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Comparison of intensive care units Structural Standards

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ABSTRACT

Aims: Intensive care units are one of the most sensitive parts of each hospital; codification of appropriate structural standards and its measurement improve the quality of services in those units. So this study had been done with the aim of "determining structural conditions of intensive care units"

Methods : This cross-sectional study had been designed for measuring structural standards of intensive care units in three areas of human force, physical conditions and medical equipment in educational hospitals of Hamadan and comparing it with the last existing standards according to international guidelines and principles and accreditation standards of Iranian hospitals and it had been performed from April to September of 2011. Data were collected via completing assessing forms with direct observance of the researcher and they had been analyzed by using statistical tests, ANOVAs (variance analysis) and Spearman in SPSS (17) software area.

Results : All the three units of the study achieved less than 50% score of structural standards among total 843 scores that Besat intensive care unit 48% (the mean score 406) Ghaem intensive care unit 45% (the mean score 376) and Milad intensive care unit had 41% (the mean score 346) of the standards. The most percent of the standard score was related to human force with (%58) and the least one was related to physical conditions and facilities with (%38).

Conclusion: In intensive care units of the study, achieved scores in structural domination was less than appropriate standard level. Therefore it had been suggested that the executives consider achieving global standards specially promotion of structural standards that is guarantor of quality promotion and optimization performance of intensive care units.

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1.Introduction

Intensive care units are the most sensitive parts of every hospital; this feature is because of the crisis situation of the patients of these units that need special care for preserving life and discharging without complications [1]. Interaction between human and environment had been known from

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many years ago. More than 2000 years ago Galen the ancient Greek physician diagnosed that environment influences on health. Also Florance Nitingle showed that environment health has the main role in physical and mental health of the patients and with improving care environment (changing landscape of the patients, using color and natural light and removing excess noise) can improve patient's health [2].

Intensive care nursing needs high qualities and high abilities level that can be achieved by using guidelines , standards and special nursing frameworks[3], that nowadays designing ICU units new generations is doing by considering patients and their relatives'total needs and with the aim of promoting patients' health.

According to Donabedian's idea, medical service quality needs three main elements of structure, process and outcome according to the following cases:

1. Structure: includes physical features, staffs and facilities (human force, environment and materials).
2. Process: necessary procedures and steps for health services (diagnose, treatment and nursing processes)
3. Outcome or output: the effect of health services on customers (care processes results or effects on patients) that includes; improving, rehabilitation, life quality, death quality, satisfaction, complications, survival and care cost [4].

Structural standards, (human force, physical environment and medical equipment and facilities) like process standards have greatest impact on nursing service quality to critically ill patients [5].

Facilities, physical environment and medical equipment of the unit have great impact on work quality of health personnel and have great role in outcomes, as an example in 1952, during the polio epidemic,using positive pressure ventilation instead of negative pressure had decreased death of the patients from 87% to 25% [2, 6, 7].

Aise et.al (2005) in one study showed that physical environment (disorganized and ugly workspace, high level of noise nuisance,over crowdedness, lack of direct vision of the patients) tools and equipment (faulty state, wrong position, inaccessibility) materials and supplies (wrong position, inaccessibility, locked, stay away from the using place) are among functional barriers that have great impact on caresquality [18].

One of the most important problems in ICU units is high workload of medical staff specially nurses that causes risks to the quality of care, increase of medical and nursing errors, prolonged hospital stay and increase of death [8,9,10], so codification and attention to human force standards in ICU units cause improvement of outcome and output of the units.

Pronavast et.al during study in ICU units showed that lack of a fulltime resident physician, lack of expertise of intensive care in more than 50% of on call doctors, lack of daily round by doctors, decrease of nurse ratio to patients to less than one to two and lack of monthly assessment of the unit performance cause patients' death increase and 30% increase of length of stay [11].

Iran's Ministry of health and medical education in 2002 in managed care guidelines number 7 published guide of managing intensive care units and in its last approval in 2010 it also has published intensive care units standards with the name of "hospital accreditation standards"[12].

