Coronary Care Unit Quality Evaluation in Fars Township Hospitals and Comparison with Mortality Rate in 2004 and 2008

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Abstract: Coronary disease is one of the main causes of mortality in all around the world especially in industrial countries. In each hospital, Coronary Care Unit (CCU) is crucial and essential part. This research aimed to access CCU quality and relation with mortality in 2004 and 2008. CCU's quality was evaluated with regard to standard checklist that ministry of health (MOH) updates and publishes yearly. It was descriptive-analytic. Statistical universe was 14 hospital's CCU in Fars Township that selected on census. Data were personally collected by the researcher by using a valid and reliable checklist, observation and interviewing and analyzed with SPSS. According to the finding there was not any significant relation between CCU quality (depending on checklist) and mortality rate. It was concluded that so for studying CCU quality with effective role in mortality rate we should think to other alternatives for its evaluation.

Key words: Coronary Care Unit (CCU) · Coronary disease · Coronary care unit quality · Mortality rate · Checklist

INTRODUCTION

In most countries besides space and wealth, offering healthy and therapeutic services is critical [1]. On the other hand, the basic healthy and remedial services were done at hospitals and medical institutes [2]. It specifies their most important role in physical and mental health for patients and training skillful human resources by using special facilities and equipment [3]. Consequently, "Science Shrine" is a meaningful word for hospitals as the effective factor in medical as much as in training services [4]. With regards to this circumstance, more attention must be paid in standard building in order to have calm and safe environment for patients and staffs [5-8].

The coronary care unit is a unit for particular and critical cardiac intensive care to treat patients with acute myocardial infarction and other acute cardiac conditions. This unit with special and particular equipment and services supports cardiac patients who need the constant care of highly skilled nurses and other health care professionals. Each team in CCU includes nurses, physicians and respiratory therapists provide expert care to all patients responsibly [9]. CCU is equipped to treat and monitor patients with serious and various heart conditions such as acute cardiac episodes, heart attacks and unstable angina that require continuous monitoring and treatment [10].

In the 1960s, coronary care units developed to offer close monitoring by specially trained staff, cardiopulmonary resuscitation and medical measures in order to reduce the mortality from complications of cardiovascular diseases [11-13]. Mortality for many cardiovascular, highly lethal diseases, that is seen in most elderly heart disease patients remains higher than other diseases even cancers and effective observation cannot completely predict it [14].

As stein *et al.* in 1968 said that death from acute myocardial infarction among patients in hospital is often due to sudden and unanticipated arrhythmia that if detected early enough, could be arrested in most cases. Recent advances in constant monitoring systems and improvements in electronic equipment for the treatment of acute myocardial infarction fatal complications have led to the establishment of CCU [15].

Consequently, the CCU is must be a calm, quite and restful place for patients to be further evaluated and closely monitored [16].

Goldman *et al.* [17] in 1988 studied "The CCU and coronary artery disease mortality". Coronary care units are expensive innovations that have become an accepted part of American medical practice. An in-depth evaluation of such units indicates that they probably save about 10,000 lives each year nationwide by resuscitating patients from probably fatal ventricular fibrillation;

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they could potentially save some 2,000 more lives annually if high-dose Lidocaine prophylaxis were used routinely in high-risk patients. By comparison, many subsequent costly innovations in coronary care rescue relatively few patients per year. CCUs probably contributed to the decline in coronary mortality between 1968 and the mid-1970s, but are a less likely explanation for the subsequent further decrease. Of course, Lidocaine efficiency is controversial, at now.

"Efficiency Measurement of Cardiac Care Units of Isfahan Hospitals in Iran" was done by Ketabi *et al.* in 2009". This study evaluated the performance of the Cardiac Care Unit of hospitals in Isfahan, Iran. The multi-criteria comparison between the wards in hospitals is not only useful for the patients but also important for the managers to improve their performance and for the medical policy makers to plan strategic decisions. Among the existing health audit system and several quantified ratios, the most important ones, based on the patient satisfaction and resource efficiency, have been selected. The two group factors have been chosen: first, input factors: average number of active beds, medical equipment, personnel (such as doctors, nurses and technicians) and technological capabilities and the second included output factors such as, bed occupancy percentage, average length of stay, total percentage of survival and performance ratio. The Data envelopment analysis (DEA) technique has been applied to evaluate and compare 23 CCUs of hospitals in Isfahan. Although the health audit system uses a check list, has reported 21 of them as first class CCU, DEA model reveals that 11 of them are inefficient. The results suggest the improvement strategies based on the output factors [18]. The present work aimed to access CCU quality and relation with mortality in 2004 and 2008.

MATERIALS AND METHODS

Shiraz University of Medical Sciences is one of the most successful universities in Iran that covers 14 township hospitals. This was a descriptive-analytic study. Statistical universe was 14 township hospitals (Abadeh, Estahban, Arsenjan, Eghlid, Darab, Firozabad, Kazeron, Larestan, Evaz, Gerash, Lamerd, Marvdasht, Mamasani, Nayrez) that selected on Census. A valid and reliable checklist according to the standards that are edited by MOH and specialists in this field, observation and interviewing by ward personnel were used for data collection. The checklist was included human resource, structural, technologic equipment, clinical installation,

medical equipment, ethics indexes that yearly updates by MOH. Mortality rate data was taken from SUMS's statistic center. Mortality is not the only output of quality assessment, but with regards to its important we chose only this factor to show that the sole quality assessment cannot be enough. On the other hand close relationship between CCU quality and mortality guides us to focus only on it.

