The Investigation of Possible Associated Risk Factors and Causes of Mortality in Intubated Patients in ICU during Five Days of Admission

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Abstract

Background and aims: A hospital's intensive care unit (ICU) is a location where seriously ill and high-risk patients can get vigorous therapy while being monitored with both invasive and noninvasive techniques. A typical treatment in the ICU, endotracheal intubation, is linked to a high frequency of problems because critically sick patients' unstable hemodynamic and respiratory conditions. Between 25 to 39% of ICU patients experience life-threatening side effects from endotracheal intubation, including severe hypoxia, cardiovascular collapse, cardiac arrest, and death. This study aimed to investigate the causes of mortality of intubated patients admitted to the ICU, the presence of comorbidities, and their effect on mortality in Iraq/Karbala.

Method: This cross-sectional study was conducted in 70 ICU's patients during 2022 in Karbala city. We selected the hospitals and based on the sample size in each hospital. In 2022, the variables were gathered using a researcher-made checklist as part of a random sampling. Medical care allowed for the collection of all the variables. For statistical analysis, SPSS software (version 25) was used. The chi-square/exact method test was employed to ascertain whether the results for each group differed. We utilized odds ratios (OR) with a 95% confidence interval as a measure of the connection between the factors and the outcome in multi-variable adjusted logistic regression models. Every analysis was two-tailed, with a P-value of 0.05 or less considered statistically significant.

Result: Our multi-logistic regre-ssion showed that the odds of mortality in participants who admitted to the ICU adjusted with the odds of Mean Arterial Pressure group (more than 100) in the participants whom at first of admission 6.089 times (95%CI: 1.565, 23.686, p=0.009) and the odds of (more than 100) in the participants whom at fifth day of survival or death day of non-survival outcome of admission 73.121 times (95%CI: 5.749, 929.942, p=0.001) So, the relationship was significant with elevation of mortality rate. In addition of that the hepatic conditions of participants were statically significant association with odds of mortality in outcome group (95%CI: 0.04, 0.19, P=0.003) in spite of that we didn't used logistic regression for this variable because there are 0 % survivor when a patient affected with hepatic conditions. So, the outcome of non-survivor is exclusive. Also, Acid Base Balance disturbance of participants was significant relationship with odds of mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (95%CI: 1.66, 2.37, P=0.006). We didn't discuss it because Pvalue in logistic regression was <0.05.

Conclusion: In critically ill patient's mortality ratio was high in our study. we identified in univariate and multi logistic regression statistically significant association between MAP and in-ICUs, 5-day mortality. Hepatic condition, Acid base balance and vasopressor groups in univariate was statically significant association with mortality in outcome group. In future the studies of ICU mortality should put these variables in consideration.

Key words: ICU, mortality, MAP, critical unite, Risk factors

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Introduction

A hospital's intensive care unit (ICU) is a location where seriously ill and high-risk patients can get vigorous therapy while being monitored with both invasive and noninvasive techniques. In these devices, the medical practitioner is continuously updated on the patient's physiological characteristics so that titrated therapy can be given. (1)

The majority of patients hospitalized to the intensive care unit (ICU) suffer either acute circulatory collapse or severe respiratory failure. In addition, compared to the patients are not critically sick, ICU patients have lower oxygenation and organ perfusion reserves. A typical treatment in the ICU, endotracheal intubation, is linked to a high frequency of problems because critically sick patients' unstable hemodynamic and respiratory conditions. (2,3)

Between 25 to 39% of ICU patients experience life-threatening side effects from endotracheal intubation, including severe hypoxia, cardiovascular collapse, cardiac arrest, and death. (2, 4,5)

We see all different kinds of serious situations in the intensive care unit (ICU), a specialist field. Intensive care units have increased significantly over the past ten years, and hospitals in developing nations now offer these services (6). The intricacy of care in the ICU makes it the location where medical errors are most prone to happen.

This study was designed to investigate the causes of mortality of intubated patients admitted to the ICU, the presence of comorbidities, and their effect on mortality in Iraq/Karbala. Furthermore, the main objectives to become aware of variables that determine the risk factors and causes of mortalities in ICU, with a focal point on structural elements, to characterize variations that lead to increase the probability of death among patients who received Invasive mechanical ventilation via Endotracheal tube at the beginning of admission to the critical care until death less or equal to five days, In Iraq especially Karbala there are many holidays due to the presence of religious ceremonies throughout the year may result in a reduction of staffing over the weekend and negatively affect the results of patients whom admitted to the ICU. and To examine recent changes in the proportion of multiple ages over 22 years old in intensive care over time with evaluate the impact of preexisting morbidity on the association between age, gender, length of stay, comorbidities and mortality ratio among ICU patients to adjusted hospital mortality rate of critically ill patients in a tertiary care academic medical city and privet hospitals of Iraq/Karbala, with availability of diagnostic and therapeutic options.

Method and Materials

Design and participants

This study type is cross section for its execution. Participants in this research who were admitted to intensive care units in Imam Al-Hussein medical city and Imam Zain Alabdin hospitals. The included criteria were Patients with endotracheal tube, artificial ventilation, During five days from the admission in ICU, Age group over 22 years and Karbala's hospitals;(al-Hussein medical city) and (Zain al-abdin). In addition, the exclusion criteria were Patient's with corona virus, patients with tracheostomy and Lack of patient's medical documents.

Monitoring

This study used an observational and not an interventional methodology. However, some non-pharmacological intervention was used in hospital to get the missing data in medical document. Active or passive intervention were used to complete the data. Active intervention considered as active ABG intervention including to get arterial blood sample. Also, passive intervention was intervention without any additional options such as using the vital signs monitoring devises to get the values of SPo2, HR, RR, Temp. And BP. In addition, in Iraq, usually pharmacological therapy was used Ephedrine, phenylephrine, atropine, dopamine, adrenalin, nor-adrenalin and etc. were used to saving life in cardiopulmonary resuscitation in ICUs.

