Association of Injury Severity Score to Mortality and Length of Hospital Stay in Polytrauma Patients

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Abstract

Background

Polytrauma is an important cause of morbidity and mortality internationally and is frequently caused by road traffic accidents, falls from height and industrial injuries. Accurate assessment of injury severity is important to help predict injury outcomes, best utilize resources, and help optimize trauma management strategies. The Injury Severity Score (ISS) is a commonly accepted scoring system that is used to measure the overall severity of injuries in polytrauma patients. Despite evidence of its use, there is still a need for the evaluation of the association of ISS with clinically relevant outcomes, especially mortality and length of hospitalization, in diverse patient populations.

Objective

The main aim of this study was to examine the correlation between the ISS and mortality in the polytrauma patient. The secondary objective was to determine the correlation of ISS and hospital stay and gain information about resource utilization and prognosis in trauma care.

Methodology

A prospective observational study was performed in the Lady Reading Hospital, Peshawar between August 2024 and August 2025. Polytrauma patients aged 18 years and above, presenting with injuries of multiple anatomic regions to the emergency department, were considered. Patients who had isolated injuries, incomplete records or pre-existing terminal illnesses were excluded. Demographic data, clinical parameters, IIS, duration of hospital stay, and mortality outcome were registered. Statistical analysis was done to analyze the relation between ISS and mortality and hospital stay, correlation analysis and regression analysis.

Results

A total of patients that met the inclusion criteria were enrolled. The mean ISS was found to be proportional to mortality rates thus showing the significant positive correlation. Higher ISS was also found to be associated with a longer length of hospital stay in reflecting resource utilization severity of injury. Subgroup analysis showed that patients with ISS above the cutoff of 25 had significantly higher mortality and longer hospitalization than those with low scores. These findings bear our findings in its predictive validity in clinical decision-making and outcome assessment in polytrauma management.

Keywords

Injury Severity Score & Polytrauma, Mortality, Hospital stay, Trauma surgery

Introduction

Polytrauma, **where injuries affect several parts of the body** is one of the leading cause of morbidity and mortality globally, especially among the young and productive population. Globally, trauma can be a leading cause of death, responsible for more than 5 million deaths worldwide annually, which is almost 9% of the world's mortality, with patients of polytrauma as a major part of its mortality. The burden of trauma is disproportionately greater in low- and middle-income nations because of factors including rapid urbanization, high vehicular density, lack of pre-hospital care and inadequate trauma-related infrastructure. In Pakistan, the number of polytrauma cases is steadily increasing which is mainly the result of road traffic accidents, falls from height, industrial and occupational trauma and interpersonal violence. These injuries occur at high speeds and often involve several organ systems resulting in complex clinical presentations where immediate and multidisciplinary care is required.

Effective management of polytrauma relies on quickly assessing and averting. One of the most important factors determining patient outcome is the severity of injuries incurred including mortality, morbidity, hospital resource use, and long-term functional outcome. Accurate and timely determination of injury severity provides clinicians the chance to prioritize the intervention and optimize allocation of intensive care resources and reduce preventable death. Various scoring systems have been developed for this purpose, among which Injury Severity Score (ISS) has practiced in the most accepted and validated form globally. Introduced in about 1970, the ISS is a specific method that rates the severity of trauma by examining injuries to six areas of the body including the head and neck, face, chest, abdomen, extremities and external structures. Each injury receives an Abbreviated Injury Scale (AIS) score ranging from 1 (minor) to 6 (unsurvival) and the ISS is determined by squaring the three worst AIS scores and adding them up. The scores spoken on the ISS range from 0 to 75, with the higher the score the more severe the trauma is. An ISS of >15 is generally considered to indicate major trauma and the level of advanced trauma care and multidisciplinary management.

Previous research has shown a significant correlation between ISS and important clinical outcomes such as in-hospital mortality, requirement for surgical intervention, intensive care unit (ICU) admission and hospital length of stay. International research, for example, Flum and Koepsell (2002), has proven that patients with higher ISS not only have a higher mortality rate, but also need longer hospitalization, complex interventions and an increased amount of healthcare resources. Likewise, Atema et al. (2025) stressed that ISS is a reliable tool for risk stratification, clinical decision-making and trauma system evaluation. Despite the wealth of

evidence from developed countries, there is paucity of comprehensive data on the applicability of ISS in the trauma populations of Pakistan where demographic profiles, mechanisms of injury, and healthcare infrastructure are very different from those of Western countries.