Human Resource Indexes: These indexes assess quality and quantity of human resource and include: qualified specialist physician, general physician, nurses and other clinical personnel and rate of their attendance, independent telephone line in CCU (1000 grade).

Structural Indexes: Location of ward according to the other ward in hospitals, total space, enough space per each bed, entrance door, elevator, nursing station, excess space and bed for emergency situation, nursing room, physician room, WC, visiting room, light, ventilation, clean bed sheet (300 grade).

Technologic Equipment Indexes: Electroshock set, mechanical intubation and ventilation set, oxygen therapy set, continual monitoring set, alarm system set, nutritional aid set, interim cardiac pacing, Tracheotomy set, drug intervention and physiotherapy (800 grade).

Clinical Installation Indexes: Central gas system, independent and central suction, emergency and urban electricity power, excess and urban water, sanitary sewerage, controlling TV, informational system and firing equipment (350 grade).

Medical Equipment Indexes: Monitoring system, ventilator set, portal and fixed equipment, measuring blood gas system, electrocardiography set, electro shock system, radiology and electroencephalography systems, pace maker (900 grade).

Ethic Indexes: Lgal and religious bases in women examination, differentiation between women and men wards, good behavior to the patients and participant, coordination and guidance with the patients and participant (400 grade).

Other Indexes: Enough forms and dossiers, scientific congress, fast action, welfare facilities and other factors (300 grade).

Table 1: Table of evaluation degree CCUs in hospitals.

Evaluation degree	Percent of total grade	Total grade
1	75% and more	3375 and more
2	65%-74%	2925-3374
3	55%-64%	2475-2924
Not valid	54% and less	2474 and less

Data was personally collected by the researchers; observation and interview were used in all data collection process. Researchers answered each question by asking, surveying document and observation. Using multi way to collect data resulted in more precision. Data analysis was carried out by using the statistical program packages SPSS 12. Data analysis included 2 parts: 1. Measuring Mortality Rate, CCU grade and its percent as Descriptive part. 2. Relationship between Mortality and CCU quality as Analytic part by Paired Sample Test.

RESULTS

Each CCU was evaluated according to the checklist and gets specific grade according the Table 1.

Data analysis (Table 2) showed that in 2004 Mamasani CCU got the highest grade (degree 1) and Lamerd CCU located at the lower degree (degree 3). From 14 CCUs, 9 were at the first degree, 4 at the second and 1 at the third degree. But in 2008 Evaz CCU got the highest grade (degree 1) and Arsenjan CCU located at the lower degree (degree 3). From 14 CCUs, 9 were at the first degree and 5 at the second degree. Data comparison in 2004 and 2008 showed partly improvement in quality of CCUs orderly in: Nayrez, Evaz, Lamerd, Larestan, Marvdasht, Arsenjan, Gerash, Darab, Firozabad and Abadeh. Besides, in Kazeron, Mamasani, Estahban and Eghlid not only didn't improve but also decreased and weakened.

As data in Table 3 states Comparison of mortality rate in 2004 and 2008 emerge partly decrease in CCU of Marvdasht, Firozabad, Kazeron, Abadeh, Estahban and Eghlid and increase in Gerash, Mamasani, Evaz, Nayrez, Darab and Larestan.

P. sample test indicated that there is not any significant relationship between CCU quality which evaluated by present checklists and mortality rate. Even there is not any significant relationship in improving CCU quality that shows very low improvement (Table 4).

Table 2: Percent of evaluation grade of each CCU in 2004 and 2008

Hospital	Quality in 2004	Quality in 2008	Hospital	Quality in 2004	Quality in 2008
Larestan	76.79	83.45	Abadeh	71.95	72.27
Evaz	71.26	84.41	Estahban	75.21	72.24
Gerash	79.41	83.43	Arsenjan	66.37	70.76
Lamerd	63.56	72.37	Eghlid	77.53	76.76
Marvdasht	78.57	83.33	Darab	76.84	78.46
Mamasani	84.44	75.50	Firozabad	77.43	78.39
Nayrez	67.26	83.43	Kazeron	82.32	72.56

Table 3: Comparison of mortality rate in each CCU in 2004 and 2008

Hospital	MR in 2004	MR in 2008	Hspital	MR in 2004	MR in 2008
Larestan	10.2	12.3	Abadeh	18.6	14.3
Evaz	2.9	9.1	Estahban	6.94	5.6
Gerash	8.2	30.6	Arsenjan	No value	No value
Lamerd	No value	14.5	Eghlid	15.72	14.5
Marvdasht	38.8	14.3	Darab	4.4	6.6
Mamasani	10.3	16.5	Firozabad	17.7	8.9
Nayrez	3.44	6.7	Kazeron	45.32	40.4

Table 4: Comparison of mortality rate and quality in each CCU in 2004 and 2008

	Man	Std. Deviation	Sig. (2-tailed)
Quality of CCU (2004 and 2008)	-2.744	7.3236	0.184
Mortality Rate (2004 and 2008)	0.209	10.4945	0.944

DISCUSSION

In evaluating hospital CCU quality majority of them located at the first degree (75% and more) in 2004 and 2008. Statistical tests didn't show any significant relation (according to used checklist) between CCU quality and mortality rate decrease and even, converse relation was seen. Probably, continuous evaluation and more expenses for it didn't effective on mortality rate decrease. With regards to the specific importance of CCU in saving emergency cardiac patients, cooperation and easing efficiency of other wards, previous literature and especially Isfahan research [14], indicated probability of not validity and reliability of MOH checklist.

Consequently, we proposed that other researchers edit and use checklist that study real quality of CCU and services that can be connect to the CCU's mortality rate decrease.

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