages of coding software such as reducing coding time had the highest average (Mean=3.82) while cost reduction had the lowest average (Mean =3.20), respectively. Meanwhile, concern about losing job opportunities was the least important disadvantage (15.5%) to the use of coding software. In general, the results of this study showed that coding software in some cases have deficiencies. Designers and developers of health information coding software should pay more attention to technical aspects, in-work reminders, help in deciding on proper codes selection by access coding rules, maintenance services, link to other relevant databases and the possibility of providing brief and detailed reports in different formats.

Keywords. views, clinical coding software, health information management, diagnosis

1. Introduction

Coding is one of the basic tasks in the field of health information management (HIM) [1, 2]. Coding of diseases is used to translate diagnoses of diseases and other health problems from words into an alphanumeric code that includes data to be stored, retrieved and analyzed easily [3]. Coded clinical data plays an important role in the

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health care industry and are used to assess clinical outcomes, monitoring quality of care, research, education improvement, resource allocation, health planning and benchmarking [4, 5]. The coding process includes examining a person from a clinical document for code recognition, when a complex coding scheme is investigated, the process may be done with the help of coding books, summary tables, or applications that make it easy to seek alphabetically [6]. Today, the volume of health information in patients' medical records is increasing extremely, and on the other hand, the complexity of coding systems is constantly added. Therefore, manual coding can be included to solve a lot of problems. Coders need tools to increase their ability to use coding systems [7]. Computer-Assisted Coding (CAC) helps coders by pointing out relevant information, suggesting codes, or in simple cases, automatically assigning code without manual checking [8, 9]. In general, the success of implementing each coding software requires integration between three main components; individuals, defined processes, and technology [10]. Therefore, the systematic evaluation of health information technology and users' views leads to the modification and development of these technologies in accordance with their needs [2, 11]. The purpose of this study was to investigate the views of HIM employees on the quality of medical coding software.

2. Methods

A descriptive cross-sectional study was conducted between May to July 2016 in 26 hospitals (academic and non-academic) in Mashhad, north-eastern Iran. The study population consisted of the chairs of HIM departments and medical coders. The criteria for selecting participants were their willingness to participate and their availability. Data were collected through a paper based questionnaire that was designed based on previous studies and published literature [12, 13]. The questionnaire included three parts: (a) demographic characteristics; (b) HIM employees' views about using the medical coding software (advantage and disadvantage, usability features) rated on a five-point Likert scale (19 questions, 1 = very low to 5 = very high) (c) HIM employees' views about the features of medical coding software(15 questions) including backup capability, ability to update, reporting, communicate with clinical and administrative wards, guides for coding, online assistance, interoperability, security and quality control (yes/no questions). Totally of 65 questionnaires were sent out for all eligible respondents, 58 completed copies returned (response rate = %89.2). The questions were evaluated by three HIM and two medical informatics specialists for content validity. Therefore, vague questions were reviewed and corrected. The reliability was assessed using the test–retest method (r = 0.86). The data were analyzed using the SPSS version 16.0.

3. Results

In this study, majority of the staff were female (86.2%) with bachelor's degrees (75.9%). The average age was 33 years. The job positions of HIM staff were as follows: 56.8% "coder", 34.9% the chair of HIM department and 8.6% had both positions. From the views of staff, the advantages of coding software such as reducing

coding time had the highest average (Mean=3.82±0.99) while cost reduction had the lowest average (Mean =3.20±1.01), respectively (Table 1).

Table 1. Users' views on the advantages of coding software

User's perspective	Very high N (%)	High N (%)	Somewhat N (%)	Low N (%)	Very low N (%)	Mean ± SD
Reduce coding time	17(30.4)	18(32.1)	15(26.8)	6(10.7)	0	3.82±0.99
Decrease coding error	15(26.3)	19(33.3)	17(29.8)	5(8.8)	1(1.8)	3.74±1
Reducing human resources	8(14.0)	17(29.8)	17(29.8)	12(21.1)	3(5.3)	3.26±1.11
Cost reduction	6(10.7)	14(25.0)	24(42.9)	9(16.1)	3(5.4)	3.20±1.01
Facilitating coding	11(18.6)	21(35.6)	20(33.9)	7(11.9)	0	3.61±.092
Improving coding quality	9(15.8)	30(52.6)	15(26.3)	2(3.5)	1(1.8)	3.77±0.82

The results showed that lack of familiarity of hospital managers with information technology (55.2%) and lack of appropriate coding software infrastructure (46.6%) were the most important disadvantages associated with using coding software. Meanwhile, concern about losing job opportunities was the least important disadvantage (15.5%) to the use of coding software (Table 2).