Despite declaration of hospital accreditation standards in Iran, but because of limited financial resources, inadequate monitoring and little attention to structural standards, most of the ICU units suffer from non-standard physical structure, shortage of medical and nursing staff or deficiencies in human force planning. So that Jadidi et.al in 2007 measured physical and human sources situation of intensive care units of Markazi city with health ministry standards during researches, results indicated that total score of educational, physical, human force and structural dimensions have been 55% of standard normal level of the country [13]. Studies indicate that structural standards in intensive units do not have appropriate condition. S0 codification and using standards in intensive care units lead to saving patients 'life and money. Because they prevent mistakes in managing intensive care units and reduce preventable death [14].

The present study has been formed with the aim of determining structural situation of intensive care units of educational hospitals of Hamedan in three areas of human force, physical conditions and medical equipment and comparing it with the last existence standards according to global guidelines and accreditations standards of Iran's hospitals that

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from this way studies strong and weak points of intensive care units and to present the results to the authorities for promoting the present situation and improving the said units performance and to help them in presenting appropriate service to the patients.

2.Materials and methods

The present study was a cross-sectional study. Study society included; general intensive care units of educational hospitals of Hamedan and the subjects of the study included Besat ICU in Besat hospital and intensive care units of Ghaem and Milad in Shahid Beheshti hospital. Used tools was assessment form of structural standards of intensive care units that the researcher-made form was along with the study aims that was according to the last approvals of Iran's ministry of health and medical education [14], guidelines of Society of Medical Critical Care and American Association of Nursing Critical Care Nurses [15],Health Care Architecture committee of America [16], Reputable books [17] opinions of professionals and experts, about human force, physical environment and medical equipment have been designed in three parts.

This assessing form was designed in three parts including human force with 41 choices, physical environment with 145 choices and medical equipment with 39 choices that its scientific validity or reliability had been achieved with content validity and with using faculty members' comments of nursing and Midwifery College, Anesthesiologistand nursing experts with havingwork experience in intensive care units. Also importance level (weighting percent) of the choices of assessing form has been determined with opinions of faculty members and physicians and nurses who are working in the considered units of the study and score of every part has been calculated by attentionto its weighting coefficient that from total score of the assessing form of structural standard (843 scores), human force area had 175 scores, physical environment had 510 scores and medical equipment had 158 scores.

Tools reliability had been achieved by the method of interrator reliability that direct observe technique was used independently by some observers (triangulation) and agreement level (correlation coefficient) among results of the observer also had been calculated by the help of correlation coefficient of Kowder Richardson. (Human force with P=0.95, physical environment with P=0.99 and medical equipment with P=0.96)

Data collection had been done with the presence of the researcher in the considered units in different shifts with using assessing form. Analyzed data related to structural standards had been analyzed by using descriptive statistic and Spearman and Variance analysis tests in SPSS (17) software environment and score of structural standard situation of every unit had been extracted and different parts had been compared.

In this study code of ethics had been observed and it had achieved certification of medical ethics committee. Also collected information is only in order to offer suggestions for promoting care quality and improving performance of the units of the units of the study.

3.Results

According to the acquired results all the three units had less than 50% of the structural standard according to the structural standard assessing form in intensive care units, according to Spearman statistical test there wasn't any significant difference between score level of every unit about different issues (P=0.67) that in all the BesatICU had 48% (406 scores), Ghaem ICU had 45% (376 scores) and Milad ICU had 41%(346 scores) of the standards.

In comparing different parts of the structural standards, intensive care units of the study

Table 1. structural standards level of intensive care units of the study in different areas.

Unit	Human force		Physical environment		Medical equipment		Standard total	
	score	percent	Score	percent	score	percent	score	percent
Besat intensive care	113	64	200	39	93	۵۹۰۹	406	48
Ghaem intensive care	103	59	200	39	73	46	376	45
Milad intensive care	91	52	185	36	70	44	346	41

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respectively, in terms of human force were Besat ICU (64%) in the first grade and Ghaem units (59%) and Milad (52%) were respectively in the next grades, in terms of physical environment standards all three units were almost in the same level and had the least possible situation (39%), in terms of medical equipment standards, firstly there was Besat ICU (59%) and then Ghaem units (49%) and Milad (46%) were respectively in the next grades. (table1)

4.Discussion

According to the acquired results, structural situation of the units of the study was not appropriate and did not achieve acceptable score of structural standards that is consistent with the results of the study in 2008 in ICU units of Markazi hospital [13].