Sample Selection

The method of sample selection was random sampling in this study. List of the patients in included hospitals were collected for two months (October, November) in 2022. Simple random sampling was used to select the participants. The inclusion and exclusion criteria were evaluated for each selected participant. Patients having massive data gaps in their records were disqualified from the study. In addition, new participants was chosen by random sampling method.

Data collection

The variables were gathered using the checklist created by the researcher. All of the variables were collected due to medical care. The collected data included the Age, Gender, Respiratory Conditions, Hepatic Conditions, Neurological Conditions, Cardiovascular Conditions, ARDS, SIRS, Vasopressors, Renal Replacement Therapy, MAP, Acid Base Balance, Urea S. /Creatinine, and Anemia.

Statistical Analysis

We used chi square test and logistic regression these methods had be done with SPSS package software (version 26) to analyze.

Results

In Table 1.0, describe the percentage and counts of patients with the variables above; Age group (65 and older) has 44% of death higher than other group of age, therefore, (45—64) age group has 33% < (65 and older) 44% of death, age group (22—34) has value 19% < (65 and older) 44% of death. Also, the age group (35—44) has 2.8% < (65 and older) 44%.

In addition, Gender group (male) has 63.9% > (female) group 36% of death and Respiratory Conditions group (yes) has 52.8% > (no) group 47.2%of death and Neurological Conditions group (yes) has 55.6% > (no) group 44.4%of death and Cardiovascular Conditions group (yes) has 77.8% > (no) group 22.2%of death and Hepatic Conditions group (yes) has 22.2% < (no) group 77.8% of death.

Among the risk factors in Table 1.0, such as age, gender, respiratory conditions, neurological conditions, cardiovascular conditions and hepatic conditions. The chi square test shows that the variable hepatic conditions has a significant association with outcome (survivor, non-survivor) and Pvalue is 0.003 which is <0.05 in spite of that we didn't used logistic regression for this variable because there are 0 % survivor (Table 1.0) when a patient affected with hepatic conditions. So, the outcome of non-survivor is exclusive. However, there wasn't significant association between outcome (survivor, non-survivor) and other variables.

In Table 2.0, describe the percentage and counts of patients with the variables above; Mean arterial pressure group (more than 100) has 33.3% < (lower than 70) 44.4% of death and (more than 100) has 33.3% > (70-100 normal) 22.2% of death. Acute respiratory distress syndrome group (sever) has 30.6% < (moderate) 50.0% of death and (sever) has 30.6% > (mild) 8.3% of death and (sever) has 30.6% > (NO) 11.1% of death. Systemic inflammatory response syndrome group (YES) has 52.8% > (NO) group 47.2% of death. Urea s. /Creatinine group (renal dysfunction) has 44.4% > (Pre renal dysfunction) 8.3% of death and (renal dysfunction) has 44.4% < (normal renal function) 47.2% of death. Acid Base balance group (Metabolic alkalosis) has 11.1% < (Metabolic acidosis) 25.0% of death and (Metabolic alkalosis) has 11.1% < (Respiratory alkalosis) 16.7% of death and (Metabolic alkalosis) has 11.1% < (Respiratory acidosis) 25.0% of death and (Metabolic alkalosis) has 11.1% < (normal) 22.2% of death. Anemia group (YES) has 58.3% > (NO) group 41.7% of death. Vasopressors group (given) has 61.1% > (not given) group 38.9%of death. Renal replacement therapy group (YES) has 33.3% < (NO) group 66.7% of death.

Among the risk factors in Table 2.0, such as Mean arterial pressure, acute respiratory distress syndrome, Systemic inflammatory response syndrome, Urea s. /Creatinine, Acid Base balance, Anemia, vasoconstrictor drugs and renal replacement therapy. The chi square test shows that, the variable Mean arterial pressure has a significant association with outcome (survivor, non-survivor) and Pvalue is 0.006 which is <0.05 and the variable vasoconstrictor drugs has a significant association with outcome (survivor, non-survivor) and Pvalue is 0.056 which is nearest to 0.05.

However, there isn't significant association between outcome (survivor, non-survivor) and other variables.

In Table 3.0, describe the percentage and counts of patients with the variables above; Mean arterial pressure group (more than 100) has 13.9% < (lower than 70) 66.7% of death and (more than 100) has 13.9% < (70-100 normal) 19.4% of death. Acute respiratory distress syndrome group (sever) has 27.8% < (moderate) 36.1% of death and (sever) has 27.8% = (mild) 27.8% of death and (sever) has 27.8% > (NO) 8.3% of death. Systemic inflammatory response syndrome group (YES) has 36.1% > (NO) group 63.9% of death. Urea s. /Creatinine group (renal dysfunction) has 33.3% > (Pre renal dysfunction) 13.9% of death and (renal dysfunction) has 33.3% < (normal renal function) 52.8% of death. Acid Base balance group (Metabolic alkalosis) has 16.7% < (Metabolic acidosis) 30.6% of death and (Metabolic alkalosis) has 16.7% > (Respiratory alkalosis) 8.3% of death and (Metabolic alkalosis) has 16.7% < (Respiratory acidosis) 25.0% of death and (Metabolic alkalosis) has 16.7% < (normal) 16.7% of death. Anemia group (YES) has 75.0% > (NO) group 25.0% of death. Vasopressors group (given) has 83.3% > (not given) group 16.7% of death.

Renal replacement therapy group (YES) has 13.9% < (NO) group 86.1%of death. Among the risk factors in Table 3.0, such as Mean arterial pressure, acute respiratory distress syndrome, Systemic inflammatory response syndrome, Urea s. /Creatinine, Acid Base balance, Anemia, vasopressor and renal replacement therapy. The chi square test shows that, the variable Mean arterial pressure had a significant association with outcome (survivor, non-survivor) and Pvalue is 0.000 which is <0.01 and the variable Acid Base Balance has a significant association with outcome (survivor, non-survivor) and Pvalue is 0.006 which is <0.05 and the variable vasoconstrictor drugs has a significant association with outcome (survivor, non-survivor) and Pvalue is 0.001 which is <0.05. However, there wasn't significant association between outcome (survivor, non-survivor) and other variables.

