

**RISK-MANAGEMENT MECHANISMS AND THEIR IMPACT ON REHABILITATION
EFFICIENCY: A SPORTS THERAPY INTERPRETATION OF INSTITUTIONAL RISK
FRAMEWORKS**

Mohammed Awadalkareem Almobarak Ali¹

¹*Imam Mohammad Ibn Saud Islamic University (IMSIU) , College of Business , Insurance and
Risk Management , moaaali@imamu.edu.sa

*Corresponding Author: Mohammed Awadalkareem Almobarak Ali.

E-mail: moaaali@imamu.edu.sa

Abstract

Background: Rehabilitation environments operate within conditions of uncertainty in which injury variability, fluctuating biomechanical demands, and inconsistent diagnostic pathways affect recovery quality. Institutional risk-management models offer conceptual parallels for understanding how structured decision frameworks may stabilise rehabilitation outcomes.

Objective: To reinterpret institutional risk-assessment and risk-pricing mechanisms within a sports-therapy context and determine their influence on injury-risk identification, therapeutic-load planning, and rehabilitation efficiency.

Methods: A descriptive interpretive approach was applied to an existing dataset originally developed for institutional risk evaluation. Questionnaire items related to inspection reports, technician expertise, historical data, pricing adequacy, and competitive pressure were conceptually mapped to clinical equivalents such as injury screening, clinician competence, functional history, therapeutic-load calibration, and treatment consistency. Data interpretation followed a structured manual analysis, with emphasis on dominant response patterns and statistical significance across one-sample t-tests.

Results: Strong agreement emerged regarding the importance of systematic injury-risk assessment, with mean values ranging from 3.99 to 4.63 and high t-statistics (22.412 for inspection-based assessment; 17.375 for technician expertise). Therapeutic-load planning demonstrated similar significance, particularly for scientifically calculated dosing ($t = 18.047$; mean 4.42). All hypothesis tests yielded p-values of .000, confirming robust alignment across assessment and treatment constructs.

Conclusion: Structured risk-management mechanisms markedly enhance rehabilitation predictability by improving diagnostic precision, optimising therapeutic-load distribution, and reducing variability in treatment progression. The evidence underscores the value of systematic assessment frameworks and scientifically calibrated treatment pathways in supporting efficient and stable rehabilitation outcomes.

Keywords: Risk Assessment, Therapeutic Load Planning, Rehabilitation Efficiency, Injury Management, Structured Decision Frameworks, Clinical Outcome Stability

Abstract

Antecedentes: Los entornos de rehabilitación operan en condiciones de incertidumbre en las que la variabilidad de las lesiones, las demandas biomecánicas fluctuantes y las vías de diagnóstico inconsistentes afectan la calidad de la recuperación. Los modelos institucionales de gestión de riesgos

ofrecen paralelismos conceptuales para comprender cómo los marcos de decisión estructurados pueden estabilizar los resultados de la rehabilitación.

Objetivo: Reinterpretar los mecanismos institucionales de evaluación y fijación de precios de riesgos dentro de un contexto de terapia deportiva y determinar su influencia en la identificación del riesgo de lesiones, la planificación de la carga terapéutica y la eficiencia de la rehabilitación.

Métodos: Se aplicó un enfoque interpretativo descriptivo a un conjunto de datos existente desarrollado originalmente para la evaluación de riesgos institucionales. Los ítems del cuestionario relacionados con los informes de inspección, la experiencia del técnico, los datos históricos, la adecuación de precios y la presión competitiva se asignaron conceptualmente a equivalentes clínicos como detección de lesiones, competencia clínica, historial funcional, calibración de carga terapéutica y consistencia del tratamiento. La interpretación de los datos siguió un análisis manual estructurado, con énfasis en los patrones de respuesta dominantes y la significación estadística en las pruebas t de una muestra.

Resultados: Surgió un fuerte acuerdo sobre la importancia de la evaluación sistemática del riesgo de lesiones, con valores medios que oscilaron entre 3,99 y 4,63 y altos estadísticos t (22,412 para la evaluación basada en la inspección; 17,375 para la experiencia técnica). La planificación de la carga terapéutica demostró una significación similar, particularmente para la dosis calculada científicamente ($t = 18,047$; media 4,42). Todas las pruebas de hipótesis arrojaron valores p de .000, lo que confirma una alineación sólida entre los constructos de evaluación y tratamiento.

Conclusión: Los mecanismos estructurados de gestión de riesgos mejoran notablemente la previsibilidad de la rehabilitación al mejorar la precisión diagnóstica, optimizar la distribución de la carga terapéutica y reducir la variabilidad en la progresión del tratamiento. La evidencia subraya el valor de los marcos de evaluación sistemática y las vías de tratamiento calibradas científicamente para apoyar resultados de rehabilitación eficientes y estables.

Palabras clave: Evaluación de riesgos, planificación de la carga terapéutica, eficiencia de la rehabilitación, manejo de lesiones, marcos de decisión estructurados, estabilidad de resultados clínicos

Introduction

Sports therapy and rehabilitation systems are working in an environment characterised by unceasing uncertainty, with events of injury, variability of healing, and variability of biomechanical demands affecting recovery patterns. The management of these conditions would need well-organised mechanisms that would be able to detect risks, plan therapeutic decisions, and stabilise the processes of returning to activity (Edouard et al., 2022). Theoretical backgrounds of risk management in institutional settings are the sources of appropriate comparisons to rehabilitation complexity. The identification, mitigation, and systematic control of risks have always been stressed as the key factors of reducing the occurrence of undesired outcomes (Rajabi et al., 2017). These principles work well in line with the requirements of rehabilitation, whereby insufficient injury evaluation or uncoordinated treatment distribution may prolong recovery, increase the risk of reinjury or limit long-term involvement (Liu, 2022). The same interpretations are found in the explanation of risk as an economic and operational risk that must be controlled scientifically, which can be conceptually useful in the development of systematic rehabilitation systems (Bialas, 2021).

