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Original Researcher Article

APACHE II scoring system assessment in trauma victims- Shar Hospital-Intensive care unit- Sulaimani City- Kurdistan Region- Iraq

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ABSTRACT

Background and Objectives:
Trauma is one of the leading causes of morbidity and mortality worldwide, especially among young adults. Accurate assessment of severity is essential for timely triage, effective management, and prediction of outcomes. The Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring system, although originally developed for general intensive care populations, has increasingly been applied to trauma patients.

Patients, materials and methods:
A prospective case series was conducted from March to July 2024, including thirty-four trauma patients aged sixteen years and older who required admission to the intensive care unit. Demographic, clinical, and laboratory variables were collected within the first twenty-four hours of admission, and APACHE II scores were calculated. Patients were monitored until discharge or death. Statistical analysis was performed using the Statistical Package for the Social Sciences version 26, and a P-value of 0.05 or less was considered significant.

Results:
Most patients were male (91%) and below thirty years of age (50%). Head trauma (41.1%) and multiple injuries (38.2%) were the most common injury patterns. Metabolic acidosis was the most frequent acid–base disorder (44.1%). The mean Glasgow Coma Scale score was 8.6. The mean APACHE II score was 14.4, corresponding to a predicted mortality rate of 21.3 percent, with no significant gender differences.

Conclusion:
The current work findings are largely in line with international data, especially from trauma-focused studies in Low- and Middle-Income Countries. The patterns of young male predominance, high rates of head trauma, limited comorbidities, and common acid-base disturbances reflect trends reported globally. Differences in gender impact may not be apparent due to small sample size but are worth exploring in larger, multicenter studies.

Keywords: Acid–base balance; Acute Physiology and Chronic Health Evaluation II; Glasgow Coma Scale; Trauma

Introduction:
Trauma is a major global health burden and remains a leading cause of morbidity and mortality across all age groups, particularly among young adults. According to the World Health Organization (WHO), trauma accounts for nearly 9% of all deaths worldwide, with road traffic accidents, falls, and interpersonal violence being the most common causes [(1)]. It is estimated that multiple traumas account for around 16% of total medical expenditures globally, highlighting the considerable economic and social impact of trauma care [(1)]. Mortality after trauma typically follows a trimodal distribution: immediate deaths within the first hour due to catastrophic injuries, early deaths within 24 hours primarily from hemorrhage or severe brain injury, and late deaths that occur days or weeks later from complications such as sepsis and multi-organ failure [(2)]. Injury severity assessment is crucial for early triage, management, and prediction of patient outcomes. Several trauma scoring systems have been developed over the last decades, including the Revised Trauma Score, Triage Score, and the Trauma and Injury Severity Score (TRISS), each aiming to provide objective estimates of survival and outcomes [(1)]. These scoring systems play a vital role in clinical decision-making, resource allocation, and quality assessment, particularly in intensive care settings [(3)]. Among the widely used prognostic models, the Acute Physiology

and Chronic Health Evaluation II (APACHE II) score, introduced in 1985 as an extension of the original APACHE system, is one of the most extensively validated severity indices in critical care medicine [4]. Although it was not originally developed specifically for trauma patients, multiple studies have demonstrated its value in predicting outcomes among critically ill trauma populations [5, 8]. The APACHE II score incorporates 12 routinely measured physiological variables (temperature, mean arterial pressure, heart rate, respiratory rate, oxygenation, arterial pH, sodium, potassium, creatinine, hematocrit, white blood cell count, and Glasgow Coma Scale), as well as age and pre-existing health conditions [3]. By assigning weighted points to each variable, it provides an overall index of disease severity and predicts hospital mortality [4]. Evidence suggests that the APACHE II score has comparable or superior predictive accuracy when compared to trauma-specific systems, especially in intensive care units (ICUs) where patients often present with complex comorbidities [6, 8]. For example, Muckart et al. demonstrated its reliability in predicting mortality among trauma patients without head injury [5], while more recent research has confirmed its utility in stratifying risk and guiding management in polytrauma and surgical ICU populations [6, 8] .Furthermore, APACHE II has been applied successfully in diverse clinical environments, including resource-limited settings, making it adaptable to varying healthcare infrastructures [9]. This study aims to assess the utility of the APACHE II scoring system in trauma victims admitted to the ICU of Shar Hospital, Sulaimani City. By evaluating its prognostic accuracy in this specific population, the study seeks to contribute evidence that may improve patient triage, enhance resource allocation, and ultimately reduce trauma-related mortality in the region.

