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Research Article

EFFECTS OF IMPLEMENTATION OF FOCUS-PDCA MODEL ON REGISTRATION MEDICAL SERVICES IN ORDER TO INCREASE REVENUE

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ABSTRACT
The purpose of this research is investigating the results of Implementation of quality improvement in the process of registration treatment actions and its effect on income Troma hospital in Shiraz according to FOCUS-PDCA model. The population of this research was all the available cases in the decathlon parts of hospital in October 2013 which the numbers of cases were 5134 and according to census sampling method all members of the population selected as the sample member. In the following performed registration treatment process for patient were examined before and after implementation of quality enhancement model by using FOCUS-PDCA and according to pre-test and post-test. And also contradiction between medical cases of patients with their financial statements before and after implementation of quality enhancement model were examined in order to determine unregistered cases in the invoice and as a result calculation total unregistered RLS items. The research data were analyzed by using Paired Samples T-Test and Pearson Correlation.the results showing positive effect of implementation quality model on hospital revenue.and thus according to discussed reasons in the Unavailability of the total revenue from the performance of services in the mentioned hospital different solutions were presented in line with improve the quality of the process of the remedial measures registration.

Keywords: *FOCUS-PDCA, TQM, Troma Hospital, Shiraz*

INTRODUCTION
Health and treatment department is one of the most important service locations and its achievements are one of the main indexes for development and social welfare of a country. Development of medical technology, increasing rate of population, changing lifestyle toward industrialization and the rise of emerging diseases has caused to increased growth of health and treatment care costs (Asefzade, 2006)
The rapid rise in health and treatment services and continuous increase in hospital tariffs is a worrying factor for people and managers. The people are wishing to know what they achieve by spending substantial funds in building, maintenance and development of hospitals.
In addition the people are also willing to enjoying optimal and better service of the hospitals in exchange for funds that they paying (Tabibi, 2001). Managers of health and medical organizations have to do some constructive innovations for solving those problems .one of these strategies is considering Total Quality Management (TQM).
Total Quality Management (TQM) is a management strategy for the purpose of creating awareness toward quality in all organizational processes. TQM focuses on increasing customer and consumer satisfaction through management methods and systemic views and using methods and simple tools in the continuous improvement process. Such improved performance is directly causes to access to different goals such as quality, the proper timing of production, meet the needs of customers, suitability of products and services and reduce costs. And guarantees role of staffs in achieving goals through training of using methods (Jelodari, 2001)
One of the basic elements of quality management is focusing on process. Process includes a combination of different factors that follow a specified purpose. And its performance relates to relationships of different customers.

Most of the quality problems causes from impairment in communication and coordination processes. Improvements in a process are being ineffective by impairment in another process. Quality is achieved if different providers act as a team and move toward shared goals. Separate look to different parts of health care processes prevents from providing comprehensive services to patient and standardization process prevents the causing faults (Farah *et al.*, 2010)

There are different methods for improving process. Each organization must choose one of these methods and educates all of its staffs. There is an absolutely essential need for applying an improved method across the organization. The FOCUS-PDCA method was developed by Hospital Association of America in 1989, in order to health teams considering activities as improvable processes this method is based on data and encourages teamwork and participation (Farah *et al.*, 2010).this paper has developed in the field of improving and enhancing process of remedial measures and examines method of improving this process and its effect on hospital income.

FOCUS-PDCA method and its relationship with income

This method is one of the types of quality improving methods of process that has performed step by step and results to quality improvement of processes and is one method of research and can be used in documenting process and evaluation process after improving (Farah *et al.*, 2010). This method can be used as self-assessment model in organizations. Evaluation within the enterprise can act as opening action for improving organizational Capacity (Farah *et al.*, 2010).

FOCUS-PDCA includes 9 steps that each letter determines a word, the steps of that can be seen in diagram 1:

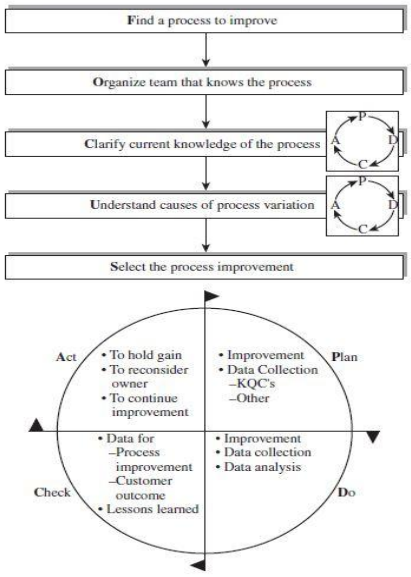


Diagram 1: Method steps of Focus- PDCA (Hospital Corporation Of America, Nashvelle, Tennessee, 1988: 1989)