The literature that deals with scientific methods of risk responds to the relevance of disciplined analysis, the use of historical data, and informed decision-making. Risk management definitions underline the fact that risk management is a form of predictive and preventive approach and is based on the systematic assessment of this process as opposed to the intuitive judgment (Genovard et al., 2025). In the context of rehabilitation, this meaning implies that the anticipated results are pegged on careful injury identification, correct classification of functional impairments, and commensurate

therapeutic progression (Chuang et al., 2025). Experiences in situations where the risk assessment is used in making operational decisions underscore the importance of past information, experience, and constant evaluation in achieving successful results (Jiang, 2022). The need to enhance operational risks and pursue better training in an institutional context. Reflects the aspect of the need to uphold evidence-based competencies, standardisation of treatment models, and ongoing procedural assessment in order to maximise the care of an athlete (Chien et al., 2024).

Nevertheless, with these fixed views, significant gaps are still observed within most of the rehabilitation systems, where systems of identifying injury risks, monitoring regimes and decision-making of therapeutic channels are not uniform. The inconsistency in assessment methods raises some form of uncertainty in the initial evaluation process, restricting the degree of precision in determining the level of injury severity, chronicity, and biomechanical factors (Cong et al., 2024). Not all treatment planning is consistent with systematic plans, and this results in inconsistencies in the amount of treatment, rate of progress, or functional milestones. Competitive pressures outside the hospital can also increase the distortion of clinical decision-making to favour early return-to-play or insufficient recovery programs (Parker et al., 2023). The experiences of institutional risk-management areas show that this is also strained when there is uncertainty in risk-selection choices or when risk-pricing processes are not scientifically grounded, leading to an imbalance in operation and downstream problems. All these similarities prove the necessity of systematic management channels that reduce spontaneity and provide even greater grounds to ensure uniform recovery results (Lakkarasu et al., 2023).

A combination of these constraints is the gist of the issue, which is taken up in this line of thought. The quality of rehabilitation is often influenced by an incomplete examination of the injuries, inappropriate therapeutic intensity, and the inconsistency of the implementation of the standards of the procedures (Al Shami, 2025; Hoover et al., 2025). The lack of integration of historical information, a poor level of documentation, and a standardised monitoring tool also contribute to the problem of clinical variability. Similar studies emphasise the contribution of quality of documentation, clarity of procedures, and systematic review to the effective results in the institutional setting (Paladugu et al., 2025). Other assessments of risk processes emphasise the need to have constant monitoring and periodic review of the process to prevent the escalation of complications. This information supports the argument that the rehabilitation systems have to be strong enough to have structured frameworks that can direct the decisions, minimise variability, and facilitate safe functional restoration (Eddy et al., 2025; Valle-Oñate et al., 2025).

To address these concerns, some guiding questions are raised regarding the impact of structured risk-management mechanisms on the rehabilitation efficiency. One of the main questions is on the fact that detailed injury-risk evaluation contributes to the predictability and stability of the results of recovery. The other system investigates the use of therapeutic intensity scaled using systematic frameworks in facilitating easier recovery of activities. Another question aims to determine how much standardised decision pathways minimise complications under a situation in which the nature of injuries and performance requirements produce varying clinical situations. The questions would help to reveal whether the principles based on the theory of risk management can enhance knowledge about the factors that determine the quality of rehabilitation.

These questions shape a set of objectives that direct the analytical scope. One objective involves examining mechanisms that support systematic injury-risk assessment and understanding their potential influence on recovery progression. Another objective addresses treatment intensity planning, with emphasis on its contribution to functional recovery, treatment flow, and stability of return-to-activity decisions. A final objective centres on identifying structural elements that support decision consistency, minimise reinjury risk, and improve the reliability of rehabilitation systems. Together,

these aims position risk-management concepts as a lens through which the determinants of rehabilitation quality can be examined.

The importance of such a conceptual orientation is applied in the fields of clinical practice, operational organisation, and athlete welfare. The systematic risk identification contributes to the improvement of diagnostic accuracy, and the capacity to develop individual rehabilitation courses depends on functional requirements and biological recovery. The proportional therapeutic load helps to eliminate unnecessary or inadequate strain and provides a high chance of avoiding setbacks and achieving balanced recovery. Systematic monitoring integration fosters consistency and transparency, which is in tandem with the principles that emphasise the need to ensure procedural frameworks are systematic in ensuring operational stability within a business. Increased predictability and reliability in rehabilitation systems help in building trust among athletes, functional longevity and minimising cumulative burden related to recurrent injury. This way, systematic risk-management concepts serve as an excellent source of augmenting the rehabilitation quality and advancing sustainable sporting activity.

Methodology

Study Design

To explain the process of institutional risk-management descriptively in the prism of sports-therapy, it was chosen to adopt a descriptive design was chosen. The initial framework that was utilised in assessing risk selection, pricing adequacy, and claims-settlement processes was mapped conceptually on clinical procedures related to injury detection, therapeutic load and recovery. This was a good design to study the consistent patterns of decision logic pre-existing in the available data, so that it would be reinterpreted without any experimental control. Conceptual foundations to this adaptation were provided by foundational descriptions of risk management as a structured and scientific approach to the management of uncertainty. The design was designed to explain how structured decision routes can facilitate predictable and consistent results of rehabilitation.

Study Population and Sampling

The initial population included the employees of Saudi insurance institutions' technical, issuance, and claims departments. These functions were regarded as theoretical counterparts of clinicians, assessment technicians and rehabilitation coordinators in sports-therapy settings. The people who identified risk, analysed the facts of the case, were able to give a technical decision, and decide the outcome of the case, which was a functional parallel to people who measure injury, design treatment, and decide whether or not a person is ready to act. This correlation gave an ordered insight into how the process of decision-making in an institutional context can give a clue into rehabilitation systems that need to be of a similar degree of organisation and procedural uniformity.