Patients and methods:

This prospective case series was conducted at the Intensive Care Unit (ICU) of Shar Teaching Hospital, Sulaimani City, Kurdistan Region–Iraq, over a five-month period from March 1, 2024 to July 31, 2024. This is a sample survey with confidence level + - 5 confidence interval. The study population included all trauma patients aged 16 years and above of both sexes who required ICU admission. Eligible injuries comprised head, spine, chest, abdominal, pelvic, and extremity trauma, as well as electrical burns and polytrauma. Patients admitted primarily with medical conditions, non-electrical burns, or smoke inhalation syndromes were excluded. Convenience sampling method was used to recruit patients. Consecutive eligible patients admitted during the study period whose relatives consented were enrolled. Data were collected prospectively using a structured case review sheet. Demographic information, mechanism and nature of trauma, and comorbidities were recorded. Clinical parameters, including temperature, mean arterial pressure, heart rate, respiratory rate, and Glasgow Coma Scale (GCS), were measured at admission and again 24 hours later. Laboratory investigations included hematocrit, white blood cell count, serum sodium, potassium, creatinine, and arterial blood gas (ABG) analysis, along with fraction of inspired oxygen (FiO_2). All patients received initial management according to Advanced Trauma Life Support (ATLS) protocols and ICU guidelines. The Acute Physiology and Chronic Health Evaluation II (APACHE II) score was calculated for each patient using the worst values of 12 physiologic variables obtained within the first 24 hours of admission, combined with age points and chronic health points. Chronic health status considered the presence of severe organ insufficiency such as hepatic, renal, pulmonary, or cardiac disease, as well as immunocompromised states. Patients were followed from ICU admission until hospital discharge or death, and outcomes assessed included survival, length of ICU stay, and the relationship between APACHE II scores and mortality. As most patients were admitted in critical condition, informed written consent was obtained from their relatives after explanation of the study purpose. Relatives were informed of their right to withdraw consent at any time. Access to patients' healthcare records was authorized, and data were retrieved prospectively from patient files by the investigators. The study received approval from the Kurdistan Board of Medical Specialties Research Protocol Ethics Committee (approval code no. 954, dated March 7, 2024). All data were analyzed using IBM SPSS Statistics version 26. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The Chi-square test was applied to assess associations between categorical variables, and one-way ANOVA was used to compare differences in means. A p-value ≤ 0.05 was considered statistically significant.

Results:

The age distribution shows that (20.5 %) (n = 7) of patients were under 30 years old, while (29.4%) (n = 10) were under 20 years old, with no significant gender-based difference (F/M ratio=3/31), (p=0.773). Occupation data indicates that the majority of the patients (58.8%) (n = 20) worked in the private sector, while (32.3%) (n = 11) were unemployed, and only (8.82%) (n = 3) were employed in governmental sectors. A higher proportion of male patients resided in rural areas (61.7%) (n = 21) compared to only (29.4%) (n = 10) in urban areas; (p=0.539). Twelve patients 35.2% were smokers and male; with (p=0.537). Two patients were drinking alcohol socially (5.88%), exclusively were males. As shown in table 1.

***Table I*:** Shows demographic characteristics of the patients

Variables		Female	Male	Total	p-value
Age	<20	1 (2.94%)	9 (26.4%)	10 (29.4%)	0.773
	20-30	1 (2.94%)	6 (17.6%)	7 (20.5%)	
	>30	1 (2.94%)	16 (47.05%)	17 (50.0%)	
Occupation	Employed	0 (0%)	3 (8.82%)	3 (8.82%)	0.071
	Unemployed	3 (8.82%)	8 (23.5%)	11 (32.3%)	
	Employed in Private sector	0 (0%)	20 (58.8%)	20 (58.8%)	
Residency	Urban	0 (0%)	10 (29.4%)	10 (29.4%)	0.539
	Rural	3 (8.82%)	21 (61.7%)	24 (70.5%)	
Smoking status	Smoker	0 (0%)	12 (35.2%)	12 (35.2%)	0.537
	Non-smoker	3 (8.82%)	19 (55.8%)	22 (64.7%)	
Alcohol intake		0 (0%)	2 (5.88%)	2 (5.88%)	1.000

