Website: http: jebhpme.ssu.ac.ir
EBHPME 2020; 4(3): 172-80 pISSN: 2538-5070

EBHPME

ORIGINAL ARTICLE

Evidence Based Health Policy, Management & Economics
Health Policy Research Center, Shahid Sadoughi University of Medical Sciences

Identifying the Causes and Extent of Insurance Deductions in a Hospital: An Interventional Approach to Cost Management

Roohangiz Taheri[1], Rohollah Kalhor[2], Bahman Ahadinezhad[3], Mohammad Zakaria Kiaei [4,5*]

[1]Health Services Management Department, School of Public Health, Qazvin University of Medical Sciences, Qazvin, Iran
[2]Health Services Management, Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran
[3]Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran
[4] Department of Health Services Management, South Tehran Branch, Islamic Azad University, Tehran, Iran
[5] Health Services Management Department, School of Public Health, Qazvin University of Medical Sciences, Qazvin, Iran

ARTICLEINFO

Article History:
Received: 8 Jan 2020
Revised: 25 Apr 2020
Accepted: 2 Aug 2020

***Corresponding Author:**
Mohammad Zakaria Kiaei

Department of Health Services Management, South Tehran Branch, Islamic Azad University, Tehran, Iran

Email:
kiaei_mzsa@yahoo.com

Tel:
+98-28-33369581

ABSTRACT

Background: A significant amount of revenues and deductions exist in the hospitals each year. This study aimed to determine the number of deductions applied and identify its causes. Furthermore, we aimed to provide management strategies to reduce these deductions in Shafa Takestan hospital.

Methods: This applied and interventional study was conducted with a cross-sectional design. The data collection tool was a checklist from the previous studies. Data were analyzed using descriptive statistics such as mean, percentage, and standard deviation as well as analytical statistics of the Wilcoxon test.

Results: Before the intervention, among 405 non-global inpatient cases, about 323 (80 %) contained subtractions. After the intervention, among 555 non-global hospital admissions, about 264 (47 %) included deductions. Most deductions were related to health services insurance (75.38 %). Concerning each hospital ward, most deductions were related to surgery ward (38 %). Before and after the intervention, service deductions were included in 5.59 % and 4.57 %, respectively.

Conclusion: Therefore, medical personnel should pay more attention to documenting patients' records and minimizing documentation errors. Moreover, to reduce patient record deductions, the health care staff should be familiarized with proper documentation procedures by conducting training sessions.

Key words: Hospital deductions, Cost Management Interventional Approach, Six Sigma, Insurance Organizations.

Citation

This paper should be cited as: Taheri R, Kalhor R, Ahadinezhad B, Kiaei MZ**. Identifying the Causes and Extent of Insurance Deductions in a Hospital: An Interventional Approach to Cost Management.** Evidence Based Health Policy, Management & Economics. 2020; 4(3): 172-80.

[DOI: 10.18502/jebhpme.v4i3.4163]

Introduction

Nowadays, the health sector is encountered the violent problems regarding resource constraints in many countries, including Iran; therefore, it is essential to use the facilities correctly with maximum productivity (1). As a result, hospital managers are required to control these resources for efficient use (2). To this end, hospitals should be run more economically.In the economic management of hospitals, the financial position of hospital should be controlled, necessary financial resources should be provided, and the efficiency of hospital revenue should be increased (3). Considering the insurance organizations are responsible for paying a part of the medical costs, most hospital resources are provided by the contracts with insurance organizations that render services to the organizations under their coverage (4,5).