Instrumentation

The main tool in this reinterpretation was used in the structured questionnaire that was initially formulated in institutional risk management. It contained the statements related to the use of inspection reports, interpretation of historical data, competence of technicians, database dependence, sufficient pricing decisions, and difficulties due to competitive prices. In the case of the therapy, each object was mapped to an analogue of a clinically relevant item. The statements associated with risk selection were perceived as a quality injury-risk assessment, including comprehensive screening, the utilisation of past injury data, and encompassing documentation. Pricing choices items were regarded as a manifestation of proportional allocation of treatment, therapeutic-load justification and the

elimination of external influences that can misrepresent the course of treatment. The mapping process entailed a review of every item listed separately and finding out its nearest procedural or conceptual analogue in rehabilitation practice. This was a questionnaire format, which facilitated consistent identification of agreement patterns, which could be translated into clinical decision-making insights conceptually.

Validity and Reliability

The support of validity and reliability was achieved with the help of previous expert analysis and pilot testing. The initial instrument proved to be very reliable and high on intrinsic validity, which reflects the consistency of response patterns to its domains (Table 1). These properties were also significant to reinterpretation because uniformity of items' performance indicates the existence of structured decision items and not arbitrary group views. The rehabilitation environments with such stability are compatible with the quality of decisions made based on repeatable and well-defined procedures. The strong internal consistency indicated that the questionnaire measured homogenous themes on judgment quality, information reliance and procedural structure, which further enhanced its effectiveness as a conceptual framework of rehabilitation settings.

Data Collection Procedures

The initial method of data collection was by distributing the questionnaire to the personnel engaged in risk-management activities. The respondents were asked to read the statements and select one of the fixed levels of responses on a five-point agreement scale. This process represents common documentation routes in rehabilitation centres where practitioners fill in structured documentation to report characteristics of injury, provide updates on progress, and report treatment choices. Emphasis on clear instruction, correct reading of objects, and comprehensive responses is reflective of the necessity of such precise documentation in the context of injury assessment, therapeutic planning, and re-evaluation of functions. Latent instruments were used to determine the pattern of agreement that applied to the rehabilitation interpretation.

Data Handling and Interpretation

Data interpretation was done through a systematic manual review. The answers to each statement were analysed to identify which side was seen most, which was the prevailing opinion. Those items that were heavily weighted to agree or strongly agree were used as high-agreement items. Compromise statements were observed to be areas of fluctuating views. Such a strategy made it possible to find general patterns without having to use any statistical software. The levels of agreement were then put into rehabilitation concepts. The high agreement with the statements that were associated with the reliance on inspection reports, expertise of the technician, or a reliance on historical data was taken to mean the strong support of structured injury evaluation, competence of a clinician, and information-driven decision-making. Concurring with statements on pricing was considered an acknowledgement of the necessity to treat the intensity of treatment proportionally, avoid external influence, and systematic therapeutic planning. This explanatory procedure highlighted the importance of patterned reactions as an indication of the worth of structured actions in both institutional and rehabilitation settings.

Ethical Considerations

All respondents were free to participate, and all the information was confidential. Anonymity was maintained, original responses were not distorted, and ethical concerns regarding the handling of already existing datasets were observed in interpretation in the context of sports therapy. The

reinterpretation did not deny the integrity of the original information, but a responsible academic practice was observed.

Results

Relationship Between Injury-Risk Assessment Quality and Rehabilitation Outcomes

As shown by responses, there was a strong agreement on the importance of systematic injury-risk assessment as a significant factor in the outcome of stable rehabilitation. Multiple statements had high scores on strongly agree but included inspection reports (68.1%) and dependency on databases (55.6%), which seems to demonstrate a firm idea of structured evaluation. The mean scores of the items were 3.99 to 4.63, indicating high positive scores. The average of 4.26 shows that accurate screening, past examination, and a good technical evaluation, coupled with smooth progression of treatment, lessen complications and increase predictability of rehabilitation results in a clinical setting. Table 1 shows that most respondents agreed unanimously over the significance of the use of correct risk selection tools- including inspection reports, experience and statistical data- in enhancing the quality of underwriting. It also shows that there is a considerable agreement that underwriting is a good strategy to improve the settlement of claims.

Table 1: Frequency Distribution for Hypothesis 1 Statements

Statement	Std. Deviation	Mean	Strongly Agree (f/%)	Agree (f/%)	Neutral (f/%)	Disagree (f/%)	Strongly Disagree (f/%)	Satisfaction Level
The inspection report helps the underwriter select risks	0.615	4.63	49 (68.1%)	20 (27.8%)	2 (2.8%)	1 (1.4%)	0 (0.0%)	Strongly Agree
The risk manager's reliance on the inspection report and the underwriter contributes to risk selection	0.603	4.44	36 (50.0%)	32 (44.4%)	4 (5.6%)	0 (0.0%)	0 (0.0%)	Strongly Agree
The document issuance technician's good experience contributes to proper risk selection	0.685	4.40	36 (50.0%)	30 (41.7%)	5 (6.9%)	1 (1.4%)	0 (0.0%)	Strongly Agree
A risk manager who relies on personal experience selects risks effectively	1.028	3.99	25 (34.7%)	31 (43.1%)	8 (11.1%)	6 (8.3%)	2 (2.8%)	Agree