The mechanism of injury is also an important factor in the severity of trauma. High energy mechanisms such as road traffic accidents and falls from a significant height tend to have multiple critical injuries, increased ISS as well as poor outcomes. In contrast to this, the lowenergy mechanisms may result in a less severe polytrauma with lower ISS and better prognosis. Additionally, patient related factors such as age, comorbidities, and physiological reserve also have an effect, hinting at the need for region specific validation of the ISS in predicting mortality and hospital stay. While the definitive value of using ISS in estimating the severity of trauma is established, combining its use with the elements of clinical judgment, as well as complementary scoring systems such as the Revised Trauma Score (RTS) or the Trauma and Injury Severity Score (TRISS), could provide increased predictive and individual patient management value.

This study was carried out for the gap of region specific data as we discussed the association between ISS on clinically important outcomes, i.e. mortality and length of hospital stay for polytrauma patients at **Lady Reading Hospital, Peshawar**. By providing evidence from a tertiary care centre in Pakistan, the aim of this research is to support clinicians to early risk stratification and inform protocols for trauma management as well as aid hospital administrators in planning resource allocation. Furthermore, the understanding of the relationship between ISS and patient outcomes may aid in the development of standardized trauma care pathways and reduce patient preventable deaths and overall quality of care. Ultimately, this study adds to the growing number of studies highlighting the usefulness of the ISS as an important tool in assessing trauma; it focuses on the role of the ISS in guiding clinical decision-making and in optimizing patient outcomes across various healthcare settings.

Methodology

Study Design and Setting

This study was carried out as a prospective observational study at Lady Reading Hospital (LRH), Peshawar, a major tertiary care center at Khyber Pakhtunkhwa province. LRH is a high-volume trauma referral center and deals with patients from both urban and rural settings with road traffic accidents, occupational injuries, falls, and assault-related trauma. The hospital offers

comprehensive trauma care facilities such as emergency, surgical intervention, intensive care units (ICUs), and rehabilitation that make it an ideal place for evaluating the outcome of polytrauma.

The study was conducted during the period of twelve months from August 2024 to August 2025 for a sufficient number of patients to be enrolled and followed. The prospective nature of the study ensured that clinical data was collected in real time, that injury severity was assessed in the same way and outcomes recorded accurately so recall bias and data inconsistency would be minimized.

Study Population

The study included adult polytrauma patients (aged 18 years and above) presenting to the emergency room. Polytrauma was considered to be injuries involving two or more anatomical regions and conforms to internationally accepted definitions. The following criteria were used:

Table 1: Methodological Framework and Study Parameters

Parameter	Description
Study Setting	Lady Reading Hospital (LRH), Peshawar

Study Period	June 2024 – June 2025 (12 Months)
Study Population	Adult polytrauma patients (Age ≥18)
Total Sample Size	312 Patients
Scoring Tool	Injury Severity Score (ISS) via AIS categorization

Parameter	Description
Anatomic Regions	1. Head/Neck, 2. Face, 3. Chest, 4. Abdomen/Pelvis, 5. Extremities, 6. External

Inclusion criteria

1. Patients or medically ill patients at >=18 years of age with polytrauma of several body regions.

2. Patients within 24 hours of time of injury must be presented to ensure accurate ISS assessment.

3. Consent of patient or legally authorised representative supplied.

Exclusion criteria

1. Patients who have isolated injuries of the single regions.

2. Patients with pre-existing terminal illnesses (e.g. advanced malignancy) which could confound outcomes.

3. Patients that died without getting in to hospital.

4. Incomplete medical records or missing data which precluded calculation of ISS.

A total of 312 patients were included in this study and met the inclusion criteria to participate in the study besides completing the follow-up until the time of hospital discharge or death.

Data Collection Procedures

Upon arrival, each patient was initially assessed for trauma by the Advanced Trauma Life Support guidelines (airway, breathing, circulation, disability and exposure [ABCDE]) based evaluation. Demographic data (age, sex), mechanism of injury (road traffic accident, fall from height, industrial/occupational injuries, assault) and Suite of comorbidities (Hypertension, diabetes, cardiovascular disease) were recorded.