These 9 steps are including: the first is Find that include finding a process that needs improvement. Organization: organizing a team that has educated for using the steps. Clarify: clarifying the performance of the process. Understanding: Understanding the causes of performance changes of the process and specifying origin of the problems and designing it as fishbone. Select: Selecting that part of process that needs upgrade. Plan: programming for selected process, data collecting and analyze them. Do: running the program according to data collected and analyzed. Act: continuing evaluation of results and finally. Check: Program promotion and transfer it to other parts even higher levels (Tam, 2007; Prior, 2006)

Results of different research showed that FOCUS-PDCA method has positive relationship with individual and organizational variables. A research has been done by Alexander *et al.*, (2006) entitled "Improvement

the quality and financial performance of hospitals". The results showed that, the hospitals that successfully have carried out quality Improvement Programs can expect significant improvement in financial performances and method of their investment. The researcher argues that although implementation of quality improvement programs is so costly but the results that achieved from successfully applying of those programs is much more than spending costs. A research entitled as "Determining the results of the implementation of quality improvement model in promote setting documentation and bills of patients at outpatient department of Shiraz Shahid Faghihi Hospital" has been done by Hesam in 2003, according to survey from implementation perpetrators. Then examined 6835 case of medical insurances in May, June, July months, that results are showing that the hospital have been subtractions respectively, 12076700, 11628900, 13474435 RLS.

According to 88% expert comments, after running the upgrade process time of sending documents has been reduced considerably.in addition 67% experts believed that after running the process completion of attached documents have been promoted dramatically.

Heydaranlo *et al.*, (2009) in the intervention study were witnessed increasing satisfaction of process owners and reducing time of transportation patients to the relevant departments, after implementation of FOCU-PDCA method on 40 patients at Shahid Mahallaty Hospital in Tabriz. Tea *et al.,* (2008) at orthopedic ward of Inora Hospital at U.S.A represents the positive effect of this method on increasing satisfaction and section performance. Chen *et al.,* (2006) conducted a research in relation with effect of quality improvement using FOCU-PDCA method in the case of dialysis patients with anemia in Beijing hospital in Beijing. Considering the fact that anemia is common in hemodialysis patients this problem was followed in those patients. Finally the satisfaction of dialysis patients was increased. In a study entitled as "The performance impact of implementation TQM programs" that was conducted by Weech *et al.,* (2001), the results about financial performances, human Resources and provided services were analyzed. Factors associated with implementation of TQM programs were include: management controls, reward Systems and organizational Structures, during the course of the TQM program were considered as control variable. Results showed that modeling has been positive effect on financial results. The implementation of TQM programs and reporting requirements on the results of quality improvement activities had positive effect on financial performance and human resources. Quality council had a positive impact on financial performance.

In another research that was conducted by Kossovsky *et al.,* (2002) entitled as "assessment of improvement quality intervention in reducing inappropriate hospital usages" at internal sector of some of the educational hospitals in the Geneva city in Switzerland, two process that influencing inappropriate use of hospital was selected, that are include, unnecessary admissions and receptions. Before implementation of the program a sample of 500 subjects from patients were selected and studied. Then intervention was done and after that a sample including 498 patients were selected in order to comparing. The results indicated that because of implementation of quality improvement program the amount of unnecessary admissions reduced from 15% to 9% and also proportion of unnecessary hospitalization days reduced from 28% to 25%. Smyrnios (2002) has performed a research about the effectiveness of quality improvement programs on using the artificial devices and has analyzed the results of the program in 2 successive years.

The results showed that the number of patients increased from 220 persons from the base year to 247 people in the first year of program implementation. The average number of days using the device reduced from 23.9 to 21.9 days. The average duration of stay in hospital reduced from 5.37 to 6.31 days and the average stay in the ICU reduced from 30.50 to 25.9 days. Results showed that the number of patients in the second year of the program compared to the base year increased from 220 to 267 patients and the average number of days using the device reduced from 23.9 days in the base year to 17.5 days in the second year. The average stay in hospital reduced from 37.5 to 24.7 days and the average stay in the ICU reduced from 30.5 to 20.3. Also the average costs of each person reduced from 92933 to 63687 dollar. As a result of implementation of the program the amount of 3440787 were saved and the mortality rate reduced from 32% to 28%.

Also a study has been done by Blance *et al.,* (2001) entitled as "Process of continuous quality improvement in radiology and reducing waste". In this study Implementation of quality improvement model has done in radiology section in order to reduction of partial images or wasted videos and also reduction deration of image study to final report publication. The incomplete cases were defined as images that had not signs of final report (images that captured within 3 to 90 days). For this purpose computer software was designed to identifying incomplete cases since arriving patient to the related section until final print of Radiology Information System. Intervention was running within 1992 to 1999 and the results were examined. The problems at all stages of the process were identified. Although some of the problems were out of process of owner domain, Interventions conducted reduced 72% incomplete cases. Before intervention incomplete cases were 2.8 % of all captured images and after that reduced to 0.8%.