Insured patients receive the needed services from hospitals, but insurance organization hasthe task of cost compensation under a contract (2). After auditing the financial documents in the hospital, the insurance organization decreasesthe amount of money as a deduction.In other words, deductions are different between the total amount of hospital expenses and the amount of insurance reimbursement to the hospital (6). These deductions, not only reduce the hospital's financial resourcesbut also lead to delay in the reimbursement of costs to hospitals and cause dissatisfaction among hospital managers and staff (7). Therefore, the extent and cause of deductions are essential because they inform management, health care providers, and other stakeholders about the economic situationof hospital. Appropriate management of costs increases the hospital revenues and ultimately creates mutual trust among the contract parties (8, 9). According to hospital studies in Iran,there are many reasons for insurance deductions, such as failure to comply with insurance regulations, incorrect coding of service units, incorrect tariffs, surplus or lack of specified tariffs, document defects and corrosion, structural and organizational errors, service delivery, weakness ina supervisory role of insurers, etc.(10-13). The main reason for deductions in inpatient cases in Iran was related to the defect in the documentation process; while in studies conducted in foreign countries, the main reason for deductions was lack of service in the insurance contract.In these countries, smart and digital documentation systems, as well as appropriate payment mechanisms, are used; so, not many other causes of deductions exist (9,14). In fact, the reimbursement of medical expenses by insurance organizations depends on the accurate documentation of medical records.The insurance organization investigates all documents for patients and determines the extent of reimbursement. However, one of the most significant problems with hospital income is its inadequate organization in hospital finance and accounting (15). Due to the importance of deductions, various studies in recent years have investigated the reasons and extent of deductions in Iranian hospitals. In this regard, Karimi et al. (13) examined the causes of deductibles in insurance accounts at Seyyed al-Shahid Hospital in Isfahan. They showed that the most reasons for deductions were in higher insurance premiums. In another study conducted by Mohammadi et al. (16), the number of deductions applied to medical services and social security was analyzed concerning the most prominent hospital bills, which was training staff. Khalesi (17) also reported the impact of the staff training programs on the deductions at FirouzKuh Educational Center.

The present study aimed to compare the deductions of different types of insurance in Iran, including Health, Social security, Armed forces, and the Relief Committee. Furthermore, the patients' bills admitted in Shafa Hospital, Takestan city were compared before and after the educational intervention over identifying the reasons of deductions. As a result, appropriate strategies were provided for reducing deductions.

Materials and Methods

This interventional, cross-sectional, and applied research was designed in two main stages: 1) the

[DOI: 10.18502/jebhpme.v4i3.4163]

investigation of patients' records and insurance organization reports (document analysis); 2) the intervention. The first phase of research involved determining the number of deductions by services, basic insurance, deduction generatorwards, and individuals, as well as reasons of deductions. At this stage, the research team reviewed the hospital admission records for one month. These files included all hospital records (405 cases before the interventionand 555 cases after intervention) sentfor insurance organizations. The data in this phase were collected using a checklist (18). Also, case reports provided by some insurance organizations regarding hospital deductions were analyzed by the document analysis method. In the second phase, an educational intervention was performed. To identify the underlying reasons of deductions, an expert panel containing managers and experts in deductions was held in three two-hour sessions at the hospital. The panel consisted of the research team, top and middle managers of the hospital, supervisors, medical record experts, insurance experts, and financial experts at the hospital (N = 12). A list of deductions (reviewed by previous literature and interviews with experienced individuals) was provided by the research team and made available to the panel of experts. The panel eventually provided a single list of deduction causes. At this stage, after identifying the primary purposes of deduction in the studied hospital, a list of strategies was prepared for removing these factors.

The strategy proposed to improve some processes included greater coordination between units involved in insurance as well as better communication with upstream units such as Insurance Working Group and Tariff Office of the department of health and medical education. In this regard, the coordination among units involved and training was considered as the central interventionby the expert team. The research team prepared the training materials needed by those involved in the insurance process; as a result, the items needed for training were completed and approved by the panel of experts.

Six Sigma method was applied for intervention at this stage. The most common tool for implementing Six Sigma is DAMIC cycle (19), which consists of five stages, each step logically related to the previous step as it is to the next. These stages include defining, measuring, and evaluating the current hospital performance, analysis, improvement, and control stages. This cycle is a coherent, comprehensive and structured approach to process improvement. The harmonious combination that exists in the period leads to problem-solving. After the intervention, hospital records ofone month were reviewed by a checklist.