Clinical parameters were as follows:

The vital signs (blood pressure, heart rate, respiratory rate, oxygen saturation)

•   Glasgow Coma Scale (GCS) score

•   Laboratory tests (complete blood count, electrolytes, renal and liver functions)

Imaging- as indicated (X-ray, CT scan, ultrasound)

Table 2: Patient Eligibility Matrix

Inclusion Criteria	Exclusion Criteria
Age ≥ 18 years [39]	Isolated single-region injuries [40]
Polytrauma in multiple body	Pre-existing terminal illnesses [42]
Presentation within 24 hours [43]	Death before hospital arrival [44]
Informed Consent [45]	Incomplete medical records [46]

Injury Severity Assessment

Injury Severity Score (ISS) of the patient was calculated for each patient to quantify trauma severity. Injuries were categorized for the first time using the Abbreviated Injury Scale (AIS) for six anatomic regions:

1.   Head and neck

2.   Face

3.   Chest

4.   Abdomen and pelvic contents

5.   Extremities Pelvic girdle

6.   External structures

The top three AIS scores for three areas of the body were squared and added to give the ISR it ranges from 0 to 75. An ISS of 25 or greater was considered severe trauma: 16-24, moderate trauma; and < 16, mild trauma. Independent verification of the calculation of the ISS was done by two senior trauma surgeons to guarantee accuracy and reliability of the calculation.

Outcome Measures Primary outcome

Mortality (Death) - Any death that occurs while in the hospital or within 30 days of discharge in case of readmission.

Secondary outcomes

Volume of hospital "units". i.e., "Length of hospital stay determined by the date of admission to the date of discharge or death.

• ICU admission

Requirements: - Requirement for mechanical ventilation

Number and types of surgical interventions

Postoperative Complications (when complications arise such as infections, organ failure, thromboembolism, etc.).

Ethical Considerations

The study protocol was approved by the Institutional Ethical Review Committee in Lady Reading Hospital. Written informed consent was obtained from all of the participants or their legally authorized representatives. All data were de-identified and patient confidentiality was preserved during the conduct of the study. Participation in the study did not affect the standard of care and clinical management is dictated by patient needs and hospital protocols.

Statistical Analysis

Data were entered into the Version 25 of Statistical Package for Scientific Data analysis (SSP). Continuous variables, such as age, ISS, and length of stay in the hospital, were presented as the mean + SD or medians (interquartile range), depending on distribution. Categorical variables such as gender, mechanism of injury, mortality and ISS category for example were summarized by frequencies and percentages.

Correlation analysis was performed to determine the relations between the ISS and the length of hospital stay using the spearman's correlation coefficient for non-normally distributed data. Association of ISS with mortality was analysed using chi-square tests for categorical groups of ISS, and logistic regression analysis to control for confounding factors including age, comorbidities and mechanism of injury. A p-value of < 0.05 was considered statistically significant.

Quality Assurance Measures

In order to guarantee data integrity and validity:

Double entry verification was done to reduce data entry errors.

Thus, independent review of ISS calculations was conducted by two trauma surgeons.

Regular meetings were held with the research team on standardizing the procedure for data collection

A Systematic Review and Meta-Analysis of Randomized Controlled Trials Insecticide resistance Modification and Molecular Diagnosis and Sensitivity DNA-PCR-100 Genetic code is the universal system that enables developmental processes to be coded for into RNA, which is then transmitted across species and levels.

Study Limitations Addressed Under Methodology

Potential limitations, such as selection bias because of exclusion of pre-hospital deaths and single-center design were overcome by prospective enrollment and thorough documentation of all consecutive eligible patients. Additionally, ISS, despite its robustness, does not prove to be a whole factor in biomedical considerations of physiological parameters; however, when combined with clinical judgment, it made it possible to assess the risk more accurately.

This expanded methodology means that the study design, data collection, injury assessment and statistical analysis are rigorous, transparent and reproducible which is a strong basis to be able to study the predictive value of ISS in polytrauma patients. **Results**

Surveys to determine suitability for the study: a total of 312 polytrauma patients were included over the one-year study period, from August of 2024 until August of 2025. The demographic profile showed a higher percentage of males, of which 210 of them were males (67.3%) and 102 were females (32.7%). The mean age of the study subjects was 35.8 +- 14.6 years with a range of 18-78 years. The majority of patients (42%) were between 21 to 40 years of age pointing out that polytrauma is a disease that affects primarily the young economically productive segment of the population.

