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EVALUATION OF THE MORTALİTY RATE DEVELOPED BETWEEN INTENSIVE CARE AND WORKING SHIFTS OF A HOSPITAL

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SUMMARY

Objective: We think that the longer working hours during the weekdays and on the weekends in intensive care units reduce the working performances and the attention. For this purpose, we have compared the mortality rates developed in and out of the working hours in 3 intensive care units located in our hospital.**Method:** Between 01.11.2013 and 31.12.2014, the mortalities developed in 3 intensive care units located in our hospital are grouped and recorded retrospectively in terms of the days and hours of the mortalities, age, gender and diagnosis of the patients. **Results:** A significant difference is observed among the results in (58,5 ±24.8) age and (E/K 63,7/36,3) male ratios in surgical intensive care. There is no significant difference among the mortality rates between 8-17 and 17-08 working hours (p value is 0.521). NO significant difference is found in the mortality rates between weekdays and weekends (p value is 0.455). Mortality rates are found to be high for the patients in respiratory and neurological groups. **Conclusion:** Although no significant difference in mortality rates as per working hours among intensive cares is found, there is a difference in surgical intensive cares between gender and age ratios. Besides, mortality for the patients from respiratory and neurological groups was found higher in all intensive cares.

KEYWORDS: Intensive cares, mortality, working hours

INTRODUCTION

Intensive Care Units (ICU) are featured units of fully equipped hospitals where monitoring and intensive therapy can be offered for the patients in the cases threatening the patients' lives requiring close monitoring and support treatments. Having high number of nurses per patients and permanent physicians in IC units gives the opportunity to give the fastest and most accurate intervention to the complications that may develop in patients. Mortality rates are generally high in IC units.[1] This height may vary depending on the disease the patient had when he/she are accepted, infections developed during the monitoring and the performed interventional procedures. The units where only the intensive care team take the responsibility and write "order" and follow the patient from the admission to the discharge are called "closed units", on the other hand, the mark "order" made by the doctor monitoring the patients outside and continue to monitor him/her in the intensive care is called "open unit". Ideal intensive care units should be the closed ones.[4]

Studies comparing the mortality ratio between different intensive care units of the same hospital according to the mortalities occurred in and out of the working hours are limited. Our goals is to compared the mortality ratios of patient groups monitored in intensive cares and find if there is a difference between the mortality rates in and out of the working hours.

METHOD

In our hospital, there were total of 3 ICUs including 9-bed general ICUs, 6-bed internal ICUs and 6-bed surgical ICUs. One nurse was taking care of 3 beds during those times. 1 internal medicine specialist in General Intensive Care (GIC), 1 anesthesia and resuscitation expert in surgical Intensive Care (SIC), internal medicine physician assistants heavily in Internal Intensive Care (IIC) were working including mostly less anesthetist experts. Physicians working at the weekends work in 24-hour shifts while the ones working weekdays work between the hours of 08-17 and 17-08. While the physicians working during the day keep working continuously, doctors working at nights continue to work in shifts. Nurses on the other hand work 8-16 and 16-08 both in weekends and weekdays. Patients follow-ups are performed as "closed unit" order writing in this period in GIC units, while it is made in SIC and IIC units as "open unit" order writing.

908 patients admitted between 01.11.2013 and 31.12.2014 to the general, surgical and internal intensive care units were included into the study. Patients' Sociodemographic characteristic histories (age, gender), diagnoses, mortalities, death days and times, average stays in the hospital are examined and recorded from the electronic records.

STATISTICAL METHODS

In the analysis of the data, SPSS 22.0 program (IBM Corporation, Armonk, New York, United States) was used. Compatibility of the data to the normal distribution is made by Shapiro-Wilk test and the variance homogeneity was examined by Levene test. While One-Way Anova (Robust Test: Brown-Forsythe) test, one of the parametric method In the comparison of more than two independent groups and Games-Howell for Post Hoc analysis are used, Kruskal-Wallis H Test, one of the nonparametric methods, was used with Monte Carlo simulation technique. For the comparison of categorical data with each other, Pearson Chi-Square and Fisher Exact Tests are used with Monte Carlo Simulation technique. Quantitative data are expressed in the tables as average ± std. (standard deviation) and median range (max-min) values. Categorical data, however, are represented in n(number) and percentages (%). Data are examined in 95% confidence level and p value smaller than 0,05 is accepted as significant.