Information sources included all records of hospitalized patients covered by basic insurance for two months before and after (April 2019, June 2019) the intervention. In order to collect information from the medical record of patients, the necessary permits were obtained from the Vice-Chancellor for Research and Technology Affairs and the Vice-Chancellor for Treatment Affairs.

The statistical samples consisted of all files with at least one deduction case. Data were collected using a checklist of previous studies (18) based on the services rendered at the study hospital. Data were analyzed using SPSS and EXCEL software. Data were analyzed using descriptive statistics such as mean, percentage, and standard deviation as well as analytical statistics, including the Wilcoxon test. This study is the result of a M.Sc thesis with the Ethics Code of IR.QUMS.REC.1397.212in the field of health services management in Qazvin University of Medical Sciences.

Results

Before and after the intervention, 80 % and 47% of cases were deductions, respectively. Deductions' data were categorized as insurance, wards, services provided, and deduction providers. According to the findings of Table 1, health Service insurance deductions comprised of about 75.38 % of the highest deductions before the intervention, while health insurance deductions composed of approximately 91.04 % of the most top deductions after the intervention. The percentage of

[DOI: 10.18502/jebhpme.v4i3.4163]

deductions from all cases before and after the intervention decreased from 70.5 % to 47.58 %, but no statistically significant difference was observed in this case (P-value ≥ 0.05). The results showed that the surgical ward (38 %) had the highest deductions before the intervention, but the maternity ward (0.008 %) had the least deductions. After the intervention, most deductions were in the surgical ward (47.95 %), while the least deductions were in the labor ward 0.66 %). According to Table 2, the deductions decreased in the Emergency, Labor, Postpartum, Internal, Surgery, and Pediatric, CCU, and Inpatient wards, whereas, the deductions increased in the ICU ward. The Wilcoxon test was run to test the difference between subtractions before and after the intervention. According to the results, the mean percentage of deductions from the total documents was significantly different in all sections before and after the intervention. It means that the average percentage of files subject to deductions from all cases decreased after the intervention.

Table 3 compares the frequency of data before and after the intervention for each service and shows thatthe most deductions applied before the intervention were related to regular and special services (21.7 %), while the lowest deductions were for operating room drug services (0.05 %). After the intervention, the highest deductions were for regular (21 %) and special (19 %) bed services, and the least deductions were for Sonography services (0.06 %). The results of the Wilcoxon test showed that the mean percentage of documents' deductions from the total documents were significantly different before and after the intervention. In other words, the mean percentage of the documents' deductions from the total documents decreased after the intervention.

According to the results, pre-intervention deductions showed that the highest number of deductions belonged to physicians (43.37 %), ward secretaries (34.21 %), and nurses (22.7 %), respectively**.** Deductions after the intervention were related to physicians (62.8 %), nurses (27.11 %), and ward secretaries (10.07 %). The educational intervention decreased the deduction percentage related to physicians, nurses, and secretaries. According to the results of the Wilcoxon test, a significant difference was seen between the mean of personnel knowledge in all mentioned areas (9 items) before and after training. The level of knowledge increased in personnel after participating in the training (Table 4).

Table 1. Comparison of the frequency of data before and after intervention by the basic insurance

Type of insurance	Before intervention		After intervention	
	Percentage of documents' deductions from total documents	Percentage of deductions from total deductions	Percentage of documents' deductions from total documents	Percentage of deductions from total deductions
Health Service Insurance	80.31	75.38	48.55	91.04
Social Security	79.41	16.58	37.31	4.22
Armed Forces	80.00	7.67	58.33	2.83
Aid Committee	42.85	0.35	46.15	1.87
Total	70.5	100.00	47.56	100.00
Z = - 1.46			P = 0.144 ∗	

∗Significant at $p < 0.05$

[DOI: 10.18502/jebhpme.v4i3.4163]

