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Evaluation of the Effect of Educational Intervention on the Error of Insurance Documents on Deductions in Hospitalization Records

Mahmood Mousavi [a], **Zohreh Karimiankakolaki** [b]*

[a] Department of Health Services Management, School of Management, North Tehran Branch, Islamic Azad University, Tehran, Iran
[b] Department of Health, Faculty of Medical Sciences, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran

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***Corresponding Author:**
Zohreh Karimiankakolaki

Email:
zohrehkarimian68@gmail.com

Tel: +98 9132366910

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ABSTRACT

Background: This study aims to consider the effect of an educational intervention on the error rate of insurance documents in the deducting of hospitalization records of COVID-19 patients' health insurance among hospital staff.

Methods: The target population of this semi-experimental study was all personnel involved in the management of patients with Covid-19. Among the hospitals of the COVID-19 site in Chaharmahal and Bakhtiari provinces, one hospital was selected as the educational target group (24 individuals) and one hospital was considered as the control group (16 individuals) by lottery. To measure the effectiveness of education, the sample size of all cases of 19 patients with health insurance in two hospitals during two periods of October and March 2016 was determined. Data collection was performed by checklists and direct reviews of files, the health insurance system, and the hospital HIS system. Data analysis was performed using SPSS21 software.

Results: The number of deductions in the case of "Covid 19 hospitalized patients" of the health insurance decreased significantly in the intervention hospital from 1833 to 933 ($p < .005$) and increased in the control hospital from 447 to 2712 ($p < .005$). In the intervention hospital, the highest decrease in deductions in the hoteling service was from 235 (12.8%) to 2 (0.2%) cases ($p < .001$), and for medicines from 335 (18.2%) to 56 (6%) cases ($p < .001$).

Conclusion: The results demonstrated that staff training on the error in COVID-19 insurance documents during the coronavirus pandemic outbreak has reduced the number of insurance deductions in COVID-19 patients' records.

Keywords: Education, covid-19, hospitalization, hospital

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Introduction

The pandemic disease of Covid 19 posed an unprecedented challenge for health and treatment systems. High costs of health care, lack of protective equipment containing face masks, and low numbers of ICU beds, and ventilation devices were regarded as weaknesses in providing health care to patients. In America, there was concern about uninsured individuals working in occupations susceptible to viral infection and it led to significant consequences in the form of illness (Taherinia & Hassanvand, 2020).

During the outbreak of COVID-19, economic enterprises are constantly seeking a method to increase the profitability of products or services by using it. Determining the cost of services to achieve this goal appears essential. One of the dominant challenges in healthcare and treatment organizations is the development of accurate and appropriate cost information. The rapid and increasing costs of health care services and how to control these costs are the main problems of the health care service systems (Ahmadi & Gargaz, 2020).

Considering the low tariffs for diagnostic and treatment services in hospitals and the high costs of providing health and treatment services, the requirement to collect all income from insurance organizations seems more necessary in the current situation where numerous hospitals are in financial straits, high hospital deductions are not accepted by managers, since this issue will reduce the quality of services and ultimately, patients will be dissatisfied with the hospital (Ali et al., 2021).

The deducted amounts are probably part of the hospital's income that is not received, and from the point of view of the insurance organizations, the invoices and documents with more deductions require professional procedures and a longer time for processing. It has two consequences: Firstly, the longer it takes to process the invoices and documents sent by the hospitals, the more claims the hospitals receive from the insurance organizations, which is uneconomic and seems not to make much sense in an efficient and economic system. In addition, more expertise leads to the cost of handling for the insurance organization (Taheri, Kalhor, Ahadinezhad, & Kiaei, 2020).

About the coronavirus pandemic and the decrease in hospital revenue due to the decrease in the number of referrals for non-coronavirus medical services and the importance of the discussion of deductions for hospitalized patients with corona as a part of the income of universities of medical sciences and all corona treatment centers.

The current study was conducted to determine the effect of the educational intervention on the error of insurance documents on the deductions of the hospitalization files of the COVID-19 patients of the health insurance in the hospital staff.

Methods

The present investigation was performed in a semi-experimental way during the period (October to March 2019).

Among the seven hospitals that have a ward for patients with Covid 19 in Chaharmahal and Bakhtiari province, one hospital was selected as the educational target group and one hospital as the control group by simple random sampling. The target population of this research was all personnel handling the cases of COVID-19 patients, intervention (24 people), and control (16 people).

Inclusion criteria for the study included all official, contractual, and contract personnel involved in handling patients' records, and exclusion criteria were failure to attend any of the training sessions and withdrawal from participation for any reason.