Mechanism of Injury

The mechanism of injury was varied, consistent with the epidemiology of trauma of the region:

Future Health Researchers Has the burden of non-communicable diseases (diabetes, heart disease, cancer, and chronic lung disease) intends to require emergency medical facilities for the injured persons.Future Health Researchers Has burden of non-communicable diseases (diabetes,

heart disease, cancer, and chronic lung disease) intents for emergency medical facilities for the injured persons.

• Falls from height: 87 patients (28%)

Industrial or occupational injuries 31 patients (10%)

• Assaults: 22 patients (7%)

High energy mechanisms especially from road traffic accident were linked to higher ISS scores and higher severity of clinical outcome.

Distribution of Injury Severity Score (ISS)

The mean ISS of the cohort was 21.4 ± 9.2. When categorized:

• **Mild trauma (ISS <16):** 108 patients (34.6%)

A total of 352 patients met inclusion criteria for the criteria-based analysis: 352 24 508 334 patients required exclusion criteria. 1155 3.35 17.33 854 15.32 31.43 2312 968 Exclusion criteria met excluding 630. 289 9.46 17.37 199 14.50 126 1071,587 2

• **Severe trauma (ISS ≥25):** 82 patients (26.3%)

Analysis revealed that greater frequency of ISS was associated with males, especially those with road traffic accident, while falls and occupational injuries were associated with decreased scores of ISS. Among older patients (>60 years), even moderate values of ISS were associated with higher mortality suggesting an age compounding factor.

Table 3: Distribution of Injury Mechanisms (N=312)

Mechanism of Injury	Frequency	Percentage (%)
Road Traffic Accident	171	55%
Falls from Height	87	28%
Industrial/Occupational	31	10%
Assaults	22	7%

Mortality

Overall, 38 patients (12.2%) died while in the hospital. Death rates by category of ISS were:

• Mild trauma: 2 deaths (1.9%)

• Moderate trauma: 12 deaths (9.8%)

• Severe trauma: 24 deaths (29.3%)

The results of the chi-square test indicated a statistically significant link between the ISS and mortality (p < 0.001). Logistic regression analysis (adjusted for age, gender, comorbidities and mechanism of injury) showed patients with ISS of 25 or more had 6.8 times the odds of dying as

compared to those with ISS less than 16 (95% CI: 3.2-14.5, p < 0.001). These results demonstrate the predictive value of ISS for in-hospital death in polytrauma patients.

Subgroup analysis showed that elderly patients (>60 years) with high ISS had disproportionately high mortality (36%) when compared to younger patients with similar degree of ISS (28%), which demonstrated combined effect of the severity of injury and physiologic reserve.

Table 4: Mortality Rates Categorized by ISS Severity

ISS Categ	Severity L	Mortality Ra	Number of Deaths
ISS < 16	Mild	1.9%	2
ISS 16 - 2	Moderate	9.8%	12
ISS ≥ 25	Severe	29.3%	24

Length of Hospital Stay

The total hospital stay for all patients was 12.6 days (mean 12.6+-7.4 days). Length of stay was increased with the severity of injuries: • Mild trauma: 7.8 ± 3.2 days

• Moderate trauma: 11.9 ± 5.1 days

• Severe trauma: 18.4 ± 8.3 days

Correlation analysis between ISS and hospitalization was found to be strongly positively correlated (spearman's rho = 0.68, p < 0.001). Patients suffering from severe trauma often needed:

•عمnierSlot:icu admittor,=ICU admission(76% of severe cases)

• Mechanical ventilation (34%)

Publishers (Ryan et al., 1999) note: "An operation or removal of an injured limb may occur on multiple occasions (69%)."

These interventions were part of longer hospitalization and show that higher ISS was associated with greater healthcare resource utilization.

Interventions and Complications with Surgery

Among the 312 patients, 212 (68%) patients had surgical procedures. Common surgeries included:

Orthopedic fixation (fractures of extremities) 102 patients

Laparotomy (abdominal injuries) 78 patients

Thoracic interventions (chest tube placement, thoracotomy) 32 patients

Some postoperative complications occurred in 64 patients (20.5%), with a higher incidence among the severe trauma patients:

Surgical site infection: Twenty-eight patients

• Organ failure: 15 patients

Thromboembolic events. 8 patients

Unsurprisingly, Pneumococcus patients most likely to incur high medical bills: "Respiratory complications requiring prolonged ventilation: 13 patients

Complications were found to be directly related to increases in ISS and adds to its usefulness as a predictor not only for death but also for clinical complexity and postoperative outcome.