According to the study aims there wasn't any significant difference between structural standards score of every units of the study about human force, physical space and medical equipment that studying structural standards about human force shows that Besat ICU with achieving 64% from the total scores of human force was in the first grade and Ghaem units (59%) and Milad (52%) were respectively in the next grades, all the intensive care units of the study didn't have human force standard relatives to the number of the patients that according to the acquired results of the study existence of one physician for every 20 patients and one nurse for every 3.5 patients and shortage of health personnel (one practical nurse, chiropractor and …) and non-medical (secretory and service workers) was clear and also in Milad and Ghaem units there wasn't any resident specialist physician and in all the units there wasn't any hostelry physical therapist, nutrition expert and medical equipment engineer. According to the study of Aise et.al (2005) personnel shortage (non-cooperation, inadequate personnel, inadequate skill and experience) are among factors of nursing practice barriers of Intensive care units [18]. According to Broun et.al (1989) in Canada hospitals patients' death had been decreased 50% by changing ICU physicians to specialist physician and full-time presence with daily rounds with personnel [19].

So lack of attention to human force standards causes quality decrease of nursing and medical care services and it also causes increase of patients' death and dissatisfaction.

In Ghaem and Milad units because of lack of resident physician, clinical managing of the patients was in the form of open model (the responsibility of patients' clinical managementwas with specialist physician and acceptance of the patient) and also in Besat unit a modulation of two management models close and open (total liability of intensive care of admitted patients in intensive unit is with intensive care team's responsibility until the next discharge) has been performed. During study of Maltz et.al (1998) inparochial system with close policy, care was more effective and causes death decrease (20%) and decrease of length of stay (50%) and decrease of number of the days that needed ventilator (70%) [20].

Facilities and educational programs of the units of the study were not according to the standards that it can be pointed to some cases like lack of existence of specialized library for the personnel of the unit, hostelry inaccessibility of the personnel to the Internet and computer, lack of daily rounds of the physician and personnel in the unit, lack of presence of weekly meetings document of the physician. According to study of Aies et.al (2005) activities of educational staff has a great impact on care quality and is among functional barriers of medical staff of unskilled and untrained newcomer personnel [18].

In terms of physical environment standards all three units are almost n the same level and achieved 39% of the total score of physical environment standards, that in all the units The extent of treatment rooms, office area, staff facilities and Installation were less than standard in compare with number of the beds and in all the units number of the electrical terminals of patients' bed area and also light and sound intensity of the patients' area were not according to the standard. Isolated rooms of all the units of the study didn't have standard conditioning system. Structural model of the unit in Ghaem and Milad units was in the form of parochial (direct view of patients' bed with centralized nursing station) and in Besat unit it was in the form of individual rooms that there were two patients' beds in every room in a limited space. In Besat unit there wasn't any possibility for direct and indirect view and observation of the hospitalized patients in individual rooms of the nursing central station.

About medical equipment standards of Besat ICU with achieving 59% of the total score, medical equipment was in the first grade and Ghaem units (49%) and Milad units (46%) were respectively in

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the next grades, in Milad and Ghaem units Compressed air terminals and central suction were not in patient's bed area and in all the units of the study number of the central terminal around patients' bed was less than standard and there wasn't any cardiac alert alarm of the patient in patients' bed area for emergency cases.

According to the results of study of Jadidi et al in 2008 in intensive care units of Markazi hospitals, hospitals of Markazi achieved 74% of the score of the equipment standard that achieving more score in compare with the results of our study about medical equipment (59%) is may be relate to the difference in standard criteria because in the study of Jadidi et.al just considered standard criteria of health ministry of that time had been used but in this study criteria of adopted standards from the last approvals of Iran's ministry of health and medical education, guidelines of Society of Medical Critical Care and Critical Care Nurses Association of America and America Health Care Architecture Committee have been used.

In order to promote medical and nursing cares quality in Medical Centers and improving care standards level it has been suggested that, there have to be some studies about structural, process dimensions and the standards outcome of intensive care units widely and periodically in medical institutions that from this way it can be helped to the guarantee of care service quality in intensive care units.

5.Conclusion

According to the acquired results, structural situation of intensive care units was not completed and structural standards level of them is less than the appropriate level, so according to the importance of the issue that has great impact on critical patients' death of intensive care units it has been suggested that for promoting medical treatments quality and nursing care in intensive care units and decrease of patients' death, executives should try in codification, optimization and using regional and national structural standards.

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