RESULTS

In our study, total of 908 patient files are examined and total of 329 died patients are included in the study. The distribution of the patients in Intensive care units is GIC E/K 54,8/45,2 ,SIC E/K63,7/36,3 ,IIC 56,1/43,9 and p value is found as 0.403. According to diagnosis, p value of surgery patients who died in GIC is found as <0,001. p value obtained for the day of the patients' deaths among intensive care is 0,109 and p value for the hours of their death is 0,521. p value obtained by comparing the rates for weekends and weekdays among intensive care is found as 0,455. Mean age of the patients in intensive care is determined as 73,8 for GIC, 70.7 for IIC and 58,5 for SIC and the p value is found as <0,001. The average length of stay of the patients died is calculated as 6(116-1) in GIC, 4(78-1) in SIC and 5(90-1) IIC (Table 1). p value of the patients who died in weekdays is 0,890, p values for the ones died in the weekends is found as 0.193. p value at the ratio between intensive care and in and out of the working hours on Saturday is found 0,025. p values in the analysis between in and out of the working hours among intensive cares of neurology and respiratory group patients are found as 0,014 and 0,028, respectively (Table 2).

While 65% of the respiratory group patients died In GIC units the most, this ratio is 41% for internal group patients in IIC units and it is 32% in SIC units are determined to die (Graph 1). Mortality numbers n between respiratory group patients according to the working hours 17-08 and 08-17 are found as 30 to 34 in GIC, 16-6 in SIC units and 15-13 in IIC units (Graph 2). These mortality numbers n for neurology group patients is determined as 20-14 in GIC units, 6 to 17 in SIC units and 26 to 15 in IIC units (Graph 3).

DISCUSSION

Many studies have been carried out about the rates and causes of mortalities in ICUs. Mostly acute and chronic diseases, complications, infections, interventional procedures increasing the mortality in ICUs are compared.[6,7] Furthermore, there are also studies comparing the mortality ratios in terms of the patients' acceptance to the ICUs in and out of the working hours.[8,9] However, in our study the comparison is made in 3 different ICUs in terms of the days and hours of the patients' deaths.

In our study, the mortalities developed in 329 patients out of 908 patients accepted within 13 months from the date 01.11.2013 are investigated. While in GIC neurosurgical groups no significant statistical difference exists in the mortality rates according to the disease groups among GIC units (Table 1), we don't accept this to be significant because of the addition of neurosurgery group patients in SIC and IIC units into the surgical groups. In addition, there is no significant difference in the mortality rates according to the days, between weekdays and weekends, in and out of the working hours and hospitalization time when they are examined separately and statistically (Table 1).

Statistical differences exist between ICUs in the disease diagnosis when ICUs are examined separately. Even though the values in neurology and respiratory groups are statistically significant, we don't find them clinically significant (Graph 1,2,3). We believe that these differences are caused by accepting of the patients in ICUs in higher rates when they are accepted to the ICUs depending on the diagnosis groups. However, one of the limitations of our study is that we cannot report these ratios since the patients accepted to ICUs were not recorded depending on their diagnosis.

Mean age of patients in SIC units is found as 58,5±24,8 and there is a statistical difference among the other intensive care units. We thought that the reason why mostly male and younger patients are in SIC (E/K: % 63,7/36,3) is the trauma patients and that this is experienced mostly by the male patients (Table 1). Besides, İ.Kara et. al. reported in their mortality analysis of traumatic patients in ICUs that the mean age is 62 and the gender is 81% male and the thought of that the male patients experience the trauma similarly.[10] In general, the percentage of the male patient who died in our all ICUs is higher. Previously Martin GS et. al. have a research paper indicating that male patients from the patients they monitored between 1979-2000 are more susceptible to sepsis genetically.[11] Even though the reason cannot be lightened, there are also researches showing that the female patients are accepted to

intensive care and remained more mortal.[12] In our study, this ratio is in favor of male dominance (Table 1).