Table 2. Comparison of the frequency of data before and after intervention by ward

Type of ward	Before intervention		After intervention	
	Percentage of documents' deductions from total documents	Percentage of deductions of the unit from total deductions	Percentage of documents' deductions from total documents	Percentage of deductions of the unit from total deductions
Emergency department	68	4.22	14	0.67
labor	100	0.008	50	0.66
Internal	91	29.61	55	25.41
Surgery	95	38.00	66	47.95
Pediatric	49	1.37	16	3.55
Postpartum	60	2.34	55	8.18
CCU	42	18.62	54	11.19
ICU	78	5.80	57	2.26
Total	80	100	47	100
Z = - 2.52			P = 0.012 ∗	

∗Significant at $p < 0.05$

Table 3. Comparison of the frequency of data before and after intervention by services

Type of services	Before intervention		After intervention	
	Percentage of deductions to total	Percentage to performance	Percentage of deductions to total	Percentage to performance
Visit	2.07	1.08	12.69	5.78
medical consultant	3.03	4.48	3.00	4.42
Bed count day	21.70	2.60	21.19	2.01
Nursing Services	0.55	1.15	1.24	1.94
Anesthesia	0.86	3.65	0.96	3.47
Surgery	13.03	15.27	13.33	14.13
Surgery room	1.80	5.48	5.10	12.36
Ward medicine	1.92	1.16	6.96	3.28
Ward Supplies	19.08	38.80	11.57	24.33
Operating room medicine	0.05	0.61	1.48	14.61
Operating Room Supplies	1.34	4.97	7.09	18.61
Pathology	2.44	63.96	0.40	15.73
Lab	5.00	4.64	2.51	2.15
Sonography	0.65	2.72	0.06	0.18
Radiology	10.65	71.09	0.54	2.51
CT	12.72	33.15	5.64	15.36
Rehabilitation	-	-	2.17	34.2
endoscopy	-	-	1.50	7.03
Dialysis	-	-	-	-
M.R.I	1.60	-	-	-
ECG	1.12	2.16	0.56	1.26
Cardiac resuscitation	-	-	0.33	11.11
Other services	0.30	2.21	1.58	12.49
Total	100	5.59	100	4.57

Table 4. The personnel's knowledge before and after the intervention

Item	Negative Ratings	Positive Ratings	Equal Ratings	z	P
Knowledge of insurance performance	0	26	1	- 4.46	0.000 ∗

∗Significant at $p < 0.05$

[DOI: 10.18502/jebhpme.v4i3.4163]

Discussion

The results showed that the highest amount of deductions was related to Health insurance based on basic insurance before and after the intervention. This excessive increase in health insurance deductions is due to the inequality and different distributions among clients covered by other health insurance policies. In fact, it is due to the large number of villages around studying city.Thus, rural insurance has dramatically increased. The results showed that the surgical ward had the most deductions. Regarding the provided services, the most deductions applied before the intervention were related to regular and special bed services, departmental supplies, surgical procedures, CT scans, radiology, and laboratories. According to the findings after the intervention, the most deductions were related to regular and special bed services, surgery, visitation, medication ward supplies, and operating room supplies.