Table2. Users' Perspectives on the disadvantages and Challenges of Using Coding Software

Reasons for not using coding software	Yes N (%)	No N (%)
Not user friendly software	17(29.3)	41(70.7)
The high cost of using the software	16(27.6)	42(72.4)
Lack of familiarity with computer and informatics	20(34.5)	38(65.5)
Low efficiency relative to cost	10(17.2)	48(82.8)
No major difference in the manual system and software	13(22.4)	45(77.6)
Increasing time vs. manual systems	13(22.4)	45(77.6)
The probability of a decrease in workforce if the software is deployed	9(15.5)	49(84.5)
Lack of applying coding software infrastructure (Such as the Internet, cultural factors and etc.)	27(46.6)	31(53.4)
Hospital administrators not familiar with IT	32(55.2)	26(44.8)

Regarding the appearance features of the software, volume of information per screen (mean = 3.56±0.93) and screen interface (mean = 3.44±0.95) had the highest average, while clarity and meaningfulness of warnings and error messages (mean = 3.13±1.15), and access to menus (mean = 3.38±0.95) had the lowest mean, respectively. The most important features of coding software for staff include backup capabilities (91.3%), statistical reporting during a specific period (84%), reporting of multiple surgical procedures for a specific patient (76.2%), and the ability to communicate with clinical wards (60%).The lack of guides for coding such as "includes" and "excludes" (85.7%) and lack of online assistance (73.9%) were the most important deficiencies in the software.

4. Discussion

The findings of this study indicated that from the perspective of users, reducing coding time and increasing the coding quality were the most important advantages of using the coding software while cost and workforce reduction had the lowest score in this regard. Pakhomov et al. concluded in their study that more than two-thirds of all diagnoses

coded automatically by the coding software had a high accuracy. They revealed that the development and validation of these technologies are necessary to maximize their effectiveness [10]. On the other hand, Elkins et al. found that computers are not more accurate than humans when multiple parameters are involved, however, manual and computerized coding have separate errors [14]. The results of Jones et al.'s study showed that CAC does not have a great impact on the accuracy of data, but reduces 22% of the time spent on coding each record [15].

The results of this study showed that the reduction of workforce in comparison with other advantages of coding software had fewer score from users' point of view. Also users identified "concern about losing job position" as the least important challenge in using coding software. In general, most previous studies indicated that coding software cannot replace coders completely and it is not supposed to be so [11, 16-18]. The codes given by the CACs without checking the coder's have less accuracy than the codes given by combining the manual coding and CAC [19]. Of the 113 studies examined in the systematic review of automated coding and clinical classification, 26 studies show that automated systems were better or similar to humans, while four studies stated that humans have a better performance than automatic systems [6]. Peterson et al. also emphasized in their study that coders will not lose their jobs with the creation of automated coding systems. By changing the paper- based record to electronic record and automated coding, coding specialists need to improve their qualification. They need a program that can help them and prepare them in a competitive environment [17]. When the coding process was performed using CAC, the most important tasks of coders were review, validation, and editing the codes proposed by the CAC [10, 20, 21].

The results showed that hospital managers' lack of familiarity with IT was the most important disadvantage to investment and use of coding software. In addition, the results of previous studies indicated that management factors and managers' view about health information technologies were the most important factors in the success and failure of these technologies [11, 22]. Coded clinical data provides reliable, summarized and timely data for managers to make data-driven decision and on the other hand, inaccuracy in coding leads to the portrayal of a wrong image of the organization's activities, which will result in much financial loss [21]. Therefore, holding training programs and familiarizing managers with the benefits and improvement of the coding process can enhance their attitude toward investing in the use of related technologies. Of course, one of the main reasons for managers giving attention to the coding process in developed countries is its relationship with financial reimbursement and cost control [1, 7, 23]. However, one of the reasons for managers giving little attention to these technologies in Iran can be the non-use of diagnosis-related group (DRG) system and the lack of relationship between coding processes and financial issues. The main purpose of coding in Iran is the use of codes in clinical research.

In general, the results of this study showed that coding software in some cases have deficiencies. Designers and developers of health information coding software should pay more attention to technical aspects, in-work reminders, help in deciding on proper codes selection by access coding rules, maintenance services, link to other relevant databases and the possibility of providing brief and detailed reports in different formats.

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