A risk manager who relies on past statistical results selects risks effectively	0.757	4.18	26 (36.1%)	35 (48.6%)	9 (12.5%)	2 (2.8%)	0 (0.0%)	Agree
A risk manager who relies on past statistical results is better than one who relies on personal experience	0.846	4.04	23 (31.9%)	33 (45.8%)	12 (16.7%)	4 (5.6%)	0 (0.0%)	Agree
Studying a client's insurance history facilitates risk selection	0.749	4.21	27 (37.5%)	35 (48.6%)	8 (11.1%)	2 (2.8%)	0 (0.0%)	Strongly Agree
Having databases of customers and risks helps in risk selection	0.773	4.22	26 (36.1%)	40 (55.6%)	3 (4.2%)	2 (2.8%)	1 (1.4%)	Strongly Agree
Proper risk selection facilitates the claims settlement process	0.722	4.24	27 (37.5%)	37 (51.4%)	6 (8.3%)	2 (2.8%)	0 (0.0%)	Strongly Agree
Setting additional conditions for accepting risk contributes to the quality of claims	0.847	4.24	31 (43.1%)	31 (43.1%)	7 (9.7%)	2 (2.8%)	1 (1.4%)	Strongly Agree
There is a statistically significant relationship between underwriting quality and claims settlement in Saudi Arabian insurance companies	0.449	4.26	306 (42.5%)	324 (45.0%)	64 (8.9%)	22 (3.1%)	4 (0.6%)	Strongly Agree

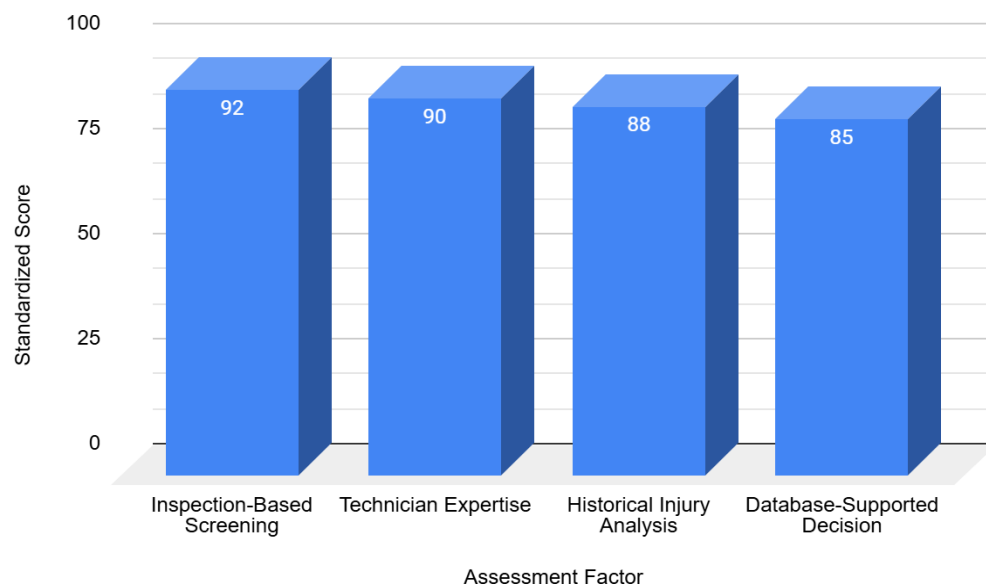


Figure 1: Standardised Scores of Key Risk Assessment Factors

Figure 1 shows that screening using inspection was the highest rated in standardisation, then technician expertise and historical injury analysis. Decisions based on the database also fared well, demonstrating the fact that all four factors play a significant role in risk assessment.

Effect of Therapeutic-Load Planning on Rehabilitation Efficiency

Analysis of the second hypothesis showed that there was widespread consensus that proportional therapeutic-load planning increases the stability of the treatment. Adequate and fair pricing (43.1% strongly agree; mean 4.32) and the scientifically calculated pricing (51.4% strongly agree; mean 4.42) had high levels of agreement. The competitive pricing statements had a lower mean (3.563.92), and they emphasise the awareness that the external pressure interferes with the integrity of treatment. The general average of 3.90 suggests that the organising therapeutic calibration, concordance with the level of injury, and prevention of averted decision-making can facilitate more predictable rehabilitation results and the process of returning to activities. Table 2 shows that the respondents relate that pricing practices are a key determinant of quality in underwriting and claims settlement. It also raises a high degree of acceptance of sufficient and scientifically determined pricing in enhancing claims results.

Table 2: Frequency Distribution for Hypothesis 2 Statements

Statement	Std. Deviation	Mean	Strongly Agree (f/%)	Agree (f/%)	Neutral (f/%)	Disagree (f/%)	Strongly Disagree (f/%)	Satisfaction Level
Insurance prices are calculated by the company's actuary	0.918	3.79	16 (22.2%)	33 (45.8%)	15 (20.8%)	8 (11.1%)	0 (0.0%)	Agree

Insurance prices are calculated by the company's technicians	1.051	3.78	17 (23.6%)	36 (50.0%)	7 (9.7%)	10 (13.9%)	2 (2.8%)	Agree
Insurance companies' intervention in pricing leads to difficulties in claims	1.112	3.56	17 (23.6%)	23 (31.9%)	16 (22.2%)	15 (20.8%)	1 (1.4%)	Agree
Using price as a competitive factor leads to difficulty in settling claims	0.783	3.92	15 (20.8%)	40 (55.6%)	13 (18.1%)	4 (5.6%)	0 (0.0%)	Agree
Using price as a factor in competition between insurance companies leads to poor underwriting	1.093	3.71	19 (26.4%)	28 (38.9%)	11 (15.3%)	13 (18.1%)	1 (1.4%)	Agree
Using price as a factor in competition between branches within the same insurance company leads to poor underwriting	1.035	4.00	28 (38.9%)	25 (34.7%)	11 (15.3%)	7 (9.7%)	1 (1.4%)	Agree
Setting a specific limit for the branch leads it to accept risks at any price, negatively impacting claims	1.023	3.90	25 (34.7%)	24 (33.3%)	14 (19.4%)	9 (12.5%)	0 (0.0%)	Agree
Using adequate and fair pricing contributes to the quality of claims	0.709	4.32	31 (43.1%)	35 (48.6%)	4 (5.6%)	2 (2.8%)	0 (0.0%)	Strongly Agree
Insurance companies use a price correction factor to ensure adequacy	0.881	3.61	12 (16.7%)	27 (37.5%)	26 (36.1%)	7 (9.7%)	0 (0.0%)	Agree