In Table 4.0 the mean arterial pressure groups the (lower than 70) group the odds of death is 1.644 times the odds of the death in the group of (more than 100) that means the chance of death in the group of (lower than 70) is lower than the chance of the death of the group of (more than 100) but in the group of (more than 100) the odds of the death 6.089 times the chance of the death in the group of (70-100 normal) and because of the P value of the group of (more than 100) is 0.009 which is < 0.05 that's mean there is significant association between mean arterial pressure and odds of the death. In the vasopressor groups the (given) group the odds of the death is 0.617 times the odds of the death in the group of (not given) that means the chance of death in group of (given) is lower the chance of death on group of (not given).

In Table 5.0 the mean arterial pressure groups the (lower than 70) group the odds of death is 1.750 times the odds of the death in the group of (more than 100) that means the chance of death in the group of (lower than 70) is lower than the chance of the death in the group of (more than 100) but in the

group of (more than 100) the odds of the death 73.121 times the chance of the death in the group of (70-100 normal) and because of the P value of the group of (more than 100) is 0.001 which is < 0.05 that's mean there is significant association between mean arterial pressure and odds of the death.

In the vasopressor groups the (given) group the odds of the death is 0.208 times the odds of the death in the group of (not given) that means the chance of death in group of (given) is lower the chance of death on group of (not given).

The Acid Base Balance groups the (Respiratory acidosis) group the odds of death is 0.482 times the odds of the death in the group of (Metabolic alkalosis) that means the chance of death in the group of (Respiratory acidosis) is lower than the chance of the death in group of (Metabolic alkalosis) but in the group of (Metabolic alkalosis) the odds of the death 3.846 times the chance of the death in the group of (normal) and the (Respiratory alkalosis) group the odds of death is 0.126 times the odds of the death in the group of (Metabolic alkalosis) that means the chance of death in the group of (Respiratory alkalosis) is lower than the chance of the death in group of (Metabolic alkalosis) but in the group of (Metabolic alkalosis) the odds of the death 3.846 times the chance of the death in the group of (normal) and the (Metabolic acidosis) group the odds of death is 0.248 times the odds of the death in the group of (Metabolic alkalosis) that means the chance of death in the group of (Metabolic acidosis) is lower than the chance of the death in group of (Metabolic alkalosis) but in the group of (Metabolic alkalosis) the odds of the death 3.846 times the chance of the death in the group of (normal) and because of the P value of the group of (Metabolic alkalosis) is 0.357 which is > 0.05 that's mean there wasn't significant association between Metabolic alkalosis and odds of the death.

In Table 6.0 Hospital type group (government) has 69.4% > (Privet) group 30.6% of death.

Cause of Admission group (Non traumatic) has 88.9% > (traumatic) group 11.1% of death.

Among the risk factors in Table 6.0, such as Hospital type and Cause of Admission.

The chi square test shows, that the variables in the table above has Pvalue >0.05 Therefore, there isn't significant association between outcome (survivor, non-survivor) and Hospital type and Cause of Admission.

Table 1.0 Demographic, Socio-Ecologic and Multiple Conditions of Chi-Square Tests Variables Characteristics of Participants

		Outcome						
		Survive		Non Survive		Total		
		Count	N %	Count	N %	Count	N %	Pvalue
Age	22--34	2	5.9%	7	19.4%	9	12.9%	0.092
	35--44	5	14.7%	1	2.8%	6	8.6%	
	45--64	8	23.5%	12	33.3%	20	28.6%	
	65 And Older	19	55.9%	16	44.4%	35	50.0%	
Gender	Male	24	70.6%	23	63.9%	47	67.1%	0.551
	Female	10	29.4%	13	36.1%	23	32.9%	
Respiratory Conditions	No	18	52.9%	17	47.2%	35	50.0%	0.632
	Yes	16	47.1%	19	52.8%	35	50.0%	
Neurological Conditions	No	14	41.2%	16	44.4%	30	42.9%	0.782
	Yes	20	58.8%	20	55.6%	40	57.1%	
Cardiovascular Conditions	No	9	26.5%	8	22.2%	17	24.3%	0.679
	Yes	25	73.5%	28	77.8%	53	75.7%	
Hepatic Conditions	No	34	100.0%	28	77.8%	62	88.6%	0.003
	Yes	0	0.0%	8	22.2%	8	11.4%	

Table 2.0 Count and Percentage of Outcome of First Day Variables

		Outcome						
		survive		Non survive		Total		
		Count	N %	Count	N %	Count	N %	Pvalue
Mean Arterial Pressure	70-100 Normal	8	23.5%	8	22.2%	16	22.9%	0.006
	Lower Than 70	4	11.8%	16	44.4%	20	28.6%	
	More Than 100	22	64.7%	12	33.3%	34	48.6%	
Acute Respiratory Distress Syndrome	NO	6	17.6%	4	11.1%	10	14.3%	0.343
	Mild	7	20.6%	3	8.3%	10	14.3%	
	Moderate	14	41.2%	18	50.0%	32	45.7%	
	Sever	7	20.6%	11	30.6%	18	25.7%	
Systemic Inflammatory Response Syndrome	NO	10	29.4%	17	47.2%	27	38.6%	0.126
	YES	24	70.6%	19	52.8%	43	61.4%	
Urea S./Creatinine	Normal Renal Function	22	64.7%	17	47.2%	39	55.7%	0.125