Most of the patients (79.4%) (n = 27) had no comorbidities. One patient with diabetes mellitus (DM); (2.94%), two cases had hypertension (HTN); (5.88%) and one patient had ischemic heart disease (IHD); (2.94%). Other comorbidities included liver failure in one patient (2.94%), cardiomyopathy in one of the cases (2.94%), and one patient with Down syndrome (2.94%). All comorbid patients were male. Despite these differences, the association between gender and comorbidities was not statistically significant (p=1.000), as following in tablet 2.

***Table II*:** Declares association between gender and comorbidity among the study sample

Comorbidity		Female n= 3	Male n=31	Total n=34	p-value
None		3 (8.82%)	23 (67.6%)	27 (79.4%)	1.000
DM		0 (0%)	1 (2.94%)	1 (2.94%)	
HTN		0 (0%)	2 (5.88%)	2 (5.88%)	
Others	Liver failure	0 (0%)	1 (2.94%)	1 (2.94%)	
	Cardiomyopathy	0 (0%)	1 (4.94%)	1 (2.94%)	
	IHD	0 (0%)	1 (2.94%)	1 (2.94%)	
	Down syndrome	0 (0%)	1 (2.94%)	1 (2.94%)	

Head injuries were the most common (41.1%) (n= 14), with higher occurrence among males (n= 31) (35.2%) than females (n = 2) (5.88%). Multiple injuries accounted for 38.2% of cases (n = 13), while injuries to the chest, abdomen, and extremities were relatively uncommon (n= 2.9, 8.82%). The association between ***Table*** trauma extent and gender was not statistically significant (p=1.000). These findings (table 3 and figure 1) suggest that head trauma and multiple injuries were the predominant injury patterns in this patient cohort.

***Table III*:** Demonstrates association between extent of trauma and gender

Extent of trauma	Female n= 3	Male n=31	Total n=34	p-value
Head	2 (5.88%)	12 (35.2%)	14 (41.1%)	1.000
Chest	0 (0%)	1 (2.94%)	1 (2.94%)	
Abdomen	0 (0%)	3 (8.82%)	3 (8.82%)	
Extremities	0 (0%)	3 (8.82%)	3 (8.82%)	
Multiple injuries (i.e; abdominal and head injuries)	1 (2.94%)	12 (35.2%)	13 (38.2%)	

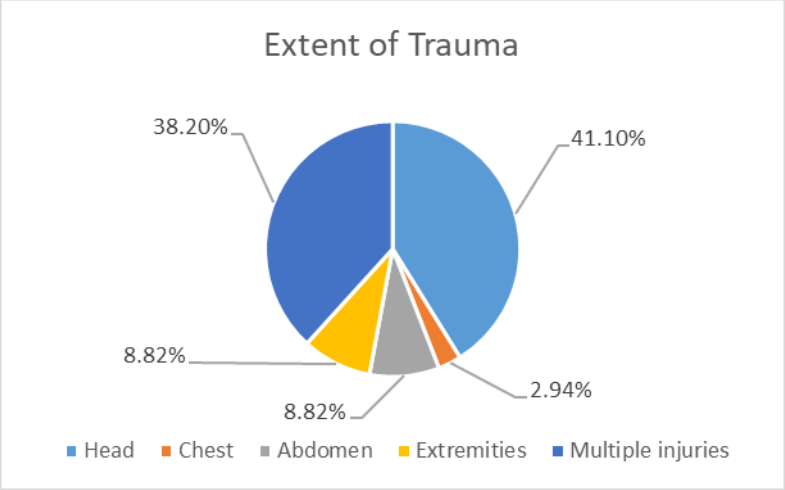

Figure I: Distribution of types and extent of injury

The arterial blood gas (ABG) parameters showed the mean pH was 7.36 (±0.1), with no significant gender-based differences (p=0.959), indicating a generally stable acid-base balance. Oxygenation levels (PaO_2) were highly variable (116.2 ± 68.2 mmHg), with no significant difference between genders (M/F ratio= 31/3) (p=0.611). Carbon dioxide ($PaCO_2$) levels were slightly lower in females (27.9 ± 5.97 mmHg) compared to males (38.3 ± 9.7 mmHg), with P-value (0.078). Bicarbonate (HCO_3^-) levels showed considerable variation (26.1 ± 23.3 mEq/L), again with no statistically significant difference (p=0.476), as declares in table 4.