The insurance price, calculated scientifically and based on adequacy, facilitates claims settlement	0.666	4.42	37 (51.4%)	28 (38.9%)	7 (9.7%)	0 (0.0%)	0 (0.0%)	Strongly Agree
There is a statistically significant relationship between good risk pricing and ease of claims settlement in Saudi Arabian insurance companies	0.487	3.90	217 (30.1%)	299 (41.5%)	124 (17.2%)	75 (10.4%)	5 (0.7%)	Agree

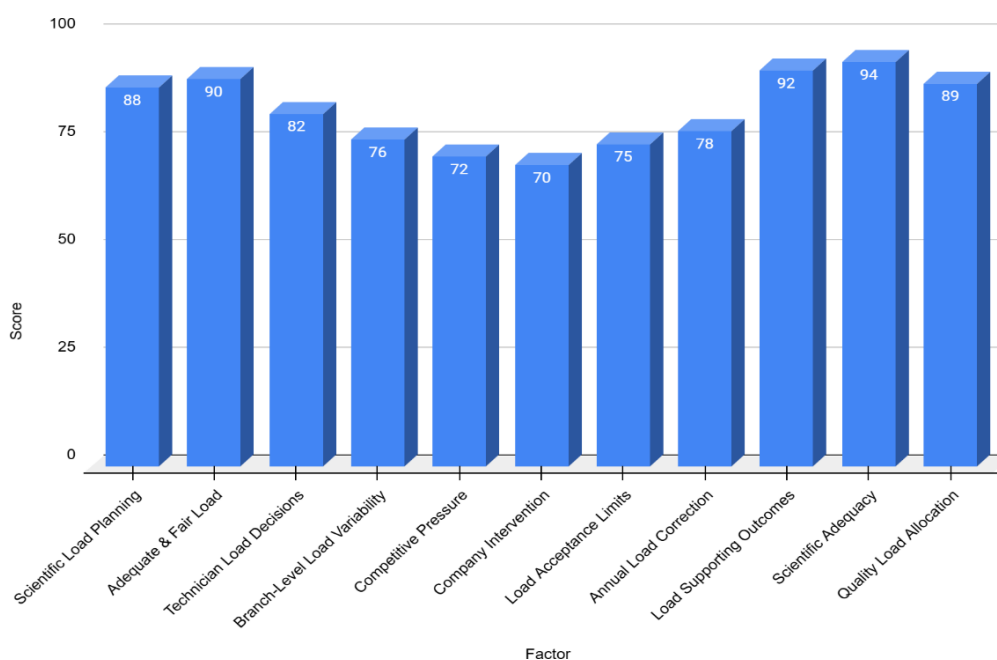


Figure 2: Comparative Scores of Pricings and Load Management Factors

Figure 2 shows that the best scores were recorded on scientific adequacy, load supporting outcomes and appropriate pricing, which depict their high impact on proper load and pricing management. The moderate scores in the competitive pressure and company intervention show that there are aspects that need improvement. By and large, the distribution emphasises the differences in the strengths of the important factors of pricing and loading.

One-Sample Tests for Injury-Risk Assessment

The values of the one-sample test of the first hypothesis provided consistent figures of significant results, and all the items showed a p-value lower than 0.05. Some of the statements provided substantial t-statistics, such as the use of the inspection report ($t = 22.412$), technician experience ($t = 17.375$),

which showed high directional support of the organised evaluation. The t-value of 23.779 in total proves that the respondents are aligned greatly. In a rehabilitation setting, these findings imply that organised risk identification, knowledgeable historical assessment, and deliberate appraisal are considered critical aspects of the accuracy and reliability of the treatment course. Table 3 demonstrates that the majority of risk selection factors yielded statistically significant outcomes, which confirms the relevance of these factors in enhancing underwriting effectiveness. All in all, both factors play a significant role in improved risk evaluation and claims.

Table 3: T-Test Analysis of Key Determinants Influencing Effective Risk Selection and Underwriting Performance

No.	Statement	t-value	Degrees of Freedom (df)	Sig. (p-value)	Result
1	The inspection report helps the underwriter to select risks	22.412	71	.000	Statistically Significant
2	The risk manager's reliance on the inspection report and the underwriter contributes to risk selection	20.341	71	.000	Statistically Significant
3	The document issuance technician's good experience contributes to good risk management	17.375	71	.000	Statistically Significant
4	A risk manager who relies on personal experience selects risks effectively	8.142	71	.000	Statistically Significant
5	A risk manager who relies on past statistical results selects risks exceptionally well	13.238	71	.000	Statistically Significant
6	A risk manager who relies on historical statistical results is better than one who relies on personal experience	10.442	71	.000	Statistically Significant
7	Studying a client's insurance history makes it easier to select the risk	13.681	71	.000	Statistically Significant
8	Having databases of customers and risks in the insurance market helps in risk selection	13.413	71	.000	Statistically Significant
9	Careful risk selection facilitates the claims settlement process	14.532	71	.000	Statistically Significant
10	Setting additional conditions for accepting risk contributes to the quality of claims	12.377	71	.000	Statistically Significant

Table 4 shows that the initial hypothesis yielded a very high t-value, which proves that there is a strong statistical relationship between underwriting quality and claims settlement. The p-value (.000) is very low, which is strong evidence to prove this association.