Table 2.0 Count and Percentage of Outcome of First Day Variables								
	Pre Renal Dysfunction	0	0.0%	3	8.3%	3	4.3%	
	Renal Dysfunction	12	35.3%	16	44.4%	28	40.0%	
Acid Base Balance	Normal	6	17.6%	8	22.2%	14	20.0%	0.608
	Respiratory Acidosis	9	26.5%	9	25.0%	18	25.7%	
	Respiratory Alkalosis	6	17.6%	6	16.7%	12	17.1%	
	Metabolic Acidosis	5	14.7%	9	25.0%	14	20.0%	
	Metabolic Alkalosis	8	23.5%	4	11.1%	12	17.1%	
Anemia	No	14	41.2%	15	41.7%	29	41.4%	0.967
	Yes	20	58.8%	21	58.3%	41	58.6%	
Vasopressors	Not Given	21	61.8%	14	38.9%	35	50.0%	0.056
	Given	13	38.2%	22	61.1%	35	50.0%	
Renal Replacement Therapy	No	26	76.5%	24	66.7%	50	71.4%	0.364
	Yes	8	23.5%	12	33.3%	20	28.6%	

Table 3.0 Count and Percentage of Outcome of Chi-Square Tests Variables at fifth day of survival or death day of non-survival of admission								
		Outcome						
		Survive		Non Survive		Total		
		Count	N %	Count	N %	Count	N %	Pvalue
Mean Arterial Pressure	70-100 Normal	12	35.3%	7	19.4%	19	27.1%	0.000
	Lower Than 70	2	5.9%	24	66.7%	26	37.1%	
	More Than 100	20	58.8%	5	13.9%	25	35.7%	
Acute Respiratory Distress Syndrome	NO	10	29.4%	3	8.3%	13	18.6%	0.144
	Mild	7	20.6%	10	27.8%	17	24.3%	
	Moderate	11	32.4%	13	36.1%	24	34.3%	
	Sever	6	17.6%	10	27.8%	16	22.9%	
Systematic Inflammatory Response Syndrome	NO	17	50.0%	23	63.9%	40	57.1%	0.241
	YES	17	50.0%	13	36.1%	30	42.9%	
Urea S. / Creatinine	Normal Renal Function	22	64.7%	19	52.8%	41	58.6%	0.579
	Pre Renal Dysfunction	3	8.8%	5	13.9%	8	11.4%	
	Renal Dysfunction	9	26.5%	12	33.3%	21	30.0%	
Acid Base Balance	Normal	9	26.5%	6	16.7%	15	21.4%	0.006
	Respiratory Acidosis	5	14.7%	10	27.8%	15	21.4%	
	Respiratory Alkalosis	8	23.5%	3	8.3%	11	15.7%	
	Metabolic Acidosis	1	2.9%	11	30.6%	12	17.1%	
	Metabolic Alkalosis	11	32.4%	6	16.7%	17	24.3%	
Anemia	No	6	17.6%	9	25.0%	15	21.4%	0.454
	Yes	28	82.4%	27	75.0%	55	78.6%	
Vasopressor	Not Given	19	55.9%	6	16.7%	25	35.7%	0.001
	Given	15	44.1%	30	83.3%	45	64.3%	
Renal Replacement Therapy	No	27	79.4%	31	86.1%	58	82.9%	0.457
	Yes	7	20.6%	5	13.9%	12	17.1%	

Table 4.0 Multi-Logistic Regression Variables of first day of admission									
		B	S.E.	Wald	df	P value	OR	95% C.I.for OR	
								Lower	Upper
Step 1	Vasopressor (1)	-.483	.543	.791	1	.374	.617	.213	1.789
	Mean Arterial Pressure			6.809	2	.033			
	Mean Arterial Pressure(1)	.497	.630	.622	1	.430	1.644	.478	5.657
	Mean Arterial Pressure(2)	1.806	.693	6.794	1	.009	6.089	1.565	23.686
	Constant	-.286	.505	.322	1	.570	.751		

Table 5.0 Multi-Logistic Regression Variables at fifth day of survival or death day of non-survival outcome of admission									
		B	S.E.	Wald	df	P value	OR	95% C.I.for OR	
								Lower	Upper
Step 1	Mean Arterial Pressure			11.476	2	.003			
	Mean Arterial Pressure(1)	.560	.829	.456	1	.500	1.750	.345	8.892
	Mean Arterial Pressure(2)	4.292	1.297	10.943	1	.001	73.121	5.749	929.942
	Vasopressor (1)	-1.572	.951	2.733	1	.098	.208	.032	1.339
	Acid Base Balance			5.928	4	.205			
	Acid Base Balance (1)	-.730	1.098	.442	1	.506	.482	.056	4.148
	Acid Base Balance (2)	-2.074	1.490	1.937	1	.164	.126	.007	2.332
	Acid Base Balance (3)	-1.396	1.300	1.153	1	.283	.248	.019	3.165
	Acid Base Balance (4)	1.347	1.461	.850	1	.357	3.846	.219	67.388
	Constant	-.193	1.068	.033	1	.856	.824		

Table 6.0 Count and Percentage of Outcome of non-specified Variables								
		Outcome						
		Survive		Non Survive		Total		
		Count	N %	Count	N %	Count	N %	p value
Hospital Type	Government	22	64.7%	25	69.4%	47	67.1%	.673
	Private	12	35.3%	11	30.6%	23	32.9%	
Cause Of Admission	Traumatic	6	17.6%	4	11.1%	10	14.3%	.435
	Non Traumatic	28	82.4%	32	88.9%	60	85.7%	