Also in a study that was conducted by Newbrander *et al.,* (2001) at some of hospitals in Kenya entitled as "improvement in registration services, increases hospital revenue" researchers proposed some solutions ,after examining of existing problems in steps of service registration. The solution that was accepted by examining aspects of affairs was computing registration service process in all the hospital. In addition, it was decided to operators of service registration be present in 5 important parts of the hospital such as, events, Pharmacies, Laboratory, childbirth division and National Insurance offices. That program was implemented during 1996 to 2001 and the results were examined.in the result of implementation of this program the number of unregistered cases were reduced considerably so that in a hospital the income was increased to the amount of 400 %.in another hospital in Mombasa that the program was implemented monthly income of hospital was increased from 24000 to 80000 dollar. In addition implementation of this program had other results such as improving hospital efficiency, improve the cost-effectiveness, Increase the accuracy of the accounts, and reduce administrative delays in the accounts and better maintenance of patient accounts. In the quality improvement program that was held by Gonzalez *et al.,* (1998) in health sector of Costa Rica, 7 different centers participated that were include 2 hospitals, 4 clinics and one health district. Some individuals were selected from these 7 sites which made a team together and discussed problems and issues. The main identified problems were include: The large number of patients which has not admitted in clinics, long waiting times for diabetic patients, delays in retrieving medical records of patients in outpatient clinics, long appointment times of physicians and prolonged hospitalization before surgery. Each center implemented quality improvement program to solve their problems. From 7 mentioned centers 4 of them managed to improve process and solving their problems. The results of the program were the: reduced not admitted patients from 15.5 to zero in outpatient clinics. Waiting time was reduced from 70 minutes to 24 minutes for Medical Records Retrieval and also waiting time for diabetic patient were reduced from 5.7 hours to 3.7 hour. Results of a team performance which was working on pre-operative length of hospital stay issue were positive. But it turned out that it's necessary to collaboration with other groups in Surgery department for the optimal solution of the problem.

MATERIALS AND METHODS

The method of research is descriptive and survey from the prospect of data collection and is practical from the prospect of purpose. The population in this research is all of the existing files in the 10 different sections of CPCR, ICU2 surgical, hospitalization events, ICU 1 surgical, hospitalization 1, hospitalization 2, Screening surgery II, events 1, Post ICU in the Troma hospital at Shiraz, which their number is 5134. All members of the statistical community selected as sample, so the sampling method is census. For collecting data firstly has used of library material and then the requirement data was collected from examining incompatible material between medical files of patients with their bills, finding not registered materials in bills and finally calculation whole unregistered material for examining effects of process of registration of remedial measures.

For patient before and after implementation of the program in the Troma hospital at Shiraz after entering data investigated relationships between the variables. In this regard it was used from paired Samples T-Test, ANOVA and Pearson Correlation.

Research Questions

1. How are registration remedial measures for patient before implementation of improving quality model in Troma hospital in Shiraz?
2. How much is the frequency of conformity remedial measures records with Measures recorded in patient's bill, before implementation of improvement quality model at Troma hospital in Shiraz?
3. How much is that costs have not received from patients and what are their effects on hospital revenue before implementation of improvement quality model at Troma hospital in Shiraz?
4. What is the reason for not registration costs of medical measures in medical file of patient?
5. How much is the frequency of conformity of registered medical measures in file with registered measures in patient's bill after implementation of improvement quality model at Troma hospital in Shiraz?
6. How much is the not received incomes from the patients and its impact on hospital revenue after implementation of improvement quality model at Troma hospital in Shiraz?

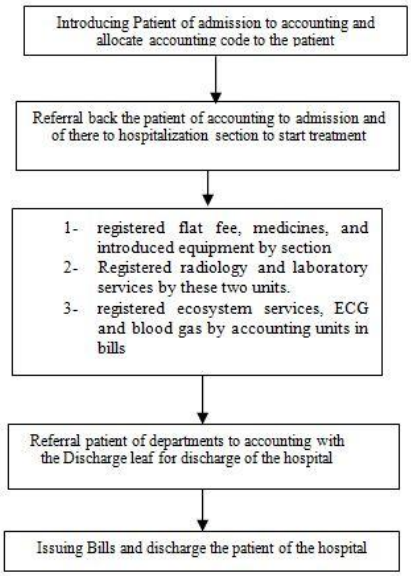
RESULTS AND DISCUSSION

Findings

In this section the findings of the above research analyzes. Analyze results of the questions of the study is coming below:

- **How is it the process of registration treatment measures for patient after implementation of improvement quality model at Troma hospital in Shiraz?**

For successfully running this step its necessary and important to comprehend process and mode of working.in this step were used from. Two tools highlight opportunity document and casted graph.



Casted graph of registration treatment measures in the Shahid Rajaee hospital

The Expressed Opportunity Document

Register treatment measures are starting with admission and allocation accounting code and terminated by issuing invoice for patient. Defects in the process is causes to failure to register some of the delivered to patients and as a result failure to fulfill a part of hospital income. Improvement in that process is causes to improvement in process of registration of treatment measures and improvement in hospital income. Since the lack of precise registration of fulfilled services for patient's causes to some losses in hospital income, improvement of this process is so important in addition since that much of the income of the hospital is

provided from its special income, improvement of this process can have a positive effect on the hospital performance.