Table *IV*: Presents blood gas analysis of the study sample

Blood gas analysis		Female n= 3	Male n=31	Total n=34	p-value
Mean±SD	pH	7.36±0.03	7.36±0.1	7.36±0.1	0.959
	paO_2	96.6±53.7	118±69.9	116.2±68.2	0.611
	$paCO_2$	27.9±5.97	38.3±9.7	37.4±9.79	0.078
	(HCO_3^-)	26.1±23.3	27.03±16.8	26.1±23.3	0.476

Metabolic acidosis was the most common disorder (n = 15) (44.1%), followed by mixed disorders (n = 5) (14.7%), and both respiratory acidosis and alkalosis (total n = 4 for respiratory acidosis and total n = 4 for respiratory alkalosis) (11.7% for each). Metabolic alkalosis was the least common disorder which was found in only two patients (5.88%), while four of the patients (11.7%) had normal blood gas parameters. Among acidosis cases, two of the cases had compensated respiratory acidosis; (5.8%), while eight had cases metabolic acidosis; (23.5%). In alkalosis cases, three cases had compensated respiratory alkalosis; (8.82%) and two of the cases had metabolic alkalosis with compensation; (5.88%). These findings highlight a predominance of metabolic acidosis in the study population, with a substantial proportion showing compensatory mechanisms; P-Value (0.669), look to table 5 and figure 2.

Table V: Expresses blood gas status of the study sample

State		Compensated	Uncompensated	Total n=34	p-value
Acidosis	Respiratory	2 (5.88%)	2 (5.88%)	4 (11.7%)	0.669
	Metabolic	8 (23.5%)	7 (20.5%)	15 (44.1%)	
Alkalosis	Respiratory	3 (8.82%)	1 (2.94%)	4 (11.7%)	
	Metabolic	2 (5.88%)	0 (0%)	2 (5.88%)	
Normal		0%	0%	4 (11.7%)	-
Mixed disorder		0%	0%	5 (14.7%)	

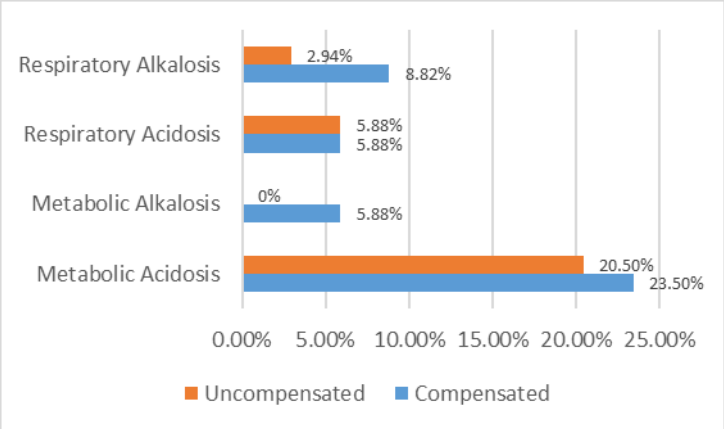

Figure II: Blood gas interpretation of the study population

Table 6, showing the bulk results regarding APACHE II, the APACHE II criteria, helps to predict severity of the health status and mortality risk. Temperature (37.3 ± 1.8°C), mean arterial pressure (77.1 ± 14.4 mmHg), heart rate (103.8 ± 27.4 bpm), and respiratory rate (19 ± 5.4 breaths/min) showed no significant gender-based differences. FiO_2 (fraction of inspired oxygen) levels varied based on oxygen support, with FiO_2 ≥0.5 averaging 345.2 ± 162.1 mmHg and FiO_2 <0.5 averaging 139 ± 91.7 mmHg. Serum sodium (141.3 ± 3.3 mEq/L) and potassium (4.0 ± 0.6 mEq/L) were within normal ranges. Hematocrit levels were slightly higher in males (33.6 ± 11.3%) than females (31.4 ± 1.9%), but this difference was not significant (p=0.744). White blood cell count was 16.3 ± 6.7 ×10⁹/L, indicating systemic inflammatory responses in thirty one patients (91.1%) patients.