Closed unit system in GIC units and Open unit system in SIC and IIC units were applied. When we check the analysis results, while the number of beds is 9 in GIC units, total mortality number is 124, the number of beds is 6 in SIC units while the mortality number is 91 and the number of bed is 6 while the mortality number is determined as 114. When we consider these numbers, in GIC units where closed unit system is applied, the ratio of the mortality number to the number of beds was assessed to be low. In the studies performed before, studies indicating that the morbidity and mortality decrease in many disease groups when hospitalization in patients, monitoring, treatment and checkout decisions are undertaken by a particular team.[13,14] In our study, we believe that working as closed system in GIC units has positive effects on mortality.

Table 1: Properties of the patients depending on their ages, genders, diagnosis and the time when they are ex and hospitalization time

		GYB	DYB	CYB	P Value
		n(%)	n(%)	n(%)	
Gender	Female	56 (45,2)	50 (43,9)	33 (36,3)	0,403
	Male	68 (54,8)	64 (56,1)	58 (63,7)	
Diagnosis	Brain Surgeon	1 (0,8)	0 (0,0)	0 (0,0)	**<0,001**
	Surgical	5 (4,0)	5 (4,4)	32 (35,2)	
	Internal Medicine	16 (12,9)	36 (31,6)	10 (11,0)	
	Infection	2 (1,6)	3 (2,6)	4 (4,4)	
	Neurological	35 (28,2)	41 (36,0)	23 (25,3)	
	Oncologic	0 (0,0)	1 (0,9)	0 (0,0)	
	Respiratory	65 (52,4)	28 (24,6)	22 (24,2)	
Death Day	Monday	11 (8,9)	25 (21,9)	12 (13,2)	0,109
	Tuesday	18 (14,5)	10 (8,8)	9 (9,9)	
	Wednesday	20 (16,1)	18 (15,8)	9 (9,9)	
	Thursday	17 (13,7)	15 (13,2)	19 (20,9)	
	Friday	13 (10,5)	13 (11,4)	14 (15,4)	
	Cumartesi	21 (16,9)	18 (15,8)	9 (9,9)	
	Pazar	24 (19,4)	15 (13,2)	19 (20,9)	
Death Hour (Shift)	17-08	59 (48,8)	64 (56,1)	46 (50,5)	0,521
	08-17	62 (51,2)	50 (43,9)	45 (49,5)	
Death Day	Weekdays	79 (63,7)	81 (71,1)	63 (69,2)	0,455
	Weekends	45 (36,3)	33 (28,9)	28 (30,8)	
AGe	**(Mean±SD)**	73,8±13,8	70,7±18,9	58,5±24,8 [a] [b]	<0,001
Hospitalization time (days)	**Median (Max-Min)**	6 (116-1)	5 (90-1)	4 (78-1)	0,153

OneWay ANOVA (Brown-Forsythe) Post Hoc Test: Games Howell Kruskal Wallis Test Post Hoc Test (monte Carlo) - Fisher Exact Test(Monte Carlo) - Pearson Chi Square Test(Monte Carlo)

[a]***: significant p value according to GIC***

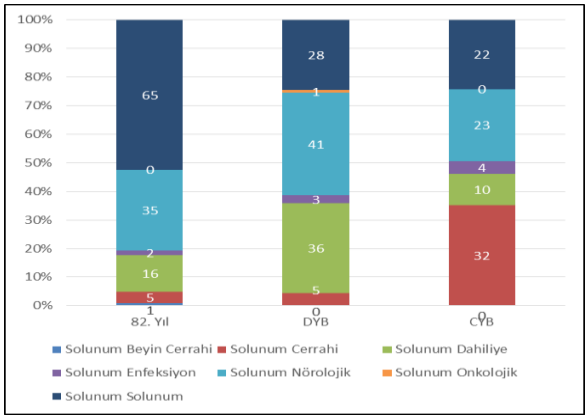
[b]***: Significant p value according to IIC***