Casted Graph

Casted graph is a simple tool for showing of process and it's used to display a large image from the process. This graph shows only the process that occurring normally in the process.

2- How much is the frequency of conformity in the registered treatment measures in patient's bill before implementation of improvement quality model at Troma hospital in Shiraz?

In this section we analyzing the findings of first phase different wards of hospitals will are presented separately:

Findings for September 2013

Section Name	The number of cases has not been charged	The number of cases performed based on record
Surgery11	81	287
Surgical ICU 1	109	525
Surgical ICU II	145	598
Hospitalization 1	106	354
Hospitalization 2	121	453
Events 1	214	507
Events Hospitalization	73	257
CPCR	288	529
Post ICU	151	512
Screen	178	1112
Total	1466	5134

3- How much is the not received income from the patients and what its impact is on total income for hospitals before implementation of improvement quality model at Troma hospital in Shiraz?

Frequency distribution table of the total amount of variance between billing and patient cases to the sections separately, in the Shahid Rajaee hospital before implementing quality improvement model

Section Name	the total amount of has not been charged in each section	Collection fee to be charged for each section	Percent of not charged amount of total income in relevant section
Surgery11	6997000	18480000	37.8 %
Surgical ICU 1	22348000	103345000	21.6 %
Surgical ICU II	22191000	114088000	19.4 %
Hospitalization 1	8139000	21586000	37.7 %
Hospitalization 2	9319000	29834000	31.2 %
Events 1	20837000	37850000	55 %
Events Hospitalization	7063000	17745000	39.8 %
CPCR	30164000	49776000	60.5 %
Post ICU	25725000	101769000	25.3 %
Screen	9599000	51380000	18.6 %
Total	162382000	545853000	29.7 %

- The maximum amount of not charged of the total income of the hospital is related to CPCR section
- The maximum percent of not charged of the total income is related to CPCR section
- The minimum percent of not charged of the income is related to screen section.
- Totally 29.7 percent of hospital income that have the ability to charge has not charged in mentioned services and units of study.

It was specified from the findings of the cases that the whole not received costs of the patients in ten investigated services during a month in the hospital was 162382000RLS .According this fact that the whole investigated files had been only a month by considering a year the total cost is 1948584000.As the results show a considerable income of the hospital not fulfilled because of the No accurate record of services performed. That is showing existence problems in the proper performance of the process.

The researcher made a team of process owners for examining problems that are included:

1. Hospital manager
2. Chief of financial Affairs
3. Personals of treatment economic
4. Head of revenue accounting
5. Accounting secretaries
6. The head nurses of health section

4- What is the reason of not registering costs of treatment measures in the patient's medical records?

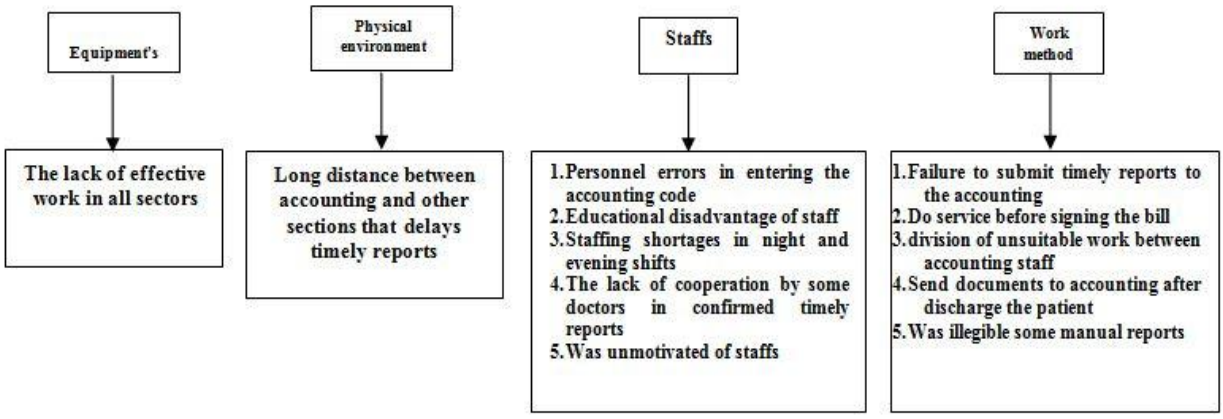
Many factors affect the process performance.it has been used from 3 tools include Brain storming, convergence Graph and Cause and Effect Graph for recognize and categorize these factors.

For identifying affecting factors it must identify difficulties in the process of the payment, these difficulties are include:

1-Lack of timely submission reports to Accounting?
2-Doing services before registration in bills because of emergency patients or absence of secretaries in related section.
3- Inappropriate division of labor between accounting personnel.
4- Sending documents to accounting after releasing patient.
5- Illegible of manually reports
6- Mistakes of personals in entering accounting code.
7- Lack training of staffs in new accounting codes
8- Manpower shortages, especially during evening and night shifts
9- Lack cooperation of some physicians in timely confirms reports and stamped records
10- Low motivation of staff
11- The long distances between some sectors and accounting that delayed timely sending reports
12- Lack of computer connected to HIS system in all sections

Convergence Graph

Convergences Graph is used to collecting and category of ideas and allows team to Categories so many ideas, Issues and Causes. This category helps to understanding the root of the problem and providing solution.