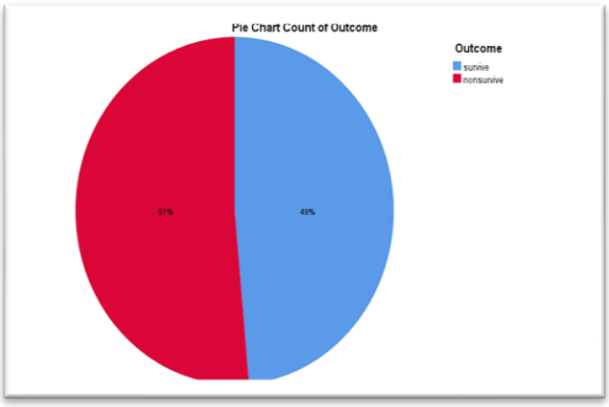

Figure 1.0 the distribution of participants according outcome groups

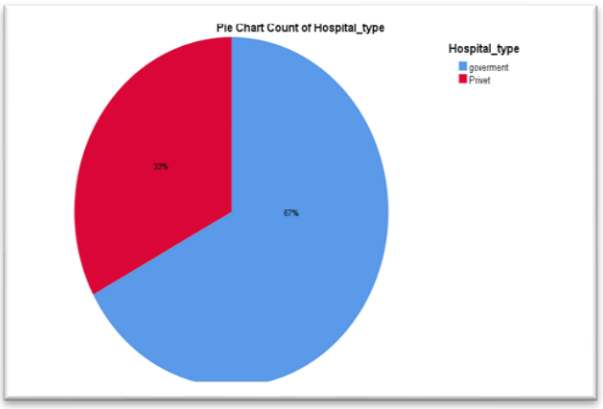

Figure 2.0 the distribution of participants according hospital type groups

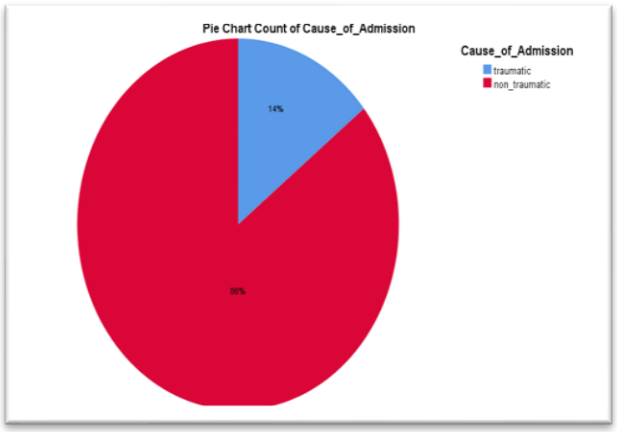

Figure 3.0 the distribution of participants according cause of admission groups

Discussion

The purpose of this study was to determine the mortality ratio for ICU patients. by identify the risk factors and causes that raise the mortality rate in Intensive care units in Iraq.

The data that collected from the ICU's patients there are general variables included the Age, Gender, Cause of Admission, Respiratory Conditions, Hepatic Conditions, Neurological Conditions, and Cardiovascular Conditions. All these data are no significance association with mortality except the patient who have suffered from hepatic conditions according to univariate test.

0n another hand, the analysis identifies the other variables that collected on two times. firstly, at first

day of admi-ssion and secondly, at fifth day of survival and death day of non-survival outcome of admission, the variables are; ARDS, SIRS, vasopressors, Renal Replacement Therapy, MAP, Acid Base Balance, Urea S. /Creatinine, and Anemia. There is a significance association with mortality just with Mean arterial pressure group and vasopressor according univariate test at first time that collected the data. And, there is a significance association with mortality just with Mean arterial pressure group, vasopressor and Acid Base Balance according univariate test at fifth day of survival or death day of non-survival from admission.

Our mortality rate is 69.4% in government hospital and 30.6% in private hospital of ICUs admissions (table 6.0), the average ratio was 51.4% that comparable with other studies such as the study of Eya et al. (8). (2022) in 179 patients, showed the mortality ratio was 34.1%. In addition, the study of Chi et al. (9). (2021) in 602 patients, showed the mortality ratio was 28%. Also, The study of Hogan et al. (10). (2020) in 471patients, showed the mortality ratio was 35%.

The study of Burns R et al. (11) Consider the possibility the accuracy of mortality prediction models for the public hospital, but not for the university hospital, was greatly enhanced by incorporating sickness severity with characteristics previously used to predict mortality. While our result showed the hospital type of participants was in biostatic term not statistically significant association with mortality in outcome group (figure 2.0, table 6.0, P=0.673) because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs of governmental hospital multiple time higher than private hospital because the government hospital had many common problems ineffective to deal with it. However, Infections such as ventilator-associated pneumonia, catheter-associated bloodstream infections, and urinary tract infections, as well as delirium, myopathies, and neuropathies associated with critical illness, are the most significant consequences of care in the intensive care unit (ICU)., uncontrolled blood pressure, acid base balance disturbance, and stress ulcers.in addition of that the private hospital had low mortality rate may be due to number of patients who admitted.

The study of Papadimitriou-Olivgeris M et al. (12) Consider the possibility of Road traffic accidents were the cause of trauma in.5% of the 326 patients, followed by falls (21.1%) and violence (7.4%). Mortality at 30 days was 27.3%. Higher New Injury Severity Scores (NISS), severe head/neck injuries, acute kidney injuries, septic shock, and hemorrhagic shock were substantially linked with mortality, according to multivariate analyses. In our result showed in term of biostatic of univariate test the cause of admission of participants was not statistically significant association with mortality in outcome group (figure 3.0, P=0.435).because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with non traumatic group multiple time higher than traumatic group because for these complications include medical causes that elective situations with gradually deterioration, and old patients more reliable for admission. But, most traumatic patient died in the way or before admission to the ICU, and most of them young age.

The outcome of our result during five days of admission was highly mortality ratio during this period. So, there are 51% no survivor and 49% survivor after five days of admission because this period had a lot of complication can be happen include exceed giving day off to the medical staff, religious ceremonies, holydays, and weekend all these circumstances crystallize by five days. So, these studies that consistent with our study include; the study of Park M et al. and Smith I et al. (13 _ 14) at hospital admission and how it changes over the course of the initial intensive care unit (ICU) stay are connected to the clinical outcome. In addition, the study of Agarwal R et al. (22) it's possible that the average RICU stay was similar with 5 days' group.