SD: Standard Deviation Max: Maximum Min: Minimum

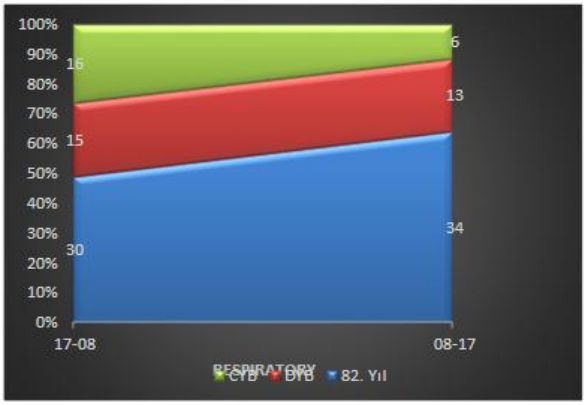
Table 2:

			GYB	DYB	CYB
		Death Hour (Shift)	**n(%)**	**n(%)**	**n(%)**
Death Day	Weekday	17-08	39 (50,6)	42 (51,9)	30 (47,6)
		08-17	38 (49,4)	39 (48,1)	33 (52,4)
	Weekend	17-08	20 (45,5)	22 (66,7)	16 (57,1)
		08-17	24 (54,5)	11 (33,3)	12 (42,9)
Death Day	Monday	17-08	5 (50,0)	12 (48,0)	6 (50,0)
		08-17	5 (50,0)	13 (52,0)	6 (50,0)
	Tuesday	17-08	8 (47,1)	3 (30,0)	5 (55,6)
		08-17	9 (52,9)	7 (70,0)	4 (44,4)
	Wednesday	17-08	12 (60,0)	10 (55,6)	5 (55,6)
		08-17	8 (40,0)	8 (44,4)	4 (44,4)
	Thursday	17-08	8 (47,1)	9 (60,0)	9 (47,4)
		08-17	9 (52,9)	6 (40,0)	10 (52,6)

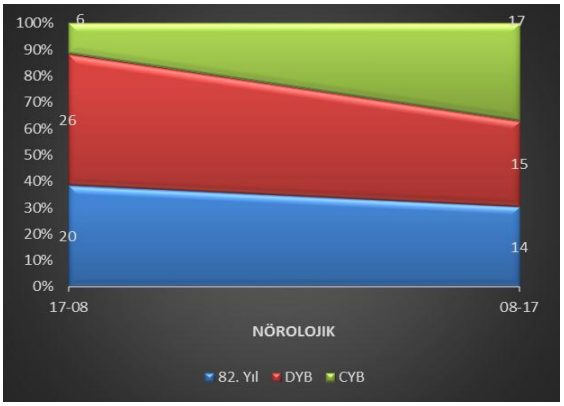
	Friday	17-08	6 (46,2)	8 (61,5)	5 (35,7)
		08-17	7 (53,8)	5 (38,5)	9 (64,3)
	Saturday	17-08	8 (38,1)	11 (61,1)	7 (77,8)
		08-17	13 (61,9)	7 (38,9)	2 (22,2)
	Sunday	17-08	12 (52,2)	11 (73,3)	9 (47,4)
		08-17	11 (47,8)	4 (26,7)	10 (52,6)
		08-17	0 (0,0)	0 (0,0)	0 (0,0)
	Surgical	17-08	3 (60,0)	4 (80,0)	18 (56,3)
		08-17	2 (40,0)	1 (20,0)	14 (43,8)
	Internal medicine	17-08	3 (20,0)	19 (52,8)	4 (40,0)
		08-17	12 (80,0)	17 (47,2)	6 (60,0)
	Infection	17-08	2 (100,0)	0 (0,0)	2 (50,0)
		08-17	0 (0,0)	3 (100,0)	2 (50,0)
	Neurological	17-08	20 (58,8)	26 (63,4)	6 (26,1)
		08-17	14 (41,2)	15 (36,6)	17 (73,9)
	Oncologic	17-08	0 (0,0)	0 (0,0)	0 (0,0)
		08-17	0 (0,0)	1 (100,0)	0 (0,0)
	Respiratory	17-08	30 (46,9)	15 (53,6)	16 (72,7)
		08-17	34 (53,1)	13 (46,4)	6 (27,3)