Neurologically, the Glasgow Coma Scale (GCS) score averaged 8.6 ± 3.1, reflecting a moderate-to-severe level of impaired consciousness. Bicarbonate levels showed high variability (26.1 ± 23.3 mEq/L), likely linked to the presence of acid-base disorders. The mean APACHE II score was 14.4 ± 5.2, with no significant gender-based difference (p=0.627). The predicted mean death rate was 21.3 ± 13.6%, with a slightly lower rate in females (16.6 ± 2%) than males (21.7 ± 14.2%), but this difference was not statistically significant (p=0.539).

Table VI: Reveals APACHE II score criteria in all recruited patients

APACHE II criteria	Female n= 3	Male n=31	Total n=34	p-value
Temperature	37.7±0.8	37.3±1.8	37.3±1.8	0.702
Mean arterial pressure	74.3±8.3	77.3±14.9	77.1±14.4	0.736
Heart rate	108±35	103.4±27.2	103.8±27.4	0.784
Respiratory rate	15±2.6	19.4±5.5	19±5.4	0.187
FiO2 (≥ 0.5)	592.8±0	327.5±152.6	345.2±162.1	0.879
FIO2 (< 0.5)	100.9±75	143.5±94.4	139±91.7	0.951
Arterial pH	7.4±0.1	7.4±0.1	7.35±0.1	0.471
Sodium	140±3.98	141±3.3	141.3±3.3	0.563
Potassium	4.1±0.3	4±0.6	4±0.6	0.706
Creatinine	0.61±0.1	0.97±0.7	0.93±0.6	0.353
Hematocrit	31.4±1.9	33.6±11.3	33.4±10.8	0.744

White cell count	17.2±7.7	16.3±6.7	16.3±6.7	0.816
Glasgow coma scale	9±3.6	8.6±3.1	8.6±3.1	0.828
Bicarbonate	16.8±2.5	27±24.2	26.1±23.3	0.476
APACHE II	13 ±1	14.5±5.4	14.4±5.2	0.627
Predicted Death rate	16.6±2	21.7±14.2	21.3±13.6	0.539

Discussion:

The current paper presents a comprehensive overview of the demographic, clinical, and physiological characteristics of a cohort of 34 patients with acute conditions, likely related to trauma or critical illness. The data offer insights into population structure, injury patterns, systemic responses, and prognostic markers.

Demographics and Socioeconomic Context

The demographic data reveal a predominantly male population (91.2%), with a female-to-male ratio of 3:31. This gender distribution, although statistically non-significant (p=0.773), reflects a common trend in trauma-related studies, where males—particularly younger males—are more frequently affected, often due to risk-taking behaviors and occupational exposures. Indeed, half of the patients were under 30 years of age, aligning with global epidemiological patterns of trauma incidence in younger adults. Chalya et al. inTanzania similarly reported that over 70% of trauma ICU patients were men under 40 years. 1 Gupta et al. in India also found a comparable male predominance with mean age in the late 20s. [(1)]

Occupationally, the majority of the cohort worked in the private sector (58.8%), while a significant minority (32.3%) were unemployed. This may point toward socioeconomic vulnerabilities, particularly in lower-income or rural settings, where healthcare access and safety regulations may be limited. Rural residence predominated among male patients (70.5%), though not statistically significant (p=0.539), and may also be associated with delays in seeking care, fewer trauma centers, or hazardous environments.

Smoking and alcohol consumption were exclusively observed among male patients, with 35.2% being smokers and 5.88% reporting social alcohol use. While not statistically significant, this further underscores behavioral risk factors in this subgroup and highlights potential targets for public health intervention.