Numerous researchers in Iran calculated the deductions of hospital bills, including a study conducted by Sarvestani et al. in the first six months of 2012 on 1706 patient records in Shohada Hospital in Sarvestan. It showed that the highest percentage of deductions was related to Social Security insurance, which was due to the high volume of insurance bills. Still, the lowest deductions were attributed to Armed Forces insurance. The rate of deductions in Social Security, Health Insurance, and Armed Forces Insurance were 3, 2, and 1.5 percent, respectively.These findings are inconsistent with the present study. According to Sarvestani et al. (4), the major reasons of deductions wereimpatience of a doctor or nurse, the number of insurance papers, failure to notice the errors, lack of physicians' knowledge about the consequences ofsigning instead of stamping, novice physicians or those employed by conscriptionlaw, insufficient training of the income department staff, lack of staff, insurers, and physicians' motivation. These reasons were in line with the findings of present study. The other reasons of deductions were irresponsibility of the insurance and income experts, as well as providing the physicians withinadequate information by insurance and income personnel, which were inconsistent with the present study. The discrepancy in the findings is becausethe insurance and income unit in studying hospital followed and identified deduction reasons and provided the physicians with the necessary warnings. In the study by Khorrami et al. (20), the most insurance deductions were related to Rural Health Insurance Fund, Urban Hospital Insurance Fund, and Social Security Insurance, respectively; these results were in line with the results of present study. Defect in the patient records, lack of the physician's visit card, lack of the physician's stamp and signature, lack of date in documents, distorted prescription, lack of test results, incorrect code insertion, lack of awareness about new tariffs, prescription of unnecessary medication, and lack of insurance coveragewere the most important reasons of deductions, which confirmed our results. Different studies showed that deductions from Health insurance were higher than other insurances. Among all thestudying hospitalwards, the most deductions were related to the surgical ward. The most important reasons of deductions were, non-acceptance of bed days, non- compliance with the applicable codes, the provision of non-contracted insurance services, and extra services, which were consistent with the findings of present study (21, 22). Leo et al. showed that deductions related to laboratory services resulted in high costs for hospitals; however, since 2013,the application of an automated computerized laboratory data control system to record physicians' orders during testing decreased the costs significantly (23). In confirmation of the present study results, lack of proper documentation of tests as well as radiology and ultrasound wards ad high deductions in the para-clinical departments (24, 25). To improve the condition and reduce preclinical service insurance deductions, para-clinical insurance documents should be controlled at least by two people, and insurance sheets should also be checked on the same day so that they do not pile up. One of the measures to reduce the hospital deductions is

[DOI: 10.18502/jebhpme.v4i3.4163]

implementing DRGs to facilitate the calculation and reimbursement of services. Nowadays, related diagnostic teams in the most advanced countries, such as America, Australia, Canada, and Germany, decide upon payment for services. The related diagnostic groups' system is a prospective payment method for hospital services and is regarded as one of the most efficient reimbursement systems for the cost of services (26).

According to the results, we can finally present the following strategies for reducing the insurance deductions in studying hospital. Deductions were initially caused by a lack of relationship between the staff's specialty and their job in the hospital under studying.In this study, staff working in the discharge and medical records'units included people who were neither familiar with the hospital's medical and financial processes nor familiar with medical terms because their education was not related to health care. It is more appropriate to recruit medical graduates to solve this problem.Insurance policy awareness should also be increased by conducting training programs for the medical personnel, doctors, nurses, and secretaries of departments. They need to have clear information about the rules and guidelines set by insurance agencies.Another solution to reduce deduction is to delegate a part of the financial management role to hospital authorities so that they can be responsible for the costs and income of their unit.In this regard, the establishment of an investigative unit or team is necessary for reviewing, refining, and finalizing inpatient documents and records, resolving potential problems, and providing feedback to relevant departments before submitting medical records to insurance organizations.

Research limitations included a lack of time to review documents and deductions in detail. It was attempted to solve this problem through careful planning. However, since the researcher was employed in the studied hospital, the accurate implementation of schedule was not possible due to the unexpected events. Furthermore, the insurance agencies did not send the patient records timely. We tried to expedite this process by negotiating and collaborating with the hospital manager. Also, other possible factors affecting the deductions over time were not investigated in this study. For instance, during the study period, when the data were collected, the insurance inspectors were working with the documents at the hospital, which could influence the results.