Convergence Graph of Causes of problems with the registration process of treatment measures in Shahid Rajaee hospital

Cause and Effect Graph

Is a visual graph that is using to show effective causes of performance of a process and its purpose is clearly showing the Factors affecting the process. As can be seen in this graph there is 4 mails reason that affecting process which include: methods, staffs, Physical environment and equipment. Each of these main factors is include subcategories that they also affect main process.

Solutions that provided by quality improvement team according existing problems are include:

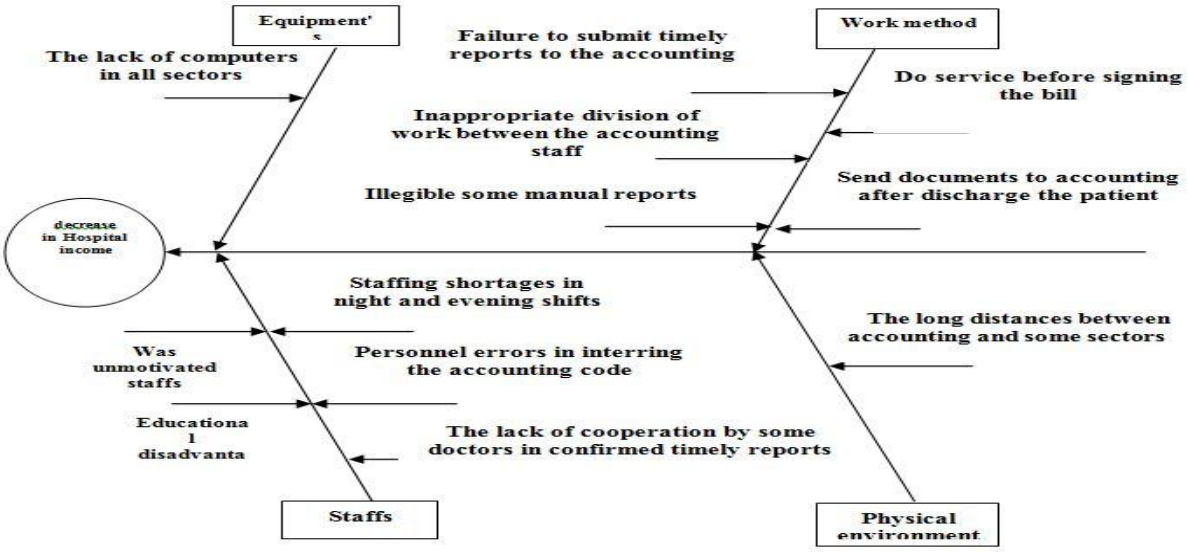
1. Considering consulting rooms for following registration of consults and coordination with physicians to seal the signing.
2. Forcing secretary of the departments to rapid submits of evening and night reports to accounting.
3. Emphasis on the readable writing code of accounting in order to avoid entering wrong code in patient's bills.
4. Forcing staffs to follow and completing medical records of patients before issuing releasing license.
5. Allocation a part of increased income to staffs for making motivation in them to proper performance of the process.
6. Equip all sections to computer and HIS system.

The selected solutions were notified to all sections and relevant units for implementation. The program was implemented for 2 months then the contradiction cases between medical records and billings of the patient were examined according to 10 desired services. Like the phase before implementation of the program medical records of patients with their financial bills were matched and also the contradictions examined.

5- **How much is the frequency of conformity registered treatment measures with registered measures in the patient's bills after implementation quality Improvement model in the Troma hospital at Shiraz?**

December 2013

Section Name	**The number of cases has not been charged**	**The number of cases performed based on record**
Surgery11	20	516
Surgical ICU 1	16	276
Surgical ICU II	30	595
hospitality 1	17	360
hospitality 2	23	496
Events 1	18	491
Events hospitality	13	251
CPCR	52	537
Post ICU	18	451
Screen	12	391
Total	219	4409



Cause and effect graph

6- How much is the not received incomes from patients and its effect on hospitals income after implementation quality Improvement model in the Troma hospital at Shiraz?

The frequency distribution table of total amount in the cases of the contradiction between Billing and records of patients in sections separately in the Shaheed Rajaee hospital after implementation of quality improvement model program

Section Name	the total amount of has not been in each section	Collection fee to be charged for each section	Percent of not charged amount of total income in relevant section
Surgery11	1639000	166110000	0.009 %
Surgical ICU 1	651000	17100000	3.8 %
Surgical ICU 2	6031000	114015000	5.2 %
Hospitality 1	972000	21748000	4.4 %
Hospitality 2	1464000	23410000	6.2 %
Events 1	1441000	35325000	4.1 %
Hospitality Events	850000	12631000	6.7 %
CPCR	4343000	50136000	8.6 %
Post ICU	2330000	83224000	2.7 %
Screen	564000	16188000	3.4%
Total	20285000	544141000	3.7 %

-in the pre-test phase 29.7 % of chargeable and receivable costs has not received because of failure of charge and accurate registration and this account has reached to 3.7 % in the post test.