The study of Yu et al. (15) and the study of NIELSSON et al. (16) Suggested that, there was an increase elderly ICU patients, growing older is linked to higher mortality. These studies were contrarily with our result showed in univariate the age group of participants was in term of biostatic not statistically significant association with mortality in outcome group outcome (table 1.0, 95%CI: 2.91, 3.41, P= 0.092). because the values between non-survivors and survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with group of 65 years and above was higher than other groups. Because the old age and elderly may have many complications deteriorate rapidly include Cardiovascular Disease, Hypertension, Cancer, Osteoarthritis, Diabetes Mellitus, Osteoporosis, and Multiple Chronic Conditions.

The study of Mahmood et al. (17) suggest that, women over 50 years old did not vary significantly from men in mortality rate. In addition, the study of Gannon CJ et al. (18) However, the study shows that when patients are correctly stratified for females with trauma do not have better results. these studies were consistent with our result showed in term of biostatic of univariate test the gender group of participants was not statistically significant association with mortality in outcome group (table 1.0, 95%CI: 1.22, 1.44, P=0.551). Because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with male group multiple time higher than female group Because for many complications include male has reliable to traumatic

jobs with more exhausted actions and expose them for a lot of dangerous material lead them for serious medical conditions in the future. These studies were contrarily with our result. The study of Vaccarino et al. (19) Consider the possibility that younger women, but not older ones, experience higher hospital death rates than men do following an acute myocardial infarction. Also, the study of Kollef MH et al. (20) Suggest that among patients requiring mechanical breathing, gender may be related to higher mortality.

The study of Gadre SK et al. (21) the patients with severe COPD who needed invasive mechanical ventilation for acute respiratory failure had significant long-term morbidity. In addition, the study of Agarwal R et al. (22) their result of 180 patients were involved (140 had ARDS and 40 had ALI) Hospital mortality was 47.8%, Also, the study of Cotton et al. (23) The relative mortality risk was 26.7 times greater among those who experienced respiratory problems (9.9% versus 0.4%). While our result showed in term of biostatic of univariate test the respiratory conditions of participants was not statistically significant association with mortality in outcome group (table 1.0, 95%Confidance interval: 0.38, 0.629, P=0.632). Because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with respiratory conditions slightly higher than without it because we suppose for many complications They include air leak syndromes, ventilator-induced lung damage, atelectasis, mucus plugging, and atelectasis-associated pneumonia, and ICU neuro-myo-pathy.

The study of Damian MS et al. (24) overall, ICU mortality was 42.4% and acute hospital mortality was 62.1% of ICH (n = 10,313 patients). While our result showed the neurological conditions of participants in term of biostatic of univariate test was not statistically significant association with mortality in outcome group (table 1.0, 95%Confidance interval: 0.45, 0.69, P=0.782). Because the values between non-survivors and survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with neurological conditions higher than without it because most frequent neurologic complication include Toxic metabolic encephalopathy, acute confusion, hyper or hypokinetic delirium, or coma.

The study of Na SJ et al. (25) overall, 55 patients (8.9%) in the low amount of the died in the CICU, compared to 74 patients (4.1%), in the high amount (p 0.001). In addition, the study of Azzalini L et al. (26) there were 130 in-hospital deaths (1.3%). Age, ST-elevation and non-ST-elevation MI, cardiac arrest, ventricular tachycardia/fibrillation, cardiogenic shock, and heart failure were all independently associated with death in the multivariable analysis. These studies were consistent with our result was showed in term of biostatic of univariate test the cardiovascular conditions of participants were not statistically significant association with mortality in outcome group (table 1.0, 95%Confidance interval: 0.65, 0.86, P=0.679). Because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with cardiovascular conditions multiple time higher than without it because the most complications are cardiac arrest, peripheral artery disease, aneurysms, heart failure, and heart attacks.

The study of Mataloun SE et al. (27) Consider the possibility that, the slight difference in BUN and Cr levels at ICU admission was highly significant, however it lost significance in the multivariate analysis. It might have been caused by hypovolemia or hypotension. In contrary with our result showed in term of biostatic of univariate test the Urea S. /Creatinine ratio of participants was not statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 0.61,1.07, P=0.125). Also, there are insignificant relationship odds of mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%Confidance interval: 0.50, 0.93, P=0.579). Because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs with Renal dysfunction multiple time higher than pre Renal Dysfunction Because we suggest for Potential complications that clarified by the Urea S. /Creatinine ratio consist of Fluid retention, hypertension, pulmonary edema, hyperkalemia, and cardiac impairment.

The study of Chawla R et al. (28) the Noninvasive ventilation should be used very cautiously in patients with moderate & severe ARDS because the hazard of failure is substantial. In addition, the study of Coppola S et al. (29) Consider the possibility that A total of 222 ARDS patients were enrolled; 88 (40%) passed away in the ICU. these studies were contrarily with our result was showed in term of biostatic of univariate test the ARDS of participants was not statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 1.60, 2.06, P=0.343). Also, there are insignificance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 1.37, 1.86, P=0.144). because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality rate of the patients admitted to the ICUs with moderate group of ARDS higher than other groups of ARDS Because the Possible Complications include Lung damage (pneumothorax), pulmonary fibrosis, Ventilator-associated pneumonia, and at last multi-organ failure. This study was consistent with our result. The

study of Agarwal R et al. (22) the category of ARDS had no discernible impact on the result (OR, 1.6; 95% CI, 0.8 to 3.2).

The study of Moskowitz A et al. (30) Consider the possibility that Refractory shock (44%) and withdrawal of care (44%) were found to be the most frequent causes of death in 115 sepsis patients in earlier studies. And the study of Fedeli U et al. and the study of Santos MRD et al. (31_32) these two studies that examined death certificates to determine the reasons of death in sepsis patients came to the conclusion that many of these patients had other underlying causes. In addition, the study of Daviaud et al. (33) revealed that 32% of all ICU deaths occurred in an early stage, specifically within three days after ICU admission. While our result showed in term of biostatic of univariate test the SIRS of participants was not statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 0.50, 0.73, P=0.126). Also, there are insignificance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 0.31, 0.55, P=0.241). because the values between survivors and non survivors were convergent. However, in term of health and medical the result showed the frequency of mortality rate of the patients admitted to the ICUs with SIRS group higher than without SIRS because for potential complications include severe sepsis lead to organ hypo-perfusion or failure, decreased urine output, unconsciousness, and disseminated intravascular coagulation.