Comorbidities and Baseline Health

Most patients (79.4%) had no reported comorbidities, indicating a generally healthy population prior to the acute event. The comorbid conditions identified were diverse but isolated: diabetes mellitus (2.94%), hypertension (5.88%), ischemic heart disease (2.94%), liver failure (2.94%), cardiomyopathy (2.94%), and Down syndrome (2.94%). All comorbid patients were male, although the gender association was not significant (p=1.000). The low prevalence of chronic illnesses may be partly explained by the young average age of the cohort, In contrast Papadimitriou-Olivgeris et al. in Greece reported comorbidities in 35% of trauma ICU patients, reflecting differences in patient age and regional epidemiology. [(13)]

Trauma Patterns

Head trauma was the most frequent injury pattern, observed in 41.1% of patients. This aligns with the typical mechanism of injuries in high-velocity impacts or falls, particularly in younger populations. Similar patterns were reported by Lee and Rainer in Hong Kong, where traumatic brain injury and polytrauma were the most frequent ICU presentations. [(16)] The predominance of head injuries in our cohort explains this overall low GCS and further highlights the neurological vulnerability of trauma patients.

This aligns with findings by Konar et al., who reported low GCS as a strong predictor of ICU mortality in traumatic brain injury patients. [(25)]

Multiple injuries were also common (38.2%), underscoring the complexity and severity of trauma in this group. Injuries limited to the chest, abdomen, or extremities were comparatively rare. Although males accounted for nearly all the cases, the gender differences in trauma type did not reach statistical significance (p=1.000), likely due to the small number of female participants. Similar patterns were reported by Lee and Rainer in Hong Kong, where traumatic brain injury and polytrauma were the most frequent ICU presentations. [(16)]

Arterial Blood Gas (ABG) and Acid-Base Disorders

Arterial blood gas analysis showed overall stability in pH (mean 7.36 ± 0.1) and normal oxygenation and bicarbonate levels. While $PaCO_2$ levels were slightly lower in females, this was not statistically significant (p=0.078). Notably, metabolic acidosis emerged as the most common acid-base disturbance (44.1%), often indicative of tissue hypoperfusion or shock—a frequent consequence of major trauma. While Raffee et al. demonstrated that metabolic acidosis and base deficit on admission strongly correlated with prognosis in trauma victims. [(20)]

Mixed disorders (14.7%) and both forms of respiratory acid-base disturbances (each 11.7%) reflect the physiological complexity in critically ill patients. Only 11.7% of patients had normal ABG values. The presence of compensatory mechanisms in both acidosis and alkalosis subgroups further demonstrates the body's attempt to restore homeostasis. However, the overall acid-base disorder distribution showed no significant gender variation (p=0.669). Likewise, Rotab et al. emphasized ABG abnormalities as early indicators of ICU admission in chest trauma patients. [(21)]

APACHE II Scores and Physiological Parameters

The APACHE II score, a critical tool for assessing illness severity and predicting mortality in intensive care settings, averaged 14.4 ± 5.2, with a predicted mortality rate of 21.3 ± 13.6%. These values suggest a moderate risk level in the studied population. The lack of gender-based difference (p=0.627) is consistent with other clinical parameters showing similar non-significant trends.

Vital signs such as temperature, mean arterial pressure, heart rate, and respiratory rate were within expected ranges for acutely ill individuals, with no significant differences by gender. The elevated white blood cell count (mean 16.3 ± 6.7 $\times 10^9$/L) in 91.1% of patients points to systemic inflammatory responses—likely a reflection of trauma or infection.