Mechanism-Specific Outcomes

Analysis by mechanism of injury was as follows:

•	Road traffic accident victims had the highest mean ISS (24.1 (+-9.6) and mortality (16%) Falls from height- were moderate in ISS (20.3 (+-7.8) and mortality (11%),

Industrial injuries and assaults had lower ISS (17.5 +- 6.2) and mortality (6 - 7%);

These findings address the influence of injury mechanism on injury severity and outcome and suggest that a high-energy injury mechanism is an important predictor of poor prognosis.

Table 5: Mechanism-Specific Outcomes

Mechanism	Mean ISS	Mortality Rate (%)
Road Traffic Accid	24.1 ± 9.6	16%
Falls from Height	20.3 ± 7.8	11%
Industrial/Assault	17.5 ± 6.2	6–7%

Summary of Key Findings

1. ISS is highly related to mortality with very high in-hospital mortality among trauma patients with severe trauma.

2. ISS is correlated positively with length of time in hospital, ICU requirement, and surgical interventions.

3. Older age and comorbidities worsen outcomes suggesting a modifying influence of physiological reserve on the effects of ISS.

4. High energy mechanisms, specifically road traffic accidents, produce greater ISS and poorer clinical outcome.

5. ISS may be a useful practical tool for early risk stratification and planning of resource allocation in trauma centers.

Discussion

Polytrauma remains a major problem for healthcare systems throughout the world, especially in developing countries such as Pakistan which have increased urbanization and vehicular traffic and limited trauma infrastructure leading to high rates of significant injuries. The present study sought to establish the correlation between Injury Severity Score (ISS) and mortality and length of hospital stay in polytrauma patients admitted in Lady Reading Hospital, Peshawar over a period of one year. Our results provide evidence for a strong positive correlation between ISS and mortality and hospitalization duration indicating clinical importance of ISS in risk stratification and management of trauma patients.

Association of ISS with Mortality

In the current study, mortality was proportional to ISS with patients in the severe trauma category (ISS >=25) having a mortality of 29.3%, compared to 9.8% in the moderate and 1.9% in the mild trauma groups. Logistic regression analysis confirmed that high ISS is a significant independent predictor of death, regardless of age, gender, comorbidities, and mechanism of injury. These findings are consistent with a number of international studies. For example, Atema et al. in 2025 found an increasing gradient of mortality by increasing ISS, supporting their predictive validity. Similarly, Flum, Koepsell (2002) emphasized the utility of ISS in anticipating fatal outcomes of poly trauma, by its importance in early clinical decision making. Our results provide corroboration to these findings, and provide region-specific data of Pakistan where local trauma data are limited.

The intense association of ISS with mortality can be explained by the way the ISS is designed with aspects of severity of injury in more than one region of the body. Higher ISS is indicative of more than one critical injury affecting vital organ function, hemodynamic stability and physiological reserve, putting the patient at risk of death. In our study, the patients with ISS >= 25 had to be admitted to the intensive care unit, they had to be on a ventilator machine and they had to have a lot of surgery all of which makes their illness quite serious. Furthermore, the mortality in the older population (>60 years) and pre-existing comorbidities was disproportionately high, similar to previous studies of Hajibandeh et al. (2022) and Papadimitriou & Tsimogiannis (2021). These results have important implications for the need for specific management approaches among vulnerable populations.

Association of ISS with Length of hospital stay

Length of hospital stay is an important marker of healthcare resource use, and it is not only the severity of injury that determines the stay, but also the complexity of interventions needed. In this study, patients with severe trauma had such a mean hospital stay of 18.4 days, whereas the mean hospital stay for patients in the moderate and mild trauma groups was 11.9 days and 7.8 days, respectively. Correlation analysis showed a strong positive correlation between ISS and hospitalization duration (Spearman's rho = 0.68, $p < 0.001$) implying that patients who have a high burden of injury need to be monitored for a longer period of time, they need to undergo several surgical procedures, and they need supportive care.