The target group of the training for this educational intervention (in the form of a census) are all the secretaries in the Corona department (2 individuals), discharge staff (4 individuals), income (3 individuals), processing documents (7 individuals), treatment economics (2 individuals), medical documents (2 individuals) and admission (4 individuals) of the intervention hospital, which was considered a total of 24 persons. Furthermore, all the secretaries of Corona departments (2 individuals), discharge staff (3individuals), income

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(1individual), processing of documents (4individuals), treatment economics (1individual), medical documents (2individuals) and admission (3individuals) of the control hospital, which together a total of 16 persons formed the control group of the study in the identical period. The indicator was applied to measure the effectiveness of the education for comparing the number of deductions of all cases included in the deduction of hospitalized Corona patients of the health insurance of the intervention and control hospital before the intervention in October 2019 and after the intervention in March 2019.

The training was conducted in a 4-day course by three experienced and specialized experts in the field of deductions, who had experience working as the vice president of treatment, hospitals, social security, and health insurance organizations, using PowerPoint and in the form of lectures. The control hospital failed to receive an intervention. The content and schedule of training are mentioned in Table (1).

Table 1. The educational program presented in the intervention group

Meeting	Educational content	Source	period
First session	General rules of insurance funds, general patient billing, and types of cases	Notification by the Supreme Council of Insurance	6 hours
second session	The same admission criteria and guidelines between basic insurance	Notification by the Supreme Council of Insurance	6 hours
third session	The same criteria and guidelines for hospitalization between basic insurance, a guide for the diagnosis and treatment of COVID-19 patients at the levels of providing inpatient services (8th edition)	Notification of the Ministry of Health, Treatment and Medical Education	7 hours
fourth Session	Flowchart of diagnosis and treatment of COVID-19 patients at the levels of providing inpatient and outpatient services, guidelines for the distribution and use of redeliver in COVID-19 patients	Notification of the Ministry of Health, Treatment and Medical Education	7 hours

The data collection checklist included medicine, laboratory, consultation, radiology and imaging, operating room and surgery, anesthesia, hotel, equipment and consumables, supplementary services for diagnostic measures, visit, dialysis, taping, then the numbers and amounts according to the checklist were extracted and recorded for each case.

The current checklist is based on the study of Al-Rezaei and his colleagues on the topic of examining the amounts and causes of deficits in selected hospitals in Tabriz in 2014-2015 and providing appropriate solutions. In terms of validity and reliability, the checklist was reviewed and approved by the professors of this field by assessing the validity of the Delphi questionnaire (Musa Rezaei, 2013). Additionally, in terms of validity and reliability, the present study was examined and approved.

Data analysis was performed using SPSS v21 software. Further, the comparison test of ratios, z, and the calculation of the phi statistic was utilized.

Result

Forty individuals participated in this research, 24 persons received educational intervention at Hajar Hospital, and also16 individuals at Seyed al-Shohada Farsan Hospital received no educational intervention.

The comparison of the average amount of deduction for each item included in the deduction for intervention and control hospitals is reported in Table 2.

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Table 2. Distribution of numbers and percentage of inpatient cases and cases subject to COVID-19 health insurance deduction and average deductions in intervention and control hospitals before and after the intervention

	group	The number of hospitalization cases by Covid-19 health insurance	The number of hospitalized cases included in the health insurance COVID-19 deduction N (%)	Average deduction per case subject to deduction(Rial)	Percentage increase %
Intervention	before intervention (October 2019)	171	165 (96%)	8,152,286 Rial	%82
	After the intervention (March 2019)	103	94 (93%)	1,428,503 Rial	
control	before intervention control (October 2019)	43	38 (88%)	7,099,913 Rial	%69
	After the intervention (March 2019)	23	21 (91%)	11,972,222 Rial	

By performing the ratio comparison test and calculating the phi statistic, it was determined that there is a difference between the number of deductions in October and March (before and after the intervention) in the intervention hospital. There is significance and it has had a significant decrease. ($P < 0.005$) in the control hospital as well, there is a difference between the number of deductions in October and March month (before and after the intervention) in the control hospital, there is a significant difference and there has been a significant increase ($P < 0.005$). (Table 3)

Table 3. Comparison of proportions of deductions with phi statistic calculation in the intervention and control group

N		Statistics		Pvalue	
5647		0.602		0.001	
Group		**Number**	**observed ratio**	**Test statistics**	**P value**
Intervention	before intervention (October 2019)	1833	0.73	11.95	0.001
	After the intervention (March 2019)	933	0.37		
	Total	2488	1		
control	before intervention control (October 2019)	447	0.14	-5.176	0.001
	After the intervention (March 2019)	2712	0.86		
	Total	3159	1		

According to the Z test, comparing the proportions of two independent samples of Shahrekord intervention hospital (S) was determined. Several deductions in March of the intervention hospital decreased significantly compared to October ($P < 0.005$) and some deductions in March of the intervention hospital had no significant difference in comparison with October, respectively ($P = 0.057$), ($P = 0.833$), ($P = 0.089$) (Table 5).