-in CPCR section in the pretest phase about 60.5 % of receivable incomes has not charged and in the post test phase has reached to 8.6 %.

-in Surgical ICU sections I and II in the pretest phase 21.6 and 19.4 of receivable income has not charged respectively, this account became to 13.4 and 5.2 respectively in the post test.

Results of Pearson Correlation Coefficient Related to not Charged Percent in Ten Section

Screen section, Post ICU section, events1section, hospital events section, hospitality section 2, hospitality section 1, surgical ICU section II, and surgical ICU section. Only in the screen section $p<0.05$ shows that there is no significant difference but in the other sections $p<0.05$ are showing that there is a significant difference.

The correlation between percepts of not charged in October 2013 and January 2013 in all sections and services is 0.479 that shows a powerful correlation. In the screen section p>0.05 shows that there is no significant difference. This amount is 0.950 in the screen section, 0.944 in Post ICU, in events section 0.613, inhospitality events0.637, in surgical ICU 20.545 and in the CPR section0.754 that are indicating a powerful directed correlation.

The numbers are obtained from hospitality section 2=0.350, hospitality section 1=0.332, surgical ICU=0.363, in surgical section2=0.024 that indicates a weak correlation.

Results of Pearson Correlation of Number of not Charged Cases in 10 Sections

Screen section, Post ICU section, events1 section, hospital events section, hospitality section 2, hospitality section 1, surgical ICU section II, and surgical ICU section.

In the screen section p>0.05 shows that there is no significant difference and in the ICU surgical section there is no significant difference in the0.05 level but in the 0/1 level there is a significant difference and in the other sections p<0.05 there is a significant difference.

The size of correlation between numbers of not charged cases October 2013 and December 2013 at all services and sections are 0.644 that indicating a powerful directed correlation. This amount is0.868 in the screen section, 0.868 in Post ICU, in events1=0.882, in the hospitality events=0.801, in the hospitality2=0.788, hospitality section 1=0.840, surgical ICU 2=0.836, in the CPCR resuscitation 0.905, in surgical section II=0.804 that are indicating a directed powerful correlation. Only in the surgical ICU=0.206 obtained that that indicating a weak correlation.

Results of Correlation Coefficient Related of not Charged Costs in 10 Sections

Screen section, Post ICU section, events1 section, hospital events section, hospitality section 2, hospitality section 1, surgical ICU section II, and surgical ICU section.

In the Screen section, Post ICU section, events1 section, hospitality 1 and 2, surgical ICU section p>0.05 indicating that there is no significant difference. In the surgical section II p<0.05indicating that there is a significant difference in the hospitality events and surgical ICU II, CPCR rehabilitation in the 0.05 level there is no significant difference but in the 0.1 lever have a significant difference.

The size of correlation between numbers of not charged cases October 2011 and December 2011 at all services and sections are 0.652 that indicating a powerful directed correlation. This amount in the screen section is 0.706, in the Post ICU=0.990, in the events 1=0.942, hospitality events=0.618, hospitality1=0.567, surgical ICU II=0.987, in the CPCR rehabilitation section=0.892, that indicating a directed powerful correlation between mentioned cases.in the hospitality section II=0.429, surgical ICU=-0.262, and in the surgical II section=0.261 that indicating a weak correlation.

Discussion and Conclusions

In this part state the discussions and conclusions relating to each of the research questions:

1. How is it the process of registration treatment measures for patient before implementation of improvement quality model at Troma hospital in Shiraz?

In this phase registration process and method of process has been done in 2 steps: 1- Opportunity statement document: that in this phase registration treatment measures has started with reception and assigning accounting code to the patient and has done by billing issuing.

That failure to precise registration of performed services in their financial bills causes to wasting some incomes of the hospital that intervention and detailed record of the process can have a great impact on hospital performance. 2- Casted graph that a simple tool for indicating steps of the process and is using for providing a big picture from the process. This graph indicating only steps that occurring normally in the process.

2. How much is the frequency of conformity in the registered treatment measures in patient's bill before implementation of improvement quality model at Troma hospital in Shiraz?

In this step investigated frequency of inconsistencies between medical records and patient billing in 10 different services that has been done in 10 different sections.

Performed services, the number of cases that has not been charged, the number of performed cases according to the record, percent of not charged items, total not charged amount, the total amount that must

be charged and Rial value service. And identified the maximum contradiction between patient's bills and medical records.

The results of the records study indicates that the most financial loss resulting from lack of service registration in Shaheed Rajaee hospital before implementation of quality improvement program related to CPCR section. An important section that performed very services because of the presence of critically ill patients. Thus hospital managers must take a special attention to this section.