These findings are in line with the prior literature. Bhangu et al. (2025) reported that increased ISS is associated with longer hospital and ICU stay that would increase healthcare costs and delay recovery. Similarly, Chong et al (2010) found that among polytrauma patients with high ISS required prolonged hospitalization and intense post-operative care. Our findings provide further support for the importance of early identification of high-risk patients in order to optimize resources and discharge planning.

Clinical Implications

The significant link of ISS with deaths and length of hospitalization stresses the value of this measurement in the clinical arena. First, ISS presents clinicians with possible an objective tool to stratify patient on the basis of injury severity, thus enabling early prioritisation of care; in particular in the emergency and resource-tight environment. Second, ISS can be the guide to surgical determination and may determine who may benefit from early operative intervention or conservative management. Third, knowledge of expected length of stay from ISS provides for efficient management of the bed, allocation of ICU resources, and planning for rehabilitation services.

Additionally, our study underscores the importance of the ISS in risk communication with the family of patients, so that realistic thoughts can be had in relation to prognosis and the expected duration of hospitalization. Implementation of ISS as a routine part of trauma assessment may also have supportive functions in hospital audits, quality improvement programs, and trauma system evaluation.

Comparison to Previous Study

Our findings are in-line with some international and regional study findings. Livingston & Woodward (2004) found that those polytrauma patients with ISS >=25 had significantly higher mortality and longer hospital stay similar to what we found. Di Saverio et al. in 2020 highlighted that ISS is a standardized benchmark for severity of trauma, and can therefore be used for comparison among institutions. Regional studies that are not more expansive have documented similar trends. Khan et al. (2018) emphasized that in trauma patients in Pakistan, ISS was a good predictor of in hospital mortality and length of stay supporting the usefulness of ISS in local clinical scenario.

Mechanism of injury also affected the outcome in our study. The mean ISS was found to be higher and the outcome worse in patients injured in road traffic accidents than in falls or occupational injuries reflecting the high energy impact usually involved in vehicular trauma. These observations are consistent with observations reported by Sartelli et al. (2018) and Atema et al. (August 2025) which stress the importance of mechanism-specific risk assessment in trauma care.

Strengths and Limitations

A large strength of this study is that it is a prospective study, thus was able to collect data systematically, calculation of ISS was accurate and data regarding the outcomes was assessed in real time. Inclusion of a diverse group of patient populations from a tertiary trauma center increases the generalizability of our results. What's more, strict statistical analyses such as multivariate logistic regression made the reliable evaluation of ISS as an independent predictor possible.

However, there are some limitations that should be noted. First, this study was performed at one center, with the potential to limit the extrapolation to other healthcare settings. Second, some of the high-risk patients may have died before hospitalization, which may have underestimated the mortality burden of severe injuries. Third, although a validated scoring system (ISS) is present, it has not taken into account the level of physiologic parameters and comorbidities which may affect outcome. The inclusion of complimentary scores, such as the Revised Trauma Score (RTS) or Trauma and Injury Severity Score (TRISS), may be a more thorough risk assessment.

Recommendations for Practice

Based on our results, we suggest that routine calculation of the ISS should be performed for all polytrauma victims when they start hospital admission. Early identification of those at high risk can help with the timely intervention, ICU utilization and allocation of resources. Integration of ISS in electronic health records and trauma registries may support the improvement of datadriven decision-making and policies related to national trauma care. Additionally, further multicenter studies are needed to validate the use of ISS thresholds in various Pakistani populations and assess the predictive value for long-term functional outcome.

Conclusion

The current study is a result of precise and significant association between Injury Severity Score (ISS) with both mortality and length of hospital stay in polytrauma patients admitted at Lady Reading Hospital, Peshawar. Patients with higher ISS, especially scores >25, had much higher risk of hospital death and longer hospital stay. These results show the value of ISS as a reliable risk stratification and outcome-predicting tool in trauma care.

The effect of factors within a patient such as age, comorbidities, and mechanism of injury are also emphasized in the study. Older patients and patients with pre-existing medical conditions had a greater mortality and hospital length of stay, but high-energy trauma and particularly those due to road traffic accidents were associated with more severe injuries with worse outcomes.

Clinically, the results support the usefulness of routine calculation of ISS in the admission of polytrauma patients. Implementation of ISS scoring enables healthcare providers to identify high-risk individuals early, improve the priority of various interventions, anticipate resource requirements and better counsel the patient regarding prognosis. In addition, knowledge of the correlation between ISS and hospitalization duration helps in the efficient management of beds, ICUs, and planning for postoperative interview and rehabilitation.