Graph 1.Mortality rates among intensive cares in terms of disease groups



Graph 2:Mortality rates among respiratory group of patients in intensive care units



Graph 3: Mortality rates among Neurology group of patients in intensive care units

CONCLUSION

Even though a statistically significant result cannot be found between mortality ratios among in and out of the working hours, in general, high rate of male patients in ex ratios led us to think that the male gender has higher genetic predisposition.

REFERENCES

1. Wu AW, Pronovost P,Morlock L. ICU reporting systems. J Crit Care. 2002 Jun; 17(2): 86-94.
2. Raffin TA. Intensive care unit survival of patients with systemic illness. Am Rev Respir Dis. 1989 Aug 140(Pt 2)S28-35).
3. Arman D.İntensive Care unit infections: Etiology, epidemilogy and risk factors.Türkiye Klinikleri J Int Med Sci., 2006; 2(46): 1-5.
4. T Çelikel.Intensive care specialists in the World and Turkey. Intensive Care Magazine, 2001; 1(1): 5-9.
5. Cullen DJ, Ferrara LC, Briggs BA,Walker PF,Gilbert J.Survival,hospitalization charges and follow-up results in critically ill patients. N Engl J Med, 1976; 294(18): 982-987.

6. Bueno-Cavanillas A,Delgado-Rodriguez M, Lopez – Luque A,et al.Influence of nosocomial infection on mortality rate in an intensive cre unit .Crit Care Med, 1994; 22: 55-60.
7. Fagon JY, Chastre J, Vuagnat A,et al. Nasocomialpneumonia and mortality among patients in intensive care units. JAMA, 1996; 275: 866-9.
8. C E Luyt, A Compes, P Aegerter, B Guidet, JL Trouillet, C Gilbert, et al. ‘‘Mortality among Patients Admitted to Intensive care units During Weekday Day Shifts Compared With ‘Off’ Hours,” Critical Care Medicine, 2007; 35(1): 3-11.
9. S Ala, N Pakravan, M Ahmadi et all. Mortality Rate and outcome among patients admitted to general intensive care unit during ‘‘morning-hour” compared with ‘‘off-hour” . İnternational Journal of Clinical Medicine, 2012; 3: 171-177.
10. İ Kara,S Altınsoy, U Gök,A Onur, R Sarıbapıççı. Mortality Analyssi of Trauma Patients in general intensive care units of a numune hospital . Journal of Turkish Society of Intensive Care. 2015; 13: 68-74.
11. Martin GS, Mannino DM, Eaton S, et all.The epidemiology of sepsis in the United States From 1975 through 2000. N Engl J Med, 2003; 348-(16): 1546-54.
12. Jed L, Louay Mardini ,Dev Jayaraman .Sex and mortality of hospitalized adults after admission to an intensive care unit. Am J Crit Care July 2013; 22(4): 314-319.
13. Carson SS, Stocking C, Podsadecki T, et al. Effects of organizational change in the medical intensive care unit of a teaching hospital - A comparison of “open” and “closed” formats. JAMA, 1996; 276: 322-8.
14. Multz AS, Chalfin DB, Samson IM, et al. A “closed” medical intensive care unit (MICU) improves resource utilization when compared with an “open” MICU. Am J Resp Crit Care Med, 1998; 157: 1468.