The Z test was applied to compare the ratios of two independent communities of the control hospital as the control group**.** Some deductions in March of the control hospital have increased significantly compared to October ($P < 0.005$). Several deductions in March of the control hospital have reduced significantly in comparison with October ($P < 0.005$). Some deductions in March of the control hospital had no significant difference compared to October, respectively ($P = 0.064$), ($P = 0.052$), ($P = 0.077$), ($P = 0.112$), ($P = 0.077$) (Table 5).

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Table 5. Comparison of frequency distribution and percent frequency of the causes of intervention and control hospitals deductions in the months of October and March 2019

Indicator Intervention	October N (%)	March N (%)	z test statistic	p-value
medicine	335 (18.2)	56 (6)	6.92	0.001
Laboratory	215 (11.7)	43 (4.6)	4.73	0.001
Counseling	29 (1.6)	18 (1.9)	1.577	0.057
imaging	3 (0.2)	2 (0.2)	0.42	0.833
Description of action	36 (2.0)	0 (0)	1.92	0.012
Hotelling	235 (12.8)	2 (0.2)	15.45	0.001
Consumables	821 (44.6)	501 (53.7)	8.85	0.001
Services	129 (7.0)	276 (29.6)	6.46	0.001
visit	0 (0.0)	3 (0.3)	-1.81	0.034
Dialysis	26 (1.4)	0 (0.0)	4.23	0.001
taping	0 (0.0)	32 (3.4)	-5.12	0.001
Total	1839	933	10.24	0.001
Indicator Control	**October N (%)**	**March N (%)**	**z test statistic**	**p-value**
Laboratory	101 (22.7%)	2430 (89.6%)	-18.44	0.001
Hotelling	65 (14.6%)	45 (1.7%)	1.69	0.064
Counseling	4 (0.9%)	6 (0.2%)	1.63	0.052
Complementary services	8 (1.8%)	44 (1.6%)	0.51	0.305
medicine	138 (31.1%)	81 (3.0%)	14.21	0.001
Dialysis	9 (2.0%)	0 (0.0%)	1.43	0.077
Radiography and imaging	6 (1.4%)	0 (0.0%)	1.22	0.112
Consumables	102 (23.0%)	94 (3.5%)	2.51	0.016
taping	1 (0.2%)	0 (0.0%)	1.43	0.077
visit	10 (2.3%)	11 (0.4%)	0.56	0.291
Total	444	2710	-5.176	0.001

Discussion

This study was conducted to determine the effect of educational intervention on the error of insurance documents on the deductions of hospitalization files of Covid 19 health insurance patients among hospital staff.

The results identified that personnel training reduced the number of errors in the deductions for hospitalized cases of COVID-19, and the increase in the control group and the decrease in the trained group prove this hypothesis. According to the conducted research, no work was observed that specifically examined the effect of hospital staff training on insurance deductions for inpatient cases of COVID-19. In most identical studies, Nader Khalsi et al. the employees were trained on the amount of insurance deductions of Firouzgar Education and Therapy Center in Tehran. The findings indicate that the total average error of setting insurance documents before the training of the employees was 3.25 and 1.38 after the training. Moreover, the amount of deductions increased from 9.6% before the training to 9.13% after the training (Khalesi. Nader, 2008), which confirmed the effect of training on the errors of setting up insurance documents according to the type of insurance (medical services and social security).

In the study by Mosadeghrad et al. in 2017 on the effect of training on insurance deductions due to the implementation of the tariff of relative values of health services in a large teaching hospital in Tehran, the results indicated that the average insurance deductions of the hospital in the second 6 months of 1392, 1393 and 1394, it was equal to 2.9%, 11.1%, and 7.3%, respectively. The number of deductions applied to patients' accounts increased by 282.8% after the implementation of the relative values tariff book and decreased by 34.2% after staff training (Mosadeghrad Ali Mohammad, 2017). Medicare and Medicaid

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insurance service centers reduced the amount of additional payments from 1.10% to 2.5% in 2004 and 2005 after the implementation of the educational program (HHS, 2008).