Conclusion

Based on the findings, the small percentage of deductions imposed a significant financial burden on hospitals. As a result, the significant reasons of deductions were determined and compared in this study.We found that many of these cases were related to the human agents' performance, and so they were preventable. In this regard, education can have a positive effect on the comprehensiveness of the patients' medical records; therefore, all secretaries, nurses, medical records staff, and discharge employees need the training to improve the quality of medical records' documentation. One of the significant problems in documenting medical records was related to the non-specialized staff working inthe discharge /admission and income units of the hospital. Effective manpower in the discharge unit must be fluent in medical terminology and familiar with insurance laws, payment methods in Iran, as well as the codification and structure of 'California' book. They also should understand patient records forms, medical information documentation rules, and finally have a good understanding of the hospital information system software.

Acknowledgments

Authors appreciate the hospital staff who helped in data collection process.

Conflict of interests

The authors declared no conflict of interests concerning the present study.

Authors' contributions

Kiaei MZ and Kalhor R designed research and analyzed the data; Taheri R collected data; Kiaei MZ and Kalhor R and Taheri R analyzed data; and Taheri R wrote manuscript. All authors read and approved the final manuscript.

[DOI: 10.18502/jebhpme.v4i3.4163]

References

1. Husereau D, Drummond M, Petrou S, Carswell C, Moher D, Greenberg D, et al. Consolidated health economic evaluation reporting standards (CHEERS) statement. BMC Medicine. 2013; 11(1): 80-6.
2. Mosadeghrad AM, Arab M, Afshari M. The impact of quality management on reducing bill deductions at operating theatre department of Valiasr Hospital: A participatory action research. Hospital. 2017; 16(1): 93-101. [In Persian]
3. Hall MA, Hager CL, Orentlicher D. Using payroll deduction to shelter individual health insurance from income tax. Health Services Research. 2011; 46(1-2): 348-64.
4. Norooz Sarvestani E, Pour Mohammadi K, Kavoosi Z, Yousefi AR. The amount and causes insurance deductions of Shohada-e Sarvestan hospital and ways to reduce it by using the techniques of problem solving, 2012. J Manage Med Inform Sci. 2014; 2(2): 122-32. [In Persian]
5. Karami M. The role of documentation in hospital bill deduction. Zahedan J Res Med Sci. 2011; 12(5): 95. [In Persian]
6. Safdari R, Sharifian R, Ghazi Saeedi M, Masoori N, Azad Manjir ZS. The amount and causes deductions of bills in Tehran University of Medical Sciences Hospitals. Payavard Salamat. 2011; 5(2): 61-70. [In Persian]
7. Mosadeghrad AM, Esfahani P, Nikafshar M. Hospitals' Efficiency in Iran: A systematic review and meta-analysis of two decades of research. Payavard. 2017; 11(3): 318-31. [In Persian]
8. Dehghan HR, Keshmiri F, Najafpour J. Evaluation of hospital information systems insurance affairs: optimization of hospital finance and insurance affairs. J Health cManag. 2012; 49(1-2): 51-60. [In Persian]
9. Saravi BM, Asgari Z, Siamian H, Farahabadi EB, Gorji AH, Motamed N, et al. Documentation of medical records in hospitals of Mazandaran university of medical sciences in 2014: a quantitative study. Acta Informatica Medica. 2016; 24(3): 202-6. [In Persian]
10. Barati Marnani A, Teymourzadeh E, Bahadori MK, Ravangard R, Saeid Pour J. Challenges of a large health insurance organization in Iran: A Qualitative Study. International Journal of Collaborative Research on Internal Medicine & Public Health. 2012; 4(6): 1050-62.
11. Tavakoli N, Jahanbakhsh M, Akbari M, Baktashian M, Hasanzadeh A, Sadeghpour S. The study of inpatient medical records on hospital deductions: An interventional study. Journal of Education and Health Promotion. 2015; 4: 38. doi: 10.4103/2277-9531.157218.
12. Bahadori M, Ibrahimipour H, Farzaneh A. The challenges of supervision on providing health services from the viewpoint of the insurer: a qualitative study. Int J Collab Res Intern Med Public Health. 2012; 4(9): 1673-85.
13. Karimi S, Vesal S, Saeedfar S, Rezayatmand M. The study deductions of insurance bills and presenting suggestions approaches in Seyed Alshohada hospital. Health Inf Manage. 2011; 7(SPECIAL ISSUE): 594-600. [In Persian]
14. Klein-Hitpaß U, Scheller-Kreinsen D. Policy trends and reforms in the German DRG-based hospital payment system. Health Policy. 2015; 119(3): 252-7. doi: 10.1016/j.healthpol. 2015.01. 006.
15. Omrani MD, Farajzadeh F, Rashidi G. Determination of the causes of income deficits at hospitals affiliated to ShahidBeheshti University of Medical Sciences. J Med Counc I R Iran. 2012; 30(3): 265-71. [In Persian]
16. Mohammadi A, Azizi AA, Cheraghbaigi R, Mohammadi R, Zarei J, Valinejadi A. Analyzing the deductions applied by the medical services and social security organization insurance toward receivable bills by university hospitals of Khorramabad. Health Information Management. 2012; 10(2): 172-80. [In Persian]
17. Khalesi N, Gohari M, Vatankhah S, AbasImani Z. Effect of staff education on the deductions of Firuzgar hospital. Health Management. 2010; 13(42): 19-26. [In Persian]
18. Rezvanjo H, Sokhanvar M, Doshmangir L. Investigating the rate and causes of deductions applied to social security payments and medical services in patients admitted to two hospitals affiliated to Tabriz University of Medical