3. How much is the not received income from the patients and what its impact is on total income for hospitals before implementation of Focus- PDCA at Troma hospital in Shiraz?

According to findings obtained from records identified that overall not received costs from patients in 10 examined services in a month was 162382000RLS.The cost of performed services has not reached to hospital because of failure to register in the patients bills. That this constitutes 29.7 percent of all hospital revenue that has capability to charge. Thus hospital managers must take attention to this section.

4. What is the reason of not registering costs of treatment measures in the patient's medical records?

Survey conducted by the researcher in relation with causes of failing to meet revenue of the hospital are include: Failure to submit timely provided service reports to the accounting,

Perform service prior to registering the account because of the urgency conditions of the patients, in appropriate division of labor between staffs, Failure to send records to the accounting after discharge of the patient,

Illegible manual reports, mistakes of the personnel in entering accounting code of the actual service, poor staff training on the importance of accurate and timely services, Manpower shortages, especially during the night and evening shifts, Lack of cooperation by some physicians at signing and sealing of approval and timely reports, Low motivation of staffs, Lack of computer connected to a centralized accounting system (HIS) in all sectors, The long distances between some sections and units of accounting that studies of Newbrander (2000), Blance (2001), Albion (2001) and Daily(1988) are confirming results of current research.

Solutions that were presented by quality improvement team were including:

1: considering Consulting Rooms for follow-up registering performed consults and coordination with the physician to sign and seal after doing, 2- Forcing receptionists of the sections to quickly sending night and evening reports to the accounting. 3- Emphasis on writing readable the accounting codes in order to avoid wrong codes in patient bills,

4-forcing staffs to follow up and complete medical records of patients before issuing discharge permit, 5-allocate a part of increased income resulting from implementation of the program to staffs in order to make motivation in them for proper performance of the process 6equippingall parts of the computer and HIS system. Therefore, hospital managers should pay special attention to these items.

5. How much is the frequency of conformity registered treatment measures with registered measures in the patient's bills after implementation quality improvement model in the Troma hospital at Shiraz?

Results of analyzes showed that percent of not charged in pre-test has been reduced so many in post –test in all sections. And this is indicating importance of implementation Focus – PDCA process and managers of Troma hospital at Shiraz must take a special attention to this process.

6. How much is the not received incomes from patients and its effect on hospitals income after implementation quality improvement model in the Troma hospital at Shiraz?

In this phase each 10 service in 10 sections analyzed before and after implementation of Focus – PDCA model.

Percent of not charged amount of total income in relevant section		
Section Name	**Before implementation of the Focus – PDCA model**	**After implementation of the Focus – PDCA model**
Surgery11	37.8 %	0.009 %
Surgical ICU 1	21.6 %	3.8 %
Surgical ICU II	19.4 %	5.2 %
Hospitality 1	37.7 %	4.4 %
Hospitality 2	31.2 %	6.2 %
Events 1	55 %	4.1 %
Hospitality Events	39.8 %	6.7 %
CPCR	60.5 %	8.6 %
Post ICU	25.3 %	2.7 %
Screen	18.6 %	3.4 %
Total	29.7 %	3.7 %

In the before implementation phase 29.7 % of the receivable and chargeable income of the hospital has not been received because of precise registration. And in the after implementation of the program this amount reached to 3.07.this examination shows that implementation of FOCUS- PDCA has a positive on increasing income and improving performance of Troma hospital at Shiraz. Studding's of Newbrander *et al.,* (2001) shows that in the result of running this program unregistered items has decreased considerably such that in a hospital in Kenya the income has increased to 400 %. Studies of Smyrnios (2002), Kossovsky *et al.,* (2002), Hessam (2003), Alexander *et al.,* (2006) and Blance (1999), which is consistent with the findings of the research.

After running mentioned solutions in the post-test phase results showing that in Rajaee hospital the overall not received costs include 29195000 RLS during a month (December 2013).In fact that constituting 5.4 percent of all chargeable income of the hospital for mentioned services. And by comparing post-test and pre –test phases that provide solutions cause to average reducing of lost revenue to the amount of 133187000 RLS in a month and 1598244000 in a year.

In fact we can see that failing to meet revenue in a month has reduced to 25.3%, and this is indicating increasing annually income of the hospital to 1598244000 RLS.

In addition we can conclude that by the accuracy of the performance of different sections that these changes is varies depending on ability, performance and motivation of staffs.in fact in spite of same level of education for staffs and its consistency in all sections the difference between performance of individuals and managers of medical care units are visible. However, in sectors such as radiology - ultrasound and echocardiography have recorded and charged services separately since the establishment of the hospital not performed substantial changes despite of improvement of performance and reducing of not charged items.

Applied Research Suggestion

1- Considering consultant rooms for tracking of performed services, stamped consulting by doctors and financial charges of consults.it is necessary to doctors be aware of importance of stamping consults in paying related costs from the insurance organizations in addition before sending documents by controller organizations the defects must resolved.