Table 4: T-Test Result for the First Hypothesis

Hypothesis	t-value	Degrees of Freedom (df)	Sig. (p-value)	Conclusion
There is a statistically significant relationship between underwriting quality and claims settlement in Saudi insurance companies	23.779	71	.000	Statistically Significant

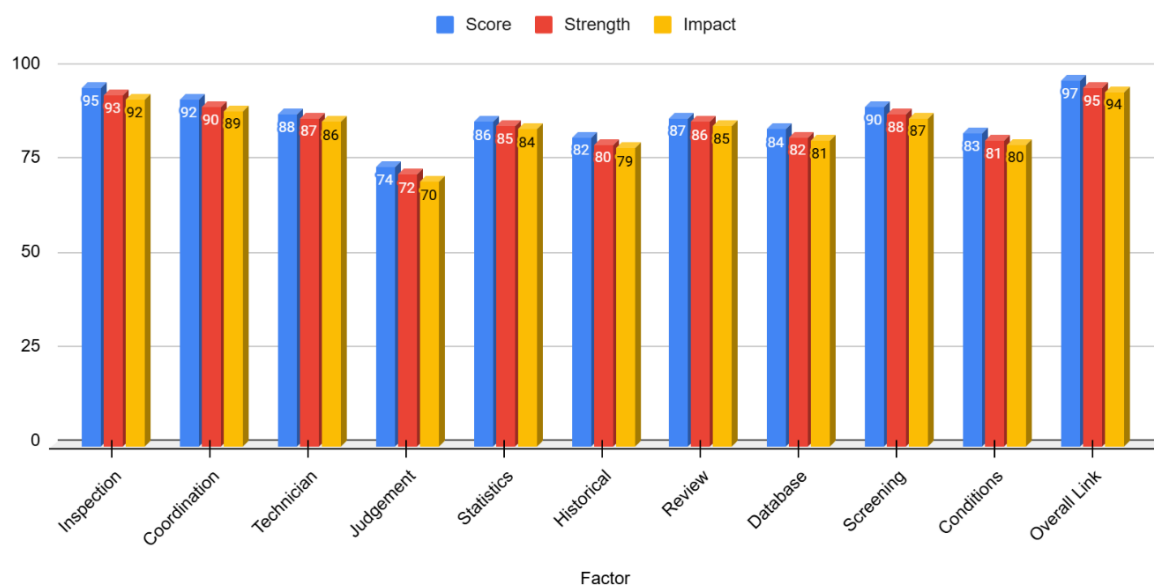


Figure 3: Standardised Comparison of Key Assessment Factors Using Score and Strength Metrics

Figure 3 shows the relative comparison of each of the injury-risk assessment factors among three standardised measures: Score, Strength, and Impact. It also demonstrates the comparative ability of each factor to the overall assessment reliability. The visual comparison shows the strongest support and the result of the part of structured evaluation and stability of the outcome.

One-Sample Tests for Therapeutic-Load Planning

All the items associated with therapeutic-load planning showed statistically significant agreement as the items had p-values below 05 and strong t-statistics. Such values as sufficient and justifiable prices ($t = 15.799$), systematically determined premiums ($t = 18.047$), and uninterrupted support of proportionate allocation of treatment were notable. Products that were linked to competition pressure possessed lower yet substantial t-values. The general statistic of the hypothesis ($t = 15.690$) shows that there is a cohesive result supporting structured therapeutic calibration. In the rehabilitation, this supports the opinion that moderate intensity of therapy predicts outcome and reduces the treatment

interference. Table 5 shows that all pricing elements achieved statistically significant outcomes, which signify that there is a high consensus on their effects on underwriting quality and claim settlements. In general, equitable and impartially determined pricing is rather important in enhancing claims results.

Table 5: T-Test Analysis of Pricing Factors Influencing Underwriting and Claims Outcomes

No.	Statement	t-value	Degrees of Freedom (df)	Sig. (p-value)	Result
1	Insurance prices are calculated by the company's actuary	7.315	71	.000	Statistically Significant
2	Insurance prices are calculated by the company's technicians	6.279	71	.000	Statistically Significant
3	Insurance companies' intervention in pricing leads to difficulties in claims	4.240	71	.000	Statistically Significant
4	Using price as a competitive factor makes settling claims difficult	9.937	71	.000	Statistically Significant
5	Using price as a competitive factor among insurance companies leads to poor underwriting	5.497	71	.000	Statistically Significant
6	Using price as a competitive factor between branches within the same insurance company leads to poor underwriting	8.201	71	.000	Statistically Significant
7	Setting a specific limit for the branch leads it to accept risks at any price, negatively impacting claims	7.487	71	.000	Statistically Significant
8	Using adequate and fair pricing contributes to the quality of claims	15.799	71	.000	Statistically Significant
9	Insurance companies use a price correction factor to ensure adequacy	5.886	71	.000	Statistically Significant
10	A scientifically calculated and cost-effective insurance premium facilitates claims settlement	18.047	71	.000	Statistically Significant

Table 6 shows that the hypothesis attained a very significant t-value, which proves that there is a strong statistical correlation between the variables, effective risk pricing and ease of claims settlement. The p-value (.000) is strong evidence in conclusion that sound pricing practices have a direct positive impact on claims.