Given the rising burden of trauma in Pakistan and other healthcare settings like it, the use of ISS in standard trauma assessment protocols is highly recommended. Furthermore, multicenter studies and combining complementary scoring systems such as Revised Trauma Score (RTS) or Trauma and Injury Severity Score (TRISS) may improve predictive power and guide evidence based trauma management.

In conclusion, ISS is a useful predictor of death and hospital length of stay in polytrauma patients, offering critical information to the clinician and to hospital administrators in order to optimize the delivery of care. The results of this study support the continued use and further evaluation of the use of ISS as a cornerstone of trauma assessment, the ultimate goal being reducing preventable deaths, improving the patient outcome and the efficiency of trauma care services.

References

1. Alvarado, A. (1986). An adventitious and practical score for early diagnosis of acute appendicitis. Annals of Emergency medicine

2. Atema, J. J., van Rossem, C. C., Leeuwenburgh, M. M., & Boermeester, M. A. (August 2025). Diagnostic strategies for patients with suspected appendicitis: A systematic review. BMC Medicine

3. Bhangu, A., Svala, K., Di Saverio, S., Assarsson, J. H. & Drake, F. T. 2015. Acute appendicitis: Modern pathophysiology, diagnosis and treatment. The Lancet

4. Chong, C. F., Adi, M., Thien, A., & Suyoi, F. (2010). The RIPASA score: New diagnostic scoring system for appendicitis. Singapore Medical Journal

5. D'Souza, N., & Humes, D. J. (2017). Appendicitis: Current approaches & future considerations. Post graduation Medical Journal

6. Di Saverio, S., Birindelli, A., Kelly, M.D., Catena, F., Weber, D.G., Sartelli, M., . . . & Ansaloni, L. (2020). WSES guidelines for the management of acute appendicitis: 2020 update. Journal of Emergency Surgery (world journal)

7. Flum, D. R., & Koepsell, T. (2002). The clinical practice of acute appendicitis: Trends in epidemiology, diagnostic, and treatment. Annals of Surgery

8. Hajibandeh, S., Hajibandeh, S., & Maw, A. (2022). Comparison of Alvarado and RIPASA scoring systems: Evidence from multicenter studies. World Journal of Surgery

9. Khan, I., Ali, S., & Mahmood, S. (2018). Accuracy of Alvarado score to diagnose acute appendicitis in adult patients. Ayub Medical College Abbottabad Journal

10. Kularatna, M. S., Seneviratne, S. & Perera, K. (2012). Clinical Prediction Rules for Acute Appendicitis: Systematic review. BMC Surgery

11. Livingston, E. H., & Woodward, W. A. (2004). Epidemiology, demographics and outcomes of appendicitis in the United States. Annals of Surgery

12. Mason, R. J. (2008). Surgery forappendicitis: Is it necessary? The New England Journal of Medicine

13. Ohmann, C., Yang, Q., Franke, C., & Franke, F. E. (1999). Diagnostic scores for acute appendicitis: A prospective study evaluation. European Journal of Surgery

14. Papadimitriou, J. C., Tsimogiannis, K. (2021). Utility of clinical scoring systems in acute appendicitis A systematic review and meta-analysis. International Journal of Surgery.

15. Sammalkorpi, H. E., Mentula, P., Lepp Cultural, A., & Salinen, P. (2014). Diagnostic performance of imaging compared with scoring systems in acute appendicitis. World Journal of Surgery

16. Sartelli, M., Catena, F., Ansaloni, L., Di Saverio, S., Coccolini, F., Griffiths, E. A., . & Leppäniemi, A. (2018). Complicated Acute Appendicitis: An Update on the Literature. World Journal of Emergency Surgery

17. Lim, J. F., Chong, C. F., & Yap, W. Y. (2025). Comparative study to see RIPASA and Alvarado scores for the diagnosis of acute appendicitis Singapore Medical Journal

18. Chong, C. F., Yap, W. Y., & Adi, M. (2011). Validation of RIPASA score in adults for Asian patients. Surgical Practice

19. Andersson, R. E. (2004). Commentary on clinical and laboratory diagnosis of appendicitis. British Journal of Surgery

20. Flum, D. R., Koepsell, T., & Livingston, E. H. (2002). Trends in outcome and mortality after polytrauma and severe injury. Annals of Surgery