2- Forming separate and frequent meetings with doctors, teachers, nurses and staff personnel in the therapy areas and personals of Administrative and Financial units for educating individuals and focusing on importance of precise completion and registration of different parts of financial records of patients and prevent loss deductions arising from insurance organizations controls.

3- Strengthen of health economics unit and insurance connector that in fact oversee processes of all financial records of the patients from beginning to discharge regularly and announce regular process to the management unit.

4- Announcing feedback performance and individuals from the point of Increase or decrease the amount of money involved in the relevant unit and in addition and fractional evaluation of medical records and resolving problems in the next month.
6- Pursuing and completion records of patients before discharging by doctor .in fact this is a main task of the secretary of the Department of Health.
7- Forcing secretory of sections to quick providing of reports, transforming patient to special sections for quickly registration of bed fee changes.in addition cost controlling of services such ECG, Counseling and physiotherapy before performing services in the medical sections. The remarkable note in this field the dramatic difference in the cost of ICU beds compared to other beds of ordinary sections that in case of not registering of bed costs is not chargeable and so many of chargeable services in the ICU cannot be calculated .
8- Permanent establishment of secretaries in the CPCR section for registering all of the performed treatment services as boarding and rapid transition of patients to ICU operating room or other sections.
9- Training methods of correct registration of accounting codes to staffs and personnel's of different units due to differences in the cost of services, considering cost services.
10- Allocate apart of increased income to staffs in order to create motivation in them and payment based on the proportion of individuals in the promotion and management of the economy and management approval.
11- Equipping all treatment units to computer equipped with centralized HIS program for service registration without reference to the accounting.

Suggestions for Future Researchers

1- Comparative analysis of implementation of improvement quality model at several different hospitals.

2- Considering the nature of hospitals in terms of mission to accomplished more services in case of emergency and severe conditions compare to other hospitals.

3- Awareness of researchers from financial and insurance regulations and using the experts and consultants in the field of financial and accounting affairs in implementation of model.

REFERENCES

Alexander JA, Weiner BJ and Griffith J (2006). Quality improvement and hospital financial performance, *Journal of Organizational Behavior* **27**(7) 1003–1029.
Asef Zadeh and Samaneh (1385). Health Management, Qazvin, the emrooz hadith [in Persian].
Blance CE, Dunnick NR and Cotton LA (2001). Continuous quality improvement process to track lost radiographs and reduce losses. *Canadian Association of Radiologist Journal* **52** 373-378.
Chen M, Deng JH, Zhou FD, Wang M and Wang HY (2006). Improving the management of anemia in hemodialysis patients by implementing the continuous quality improvement program. *Blood Purification* **24**(3) 282-286.
Farah Bakhsh, Mustafa, Tabrizi, Jafar Sadegh, Nick Niaz and Ali Reza (2010). The use of FOCUS-PDCA to improve the performance of primary health care, case study: the health center of East Azerbaijan province, *Hakim Research Journal* **13**(1) 48-40 [in Persian].
Gonzales M, Colindres H and Urroz O (1998). Health care sector reform and quality assurance in Costarica. *International Journal of Quality in Health Care*.
Hesam Sumaye (2002). The results of implementing quality improvement in improving documentation and billing patients for outpatient hospital setting process Faghihi based survey administered agents, Shiraz University of Medical Sciences and Health Services, Shiraz, Iran [in Persian].
Heydaranlu E, Khaghanizade M, Ebadi A, Sirati MN and Aghdasi NM (2009). Effect of FOCUS-PDCA performance in the activity of emergency department of Shahid Mahalati hospital of Tabriz. *Military Medicine* **10**(4) 277-82 [in Persian].
Jelodari Mamaghani Behroorz (2001). Handbook of quality management and audit, Tehran, Azadeh [in Persian].

Kossovsky M, Chopard P and Bolla F (2002). Evaluation of quality improvement interventions to reduce in appropriate hospital use. *International Journal for Quality in Healthcare*.
Newbrander D, Collin S and Gilson L (2001). Cash registers increase hospital revenues in Kenya, *Management Science for Health*.
Prior D (2006). Efficiency and total quality management in health care organizations: A dynamic frontier approach. *Annals of Operations Research* **145**(1) 281-99.
Smyrnios N, Connolly A and Wilson M (2002). Effects of multifaceted, multidisciplinary, hospital-wide quality improvement program on weaning from mechanical ventilation. Critical care medicine, Steven MS, Daryl EM; the impact of a TQM intervention on workplace attitudes in a health care organization. *Journal of Organizational Change Management*.
Tabiby Javad (2001). Total quality management in health care, Tehran, PC World [in Persian].
Tam JLM (2007). Linking quality improvement with patient satisfaction: a study of a health service centre. *Marketing Intelligence & Planning* **25**(7) 732-45.
Tea C, Ellison M and Feghali F (2008). Proactive patient rounding to increase customer service and satisfaction on an orthopaedic unit. *Orthopaedic Nursing* **27**(4) 233-40.
Weech M, Zinn JE and Hamilton RD (2001). The performance impact of content in TQM implementation, the nursing facility industry. *Journal of Health Services Management Research*.