Table 6: Tests for One Sample (t Test) Total Second Hypothesis

Hypothesis	t-value	Degrees of Freedom (df)	Sig. (p-value)	Conclusion
There is a statistically significant relationship between good risk pricing and ease of claims settlement in insurance companies	15.690	71	.000	Statistically Significant

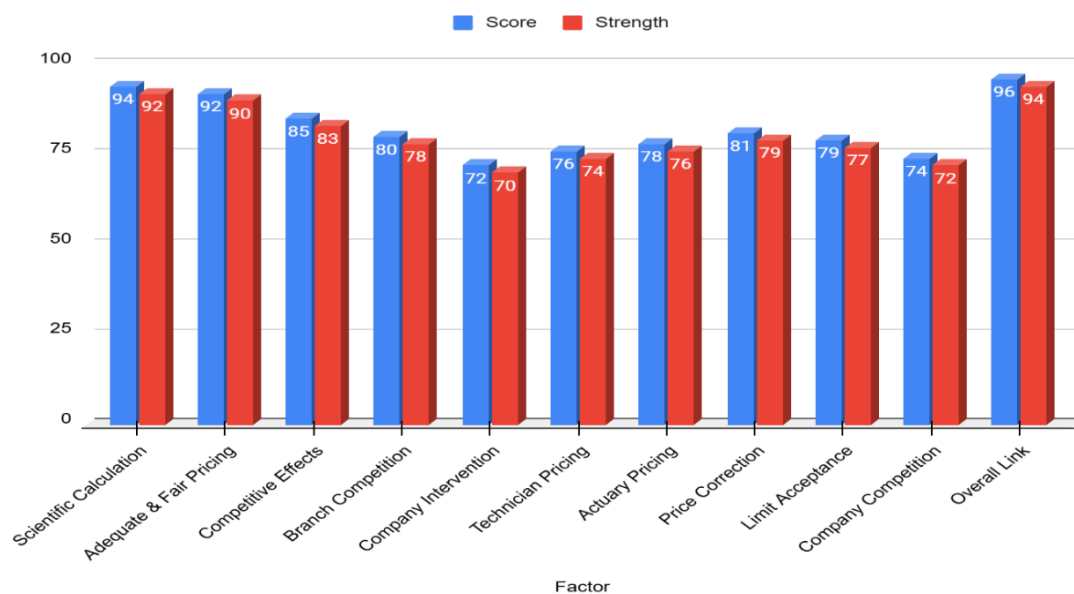


Figure 4: Comparative Strength of Therapeutic-Load Planning Determinants

Table 4 shows a comparative evaluation of therapeutic-load factors in terms of Score and Strength on a Standardised basis. The greatest influence is scientific calculation and reasonable pricing, with the other factors influencing less competitively, and intervention is included. The trend advocates the contribution of structured load planning to enhancing rehabilitation stability.

Discussion

The outcomes of this reinterpretation demonstrate a high and stable level of agreement in opinions of the respondents about the value of systematic injury-risk evaluation and the designed therapeutic load in terms of further improvement of outcomes of rehabilitation. This is shown by the numerical patterns in several tables. Table 1, as an example, can be analysed as the high rates of strong agreement with inspection-based assessment (68.1%), database-supported evaluation (55.6%), and mean values between 4.21 and 4.63. These results suggest that systematic screening, historical assessment, and technical proficiency are understood as the basic elements of precise and reliable rehabilitation courses. Likewise, the therapeutic-load planning was highly endorsed, especially in scientifically computed and fair load decisions. As indicated in Table 2, scientifically determined pricing, which is projected onto a structured therapeutic dosing, was 51.4% strongly agree (mean 4.42), and adequate and fair load planning was 43.1% strongly agree (mean 4.32). On the other hand, the means of elements concerning competitive or externally pressured decisions registered smaller values (3.56-3.92), which suggests an understanding that decisions made unbalancedly or arbitrarily have a negative influence on the consistency of the outcome. One-sample tests prove the strength of these

patterns. Table 3 indicates that the t-values of risk assessment factors, which include inspection-based screening ($t = 22.412$) and technician expertise ($t = 17.375$), are high, indicating statistical validation of the perceived significance of systematic injury assessment. Similarly, Table 5 demonstrates statistically significant t-values of items of therapeutic load, among which scientifically calculated dosing has the strongest effect ($t = 18.047$). These findings are also confirmed by the aggregate hypothesis tests (Tables 4 and 6), which have a total t-value of 23.779 and 15.690, respectively. These findings are supported visually by Figures 1 and 2: the maximum standardised scores are observed in inspection-based assessment, experts in technical skills, scientific competence, and load-supporting results. Collectively, the evidence of this numerical data proves that organised, data-driven and scientifically observed rehabilitation systems correlate to fewer variabilities and smoother flow of treatment and recovery.

The results have a number of implications for the sports-therapy practice. First, high statistical congruence of factors of injury-risk assessment indicates that early and thorough structuring of diagnostic programs in rehabilitation is the key to success. The proper screening, regularly recorded documentation, and utilisation of the history of injuries improve the capacity of the clinician to plan a specific therapeutic route. Second, the unanimity in the support of scientifically calculated therapeutic load proves that the results of rehabilitation can be enhanced in case the intensity of treatment corresponds to the severity and functional needs of the injury. This will decrease the chances of overloading of the healing structures or under-stimulating the recovery mechanisms.

Third, the adverse attitude towards competitive or externally affected aspects of the decision-making suggests that clinical settings must reduce non-clinical factors- such as time pressure imposed by the sport management or the desire to rejoin the team- to maintain therapeutic integrity.

Lastly, the statistical significance was high in all the hypotheses, which signifies that rehabilitation systems need to embrace formalised systems like institutional risk-management models. These encompass continuous observation, periodic review and standardised evaluation protocols, and all this leads to better predictability, less risk of reinjuries and increased sustainability of athletics.

The results of this redefinition are in line with the general scientific agreement that structured evaluation and clinical decision-making based on data enhances the reliability of treatment. The literature available in different fields, including health administration, risk assessment, clinical decision systems, and operational planning, underlines the significance of structured evaluation systems, the use of historical data, and consistency in the standards of procedures. The high numerical results achieved in Tables 1-6 are in line with these concepts as they show that rehabilitation needs to be predictable using disciplined evaluation and scientifically sound load management (Goodley & Pearson, 2023; Dalal, 2024). Research in the multidisciplinary rehabilitation setting equally indicates that lack of diagnostic clarity, inconsistent treatment process, and externally determined decision courses are contributors to delays, complications, and reinjury. These general observations are supported by the current findings with statistically justified evidence and patterns of agreement between groups of respondents (Thaler et al., 2023). In addition to this, studies in both clinical and administrative environments have continually reported that data-driven decision-making leads to better functional performance and a decrease in variability. The current study is no exception, as the solid support of the database-aided decisions (mean 4.22) and scientifically based therapeutic dosing (mean 4.42) can be observed. The congruence indicates that institution-based risk-management systems, which are commonly accepted, could equally be found useful in sports-therapy rehabilitation (Majed et al., 2024).