[DOI: 10.18502/jebhpme.v4i3.4163]

Sciences. Health Image. 2017; 7(4): 7-13. [In Persian]
19. Mahmodirad GH, Astaki R. The Effect of Six Sigma Model Implementation on the Quantity and Effectiveness of Patient Education in Koo District in Vali-e-Asr Hospital of Birjand. Original Research Paper. 2013; 11(2): 72-5. [In Persian]
20. Khorami F, HosseiniEshpala R, Baniasadi T, Azarmehr N, Mohammadi F. Prioritizing insurance deductions factors of Shahid Mohammadi hospital inpatients records using shannon entropy, Bandar Abbas, Iran. Hormozgan Med J. 2013; 17(1): 77-82. [In Persian]
21. Safdari R, Ghazi Saeedi M, Sheikh al-Tayifah M, Gabrieli M, Seyed Faraj Allah S, Seyed Faraj Allah E, et al. Investigating the Causes of Insurance Deviations from the Viewpoint of Insurance Experts in Educational Hospitals of Mashhad University of Medical Sciences. Journal of Paramedical Sciences, Tehran University of Medical Sciences. 2018; 1(11): 10-9. [In Persian]
22. Bagheri H, Amiri M. The Survey on causes deductions applied by insurance companys on patients' bills at a hospital of Iran. Health Care Management. 2012; 4(3,4): 17-24. [In Persian]
23. Lu TH, Chang YT, Lin YM. Implementation of an automatic laboratory data checking system to reduce deduction of statins reimbursement in a teaching hospital in Taiwan. Value Health. 2014; 17(7): 500.
24. Mosadeghrad AM, Afshari M, Nasrolahi R, Daneshgar S, CoraniBahador R. The impact of education on reducing bill deductions in a hospital: A case study. Hakim Health Sys Res. 2017; 20(3): 156-63. [In Persian]
25. Moalemi S, Shamsabadi AR, Meshkani Z, Alikiani A, KazemiKaryani A. Survey and comparison on the causes of deduction in admitted social insurance: Bahonar and Arjmand hospital in Kerman. Association of Health Information Management of Iran. 2014; 8(1): 17-23. [In Persian]
26. Safdary R, TofighiSh, Ghazisaeedi M, Goodini A. A Comparative Study on the Necessity of Using Diagnostic Related Groups for as a Tool to Facilitate the Repayment of Health Units in Selected Countries. Health Inf Manage. 2011; 8(2): 244-50. [In Persian]

[DOI: 10.18502/jebhpme.v4i3.4163]