The study of Gattinoni L et al. (34) the idea of their higher mortality and longer hospital stays are linked to lower hemoglobin concentrations. Also, the study of NELSON et al. (35) Consider the possibility that there is the hematocrit was under 28% in 13 out of 27 cases. A hematocrit of less than 28% was substantially linked to both morbid cardiac events and myocardial ischemia (p =.001 and.0058, respectively). The study of Gadre SK et al. (36) overall, mortality ratio was lower in the non-anemic patients compared to patients with anemia (HR [95% CI] = 0.68 [0.55-0.83], P < .001). While our result showed in term of biostatic of univariate test the Anemia condition of participants was not statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 0.47, 0.70, P=0.967). Also, there are insignificance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 0.69, 0.88, P=0.454). because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality rate of the patients admitted to the ICUs with anemia multiple time higher than non-anemic especially at fifth day of survival or death day of non-survival from admission because for serious complications include decrease of oxygen delivery, and hence, it may affect heart, kidney, metabolic pathway, and brain disorders.

The study of Kumar V et al. (37) According to data on 163 patients, 106 people whose infusions of vasopressor lasted less than 48 hours died, while patients whose infusions lasted longer than 48 hours also perished. When compared to individuals receiving vasopressor infusions lasting under 48 hours, there was no statistically significant increase in death. Also, the study of Sviri S et al. (38) the patients who received high-dose noradrenaline at any point during their ICU stay had an 84.3% ICU mortality rate. In addition, the study of Benbenishty J et al. (39) in their study, Patients in the critical care unit had a low chance of surviving if they got more norepinephrine or epinephrine than 5 μg/kg/minute. these studies were consistent with our result was showed in univariate the vasopressors given to the participants was statistically significant association with mortality in outcome group of first day of admission to the ICU (table 2.0, 95%CI: 0.38, 0.62, P=0.056). Also, there are significance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 0.53, 0.76, P=0.001).the most possible complications we suggest Uncontrolled dose of vasopressors, time of unnecessary giving of vasopressors, and infused at first of admission with high affinity of vasopressors, lead to Pulmonary edema, respiratory failure, heart rate disturbance, Thromboembolism, Thrombocytopenia, Ventricular arrhythmia, Atrial fibrillation, Severe hypertension, and intra or extra cranial hemorrhage. However, in multi logistic regression lost his significance at first day of admission and fifth day of survival or death day of non-survival from admission in ICU, due to the majority effectiveness of MAP variable in multi logistic regression.

The study of Elseviers MM et al. (40) Overall, the findings demonstrated that a higher anticipated mortality in AKI patients getting RRT compared to conservative treatment can be explained in part by a higher disease severity in the RRT group. In addition, the study of Vesconi et al. (41) these data don't support the idea that greater dose RRT improves survival. While our result showed in term of biostatic of univariate test the Renal Replacement Therapy of participants was not statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 0.18, 0.39, P=0.364). Also, there are insignificance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%Confidance interval: 0.08, 0.26, P=0.457). Because the values between survivors and non-survivors were convergent. However, in term of health and medical the result showed the frequency of mortality ratio of patients whom admitted to the ICUs without Renal Replacement Therapy multiple time higher than with Renal Replacement Therapy. We suppose the main cause was the duration from day of admission to fifth

day of collecting the data short enough to deteriorate glomerular filtration rate of ICU patients. The study of Rajendran B et al. (42) the Analysis of individual acid base disorders revealed metabolic acidosis as the most common disturbance. In our result showed in term of biostatic of univariate test the Acid Base Balance disturbance of participants was not statistically significant association with mortality in outcome group at first day of admission (table 2.0, 95%CI: 1.55, 2.22, P=0.608). because the values between survivors and non survivors were convergent. However, in term of health and medical the result showed the frequency of mortality rate of the patients admitted to the ICUs with Acid Base Balance disturbance there wasn't change can be mention because first day of admission is a fresh admission to the ICU, therefor, the parameters of Acid Base Balance didn't get worse yet.

In term of biostatic of univariate test was showed the Acid Base Balance disturbance of participants was significance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 1.66, 2.37, P=0.006). according to the Pvalue in multi logistic regression was below (< 0.05). So, the relationship of mortality with acid base balance group non significance due to the majority effectiveness of MAP group in multi logistic regression affected on existence of Acid Base Balance group. However, in term of health and medical the result showed the frequency and univariate test of mortality ratio of patients whom admitted to the ICUs with Metabolic acidosis multiple time higher than other groups of Acid Base Balance Because as we suggest the reasons are; diminish cardiac contractility, increased work demand on the heart, hypotension, shock, anaerobic metabolism, and lactic acidosis. Our result consistent with this study of Noritomi et al. (43) overall, patients with sepsis and septic shock display a complicated metabolic acidosis, primarily from hyper-chloremic acidosis, which was more pronounced in non-survivors. In addition, the study of Gungor S et al. (44) Consider the possibility if acute and chronic hypoxemia was prevalent. Also, the study of Maciel AT et al. (45) overall, revealed considerable metabolic acidosis in the survivors was present at the time of admission. Non-survivors had higher unmeasured anions on both the day of admission and the day of death.