According to experts from the British School of Economics and Political Science, many physicians do not perceive the cost of the service they prescribe, for instance, a physician in a hospital doesn't usually know the cost of radiology, pathology, drugs, and other things, therefore, it is necessary to provide physicians and other consumers with information on health care costs. Based on experience, the research group believes that this action can be accomplished more economically.

In this investigation, the employees performed unrecorded actions or recorded some actions for which the insurance organizations paid an amount. Although they did not pay the amount, these problems were resolved after the training course, (Nokojima, 2015; Yaghoubi, Saghaian Nejad, Abolghasem Gorji, Norozi, & Rezaie, 2009). Research by Howard and his colleagues at the Tufts-New England Medical Center confirms this case. Thus, using a PDA in the respiratory care unit, Howard observed a significant reduction in deductions, particularly medication-related deductions compared to the unit's manual registration system (Howard, 2004).

As can be observed, the results of the mentioned studies are consistent and all indicate that the training of personnel had a positive effect on reducing the number of deductions and errors in patient records. In the intervention hospital in October, the highest numbers of deductions were related to equipment and consumables, then medicine, accommodation, laboratory and complementary services, operation description, consultation, and dialysis. In the control hospital in Mehrmah, the highest numbers of deductions were associated with medicine, followed by equipment and consumables, and in the next stages, laboratory, hotel and visiting, dialysis, complementary services, radiology, imaging as well as consultation.

In research by Ali Imani et al. (2016), a study was conducted with the title of "Analysis of the causes of inpatient file deductions" and the findings demonstrated that surgeons and anaesthesiologists overcharged in coding, sending documents with the assistant surgeon's signature without his presence in the operation, and overcharged in price. Medicines and supplies were considered as one of the most important causes of deductions (Imani, 2017).

Behrouz Mahdian et al (2017) in investigating the amount and causes of deductions in the bills of patients covered by social security insurance in Amir al-Momenin Hospital (AS) in Zabul in the first quarter of 2017, reached the results that the largest number of deductions was related to consumables and the second most deductions It is associated with the right of the surgeon, an anesthesiologist. In addition, the lowest amount of deductions was related to the cost of ultrasound and Scan. CT (Madahian, 2015).

Krushat and Bhatia's investigation on the deductions of Medicare insurance payments, most of the mistakes were related to the provision of unnecessary medical services to the patients (Krushat & Bhatia, 2005). Hsia et al. conducted a study in 1998 of 788 inpatient records of patients covered by Medicare, selected as a sample from the urology departments of 239 hospitals. No coding was done (Hsia, Krushat, Fagan, Tebbutt, & Kusserow, 1988).

Based on the observations, the results of the mentioned studies are different and frequently have various causes in the number of deductions, which is necessary to mention a few points: the present study was conducted exclusively on the inpatient files of COVID-19 patients and the type of services received and accordingly, the type of applied deductions will be different compared to other cases and hospitals with various specialties and it is mostly associated to accommodation, medicine, and consumables.

On the other hand, since the coronavirus pandemic is a newly emerging disease, there have been no identical studies in this regard.

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Each research frequently involves difficulties; it facilitates the use of personal protective equipment by the researcher, as the risk of contracting the disease increases due to the spread of the disease and the presence of the researcher in the Corona Center hospitals.

The lack of studies on the research topic, the emerging nature of the disease, and the lack of information about various aspects of the disease are further limitations of the current investigation, which may limit the effectiveness of the study results shortly by identifying and discovering the secrets of the disease.

Despite the significant results, this study included some limitations. The limitations of the study were considered as the time, place, and self-reporting of the checklists. Furthermore, the outbreak of Covid 19 caused data collection difficult.

It is suggested that services including hotel and medicine, which took the largest number and amounts of corona deductions due to the pandemic crisis can be attributed to the unknown nature of the disease, the lack of definitive treatment, and the fact that most the used drugs are experimental with costs have been imposed on patients and hospitals, therefore managers and policymakers in the health and insurance sector should improve the conditions of insurance coverage by the crisis of the Corona pandemic and similar pandemics.

Conclusion

In general, the findings of the current research showed that during the outbreak of the Corona pandemic, training employees with instructions, clinical guidelines, and insurance criteria related to the disease of COVID-19, increases the awareness of employees and the income of medical centers, and errors in insurance documents, the amount of deductions Insurance reduces the number of cases of Covid-19 patients.

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Conflict of interest

There is no conflict of interest.

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Ethical considerations

The Ethics Committee of the Islamic Azad University of Shahrekord approved the study.

Code of ethics

IR.IAU.SHK.REC.1400.027

Authors' contributions

M. M, participated in the work method, data collection; and ZK in the report writing and writing of the article, and all the authors participated in the editing of the article.

Open access policy

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