Contradicting or qualifying evidence & perspectives

1. Invalidation of APACHE II in acute trauma

A classic critique: in a cohort of 280 trauma patients with shock (systolic BP < 90 mmHg), the authors found no meaningful correlation between APACHE II and Injury Severity Score (ISS), and little predictive power for length of stay. They argue that APACHE II is weighted toward chronic disease and older patients, and lacks anatomical/injury-specific components essential in trauma. [29]

2. Poor sensitivity of APACHE II in trauma without head injury

In 199 trauma patients without head injury, the mean APACHE II scores differed between survivors and non-survivors, but the predicted mortality (≈ 5.1 %) was far lower than observed (25.1 %). Critically, APACHE II had 100 % specificity but 0 % sensitivity in this subgroup—i.e., it failed to predict any of the deaths. The authors conclude that APACHE II is not applicable to trauma without head injury. [30]

3. Multicenter trauma ICU study:

APACHE II underperforms vs. newer models. In a multicenter study comparing APACHE II, TRISS, and newer 24-h ICU point models, APACHE II and TRISS "did not meet acceptable thresholds" for both calibration and discrimination in trauma patients. The authors argue that APACHE III and ICU-specific point systems outperform APACHE II in such populations. [31]

4. Comparison with SOFA in trauma patients:

A study of 241 ICU trauma patients found that while both APACHE II and SOFA predicted mortality, SOFA had a significantly higher area under the ROC curve (AUC = 0.904), meaning better discrimination. [32]

* In another Iranian study focusing on trauma patients, the authors remarked that although the sensitivity of APACHE II and SOFA were comparable, the specificity of APACHE II was lower; they preferred SOFA for trauma cases. [33]

5. In intensive care more broadly, simpler models can outperform scoring systems

In patients with spontaneous intracerebral hemorrhage (ICH), APACHE II and SAPS II had good discrimination, but did not outperform a model using only age + Glasgow Coma Scale (GCS). The authors conclude that in certain cohorts, conventional ICU scoring systems may not add predictive power beyond a simpler model. [34]

Neurological status, as reflected by a mean Glasgow Coma Scale (GCS) score of 8.6 ± 3.1, indicates that many patients presented with moderate to severe impairment of consciousness, which is consistent with the high prevalence of head trauma.

Electrolyte levels (sodium and potassium) were within normal limits, and hematocrit values were slightly higher in males, as expected physiologically, though not significantly so (p=0.744). In contradiction to the values reported by Khan et al., who observed a mean APACHE II of 15 with mortality of 18% in polytrauma patients. [6] Farajzadeh et al. in Iran reported slightly higher scores (mean ~18) with mortality around 25%, reflecting greater severity in their sample. [9]

Taken together, our results are consistent with existing evidence that trauma patients admitted to the ICU are predominantly young males, with head and polytrauma being the leading injury types. Metabolic acidosis and reduced GCS remain key clinical indicators of poor outcomes, and APACHE II continues to provide a useful framework for prognostic assessment. Nonetheless, as recent literature indicates, trauma-specific and organ dysfunction–based scores such as SOFA or TRISS may outperform APACHE II in predictive accuracy. [10, 11] Larger multicenter studies in Kurdistan and neighboring regions are warranted to validate these observations and to optimize outcome prediction in trauma care.

Clinical Implications and Recommendations

The findings highlight the burden of trauma in younger, predominantly male populations, particularly in rural and economically vulnerable settings. The dominance of head injuries and multiple trauma cases suggests a need for targeted prevention strategies, improved emergency response infrastructure, and public health policies aimed at reducing injury risk.

The prevalence of metabolic acidosis and high APACHE II scores emphasizes the severity of the patients' conditions and supports the use of these markers in early prognostication and management strategies.

While no statistically significant gender differences were observed across most variables, the overwhelming representation of males may have limited the detection of such differences. Future studies should consider larger, more balanced cohorts to explore potential gender-specific trends in trauma and critical care outcomes.

Conclusion

The current work findings are largely in line with international data, especially from trauma-focused studies in Low- and Middle-Income Countries. The patterns of young male predominance, high rates of head trauma, limited comorbidities, and common acid-base disturbances reflect trends reported globally. Differences in gender impact may not be apparent due to small sample size but are worth exploring in larger, multicenter studies.

Limitation:

We had a small sample size (n=34), which resulted in a low overall event rate (Predicted death rate of 21.3±13.6). This may compromise the validity of our results on the APACHE II score's ability to predict death. To counteract this, we applied statistical techniques. Our population's demographic information is similar to that seen in other literatures, including the methods of injuries and our result. We employed a strong statistical analysis strategy to determine the factors that influence patient outcomes, such as death. To validate our findings, however, a prospective multicenter investigation is necessary.

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