The study of Vincent JL et al. (46) overall, hypotension was defined as MAP < 60 or < 55 mmHg, the associations between duration and mortality were generally highly. The study of Li J et al. (47) the analysis showed that Nocturnal Mean Arterial Pressure was substantially linked to ICU mortality (odds ratio: 1.34; 95% confidence interval: 1.10–1.65). these studies were consistent with our result was showed in univariate the Mean Arterial Pressure group of participants was statistically significant association with mortality in outcome group of first day of admission (table 2.0, 95%CI: 1.06, 1.45, P=0.006). Also, there are significance relationship with mortality in outcome group at fifth day of survival or death day of non-survival outcome of admission (table 3.0, 95%CI: 0.90, 1.28, P<0.01). Therefore, In Our multi logistic regression showed that the odds of mean arterial pressure group remain in his strength of significant association with mortality in spite of all other groups lost their significance with mortality at first day of admission to the ICU (Table 4.0). Our study contrary with this study of Vincent JL et al. (46) Consider the possibility of hypotension was determined to be MAP 80 mmHg, there was no correlation between hypotension and death.

For that, the causes and risk factors that increase the mortality rate at first of admission to the ICU include autonomic dysfunction affected due to (heart rate, blood pressure), The damage to the circulatory system's autonomic control system may be reflected in higher or lower MAP, which may potentially create possible pathological harm by influencing organ perfusion, In addition of that, Type or sort of antihypertension drugs that given to the patient at preadmission to the ICU didn't affective the situation as it's the pharmacological purpose and didn't follow the patient probably, Dose of antihypertension drugs didn't used probably, Or the patient arrived in shock state. So, medical staff didn't manage the dose of vasopressors with proper concentration make the elevation of blood pressure (MAP) to high lead that the patient to death, or during intubation of endotracheal tube happen stimulation to sympathetic system due to light sedation lead that to increase heart rate with cardiac output elevation as on... That could explain our findings.

Our research supports this research. of Hou. C et al. (48) this study if Patients had Real average variability in mean arterial pressure during the first day in the ICU may be associated with higher or lower mortality risk.. and this study of Li J et al. (47) the analysis showed that Mean Arterial Pressure (MAPR) was significantly associated with mortality in the ICU (odds ratio: 1.34; 95% CI, 1.10–1.65).

Also, In Our multi logistic regression showed that the odds of mean arterial pressure group remain in his strength of significant association with mortality in spite of all other groups lost their significance with mortality at fifth day of survival or death day of non-survival from admission (Table 5.0). So, our result in multi logistic regression was consistent with these studies of Rothwell PM and Muntner P et al. (49_50) their result shown that abnormal BP variation is associated with various organ damage, higher risk for cardiovascular events, and mortality. The most complication consist organ damage (TOD) in heart, blood vessel, brain, and kidney, and the increase of blood pressure fluctuation, Medical staff didn't manage the dose of vasopressors with proper concentration make the elevation of blood pressure (MAP) too high or too low lead to the increased mortality, Reintubation of endotracheal tube happen stimulation to sympathetic system due to light sedation lead that to increase heart rate with cardiac

output. our result was consistent with this study of Li J et al. (47) the analysis showed that Mean Arterial Pressure (MAP) Was substantially linked to ICU mortality (odds ratio: 1.34; 95% confidence interval: 1.10–1.65).

The study of Majumdar A et al. (51) the presence of hepatic was not found to affect this relationship (p=0.33). In addition, the study of Warrillow S et al. (52) acute liver failure was an independent predictor of mortality rate (odds ratio 1.5 (1.26-1.79); P higher than 0.0001). These studies not consistent with our result showed in univariate the hepatic conditions of participants was statistically significant association with mortality in outcome group (table 1.0, 95%CI: 0.04, 0.19, P=0.003) in spite of that we didn't used multi logistic regression for this variable because there are 0 % survivor when a patient affected with hepatic conditions. So, the outcome of non-survivor is exclusive. But, this study of Vergara M et al. (53) in multi-Logistic regression analysis that supported our finding revealed that after taking into account all relevant factors,, hepatic-renal syndrome and cirrhosis conveyed the highest risk for death (49.2%; OR = 8.1(95%CI:6.6–9.9). We can suggest the possible causes are variceal bleeding, ascites, spontaneous bacterial peritonitis, hepatocellular carcinoma, hepato-renal syndrome, or hepato-pulmonary syndrome, intracranial hypertension and brain edema and Diabetes, cerebrovascular illness, and non-hepatic malignancies and Acute liver failure, portal hypertension, Cirrhosis, albuminemia, splenomegaly, pancytopenia, esophageal varices or gastric varices, Bacterial peritonitis, a dangerous infection, fatigue, weight loss, Toxin buildup in the brain (hepatic encephalopathy), accumulation of bilirubin, fractures, multi-organ failure, coma.

Conclusion

In critically ill patient's mortality ratio was high in our study. So, we discovered a statistically significant correlation between MAP and in-ICUs, 5-day mortality in univariate and multi-logistic regression. Hepatic condition, Acid base balance and vasopressor groups in univariate was statically significant association with mortality in outcome group. In future the studies of ICU mortality should put these variables in consideration.

Strength and limitation

This study's design, which was multicenter and included around 80% of the ICU population, was one of its strengths. However, it also had several limitations. With a total enrollment in two months, the sample size for this study was largely satisfactory and had sufficient power to detect the connection. Since the majority of the documents do not have any missing data, and because there was no selection bias or information bias, our result appeared to be reliable and generalizable. The findings of our study can aid in improving the health of patients who were hospitalized to the ICU because the population of patients in the ICU is somewhat random. However, due to some limitations in our study, the following restrictions must be placed on the application of our findings: First, more adverse effects or other patient issues may have been discovered with a longer time of study.. Second, in some crucial circumstances, the sample size was small, and some associations, particularly those with P-values close to 0.05, might become significant with a larger sample size. The study's final drawback concerned the tertiary hospital managers' refusal to participate in the research because it was not an intervention and had no impact on the patients.

Ethical consideration

Tehran University of Medical Sciences' ethics committee granted the study its blessing in terms of ethics (TUMS). Additionally, the study was given ethical approval (ethical code: IR.TUMS.SPH.REC.1401.240).

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Conflict of interest

There are no conflicts of interest that the authors of this study can disclose.

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