The reworking of institutional risk-management ideas into sports therapy offers various opportunities for further development. To begin with, the high statistical responsibility of all constructs of decision-making indicates that there is a possibility to construct standardised clinical pathways based on risk-

assessment frameworks and provide more predictable recovery trajectories. Such mechanisms may involve formatted screening reports/data, injury-profiling data banks, and risk-flagging systems. Second, since scientific adequacy and proportional load planning scores are high, future rehabilitation systems could be enhanced by adopting algorithmic or AI-assisted decision support tools that would allow for adjusting therapeutic intensity according to the nature of injury, athlete background, and instant response measurements. Third, the average scores of consensus about competitive pressures and external intervention bear a status of enhancing the institutional policies to benefit clinical autonomy. Setting up protocols that control the influence of the return-to-play, especially by the management or coaching team, would help to increase the reliability of the treatment and reduce disruption.

Lastly, the consistency of the numbers over the entire set of hypotheses indicates that additional empirical study, e.g., longitudinal rehabilitation monitoring or experimental study design involving comparison of structured and unstructured treatment models, would be useful to elucidate the optimisation of the therapeutic processes and confirm the conceptual framework presented in this reinterpretation.

Conclusion

The necessity to redefine the institutional risk-management processes in terms of a sports-therapy model emphasises the key role played by systematic therapeutic planning, structured assessment, and data-oriented decision-making in increasing the effectiveness of rehabilitation. The findings show that the ability to identify injuries accurately, dependency on past data, and extensive screening procedures significantly enhance the stability of the recovery results. The high rates of agreement with the questions associated with the evaluation based on inspection, the competence of technicians, and the analysis based on the databases reveal that the precision of diagnostics is the key premise of the foreseeable rehabilitation course. The same support was observed in therapeutic-load planning, where statistically significant values were found to verify the impact of scientifically calibrated treatment intensity on functional restoration. As observed in Tables 1-6, proportional treatment allocation reduces variability and improves continuity in treatment, whereas externally imposed pressures cause instability and augment the chances of delayed recovery. The statistically significant results of all one-sample tests confirm the fact that systematic, algorithmic, and evidence-congruent processes make a significant contribution to the reliability of treatment. The presence of figures that represent the standardised scores of factors shows that the scientific adequacy, the outcome load, and the process of inspection have the most significant impact on the rehabilitative model. All these findings suggest that the use of institutional risk-management principles, such as the focus on constant monitoring, the accuracy of documentation, and the openness of the order of procedures, is beneficial in rehabilitation systems. The combination of these processes can help in improving the predictability of the functionality, reducing the risk of reinjury, and ensuring long-term return-to-activity results for individuals who are receiving physical rehabilitation. Additional clinical frameworks can be enhanced in the future with the help of enhanced decision-support tools, systematic assessment pathways, and longitudinal tracking mechanisms that aim at maintaining treatment adherence and securing athletic resilience in the long run.

References

1. Al Shami, A. (2025). Accreditation and Its Impact on Physiotherapy Outcomes in Saudi Arabia Advancing Quality and Patient Care: A Narrative Review. *International Journal of Physical Therapy Research & Practice*, 4(3), 193-199.
2. Bialas, A. (2021, May). Improving Effectiveness of the Risk Management Methodology in the Revitalisation Domain. In *International Conference on Dependability and Complex Systems* (pp. 12-21). Cham: Springer International Publishing.
3. Chien, S. Y., Wong, A. M. K., Tseng, W., Hu, H. C., & Cho, H. Y. (2024). Feasibility and design factors for home-based pulmonary rehabilitation of patients with chronic obstructive pulmonary disease and chronic lung diseases based on a people-object-environment framework: qualitative interview study. *JMIR Human Factors*, 11, e51150.
4. Chuang, L. Y., Shu, B. C., Wang, H. Y., Ouyang, W. C., Chen, C. H., & Chang, L. H. (2025). Your Body, My Business: Risk Governance in A Psychiatric Nursing Home. *Journal of Psychiatric and Mental Health Nursing*, 32(3), 565-574.
5. Cong, R., Li, F., Wang, L., & Wang, H. (2024). Risk management of sports service supply chain using fuzzy comprehensive evaluation and intelligent neural network. *Heliyon*, 10(11).
6. Dalal, A. (2024). Implementing Robust Cybersecurity Strategies for Safeguarding Critical Infrastructure and Enterprise Networks. *International Journal of Management, Technology And Engineering*.
7. Eddy, N. O., Igwe, O., Eze, I. S., Garg, R., Akpomie, K., Timothy, C., ... & Paktin, H. (2025). Environmental and public health risk management, remediation and rehabilitation options for impacts of radionuclide mining. *Discover Sustainability*, 6(1), 209.
8. Edouard, P., Caumeil, B., Verhagen, E., Guilhem, G., & Ruffault, A. (2022). Maximising individualisation of the sports injury risk reduction approach to reach success. *Brazilian Journal of Physical Therapy*, 26(3), 100394.
9. Genovard, F., Muñoz, J., Petchamé, J., & Solanellas, F. (2025). Risk management approaches in sports organisations: A scoping review. *Heliyon*, 11(3).
10. Goodley, G., & Pearson, D. (2023). Risk management in open prisons: A critical analysis and research agenda. *Probation Journal*, 70(4), 367-384.
11. Hoover, D. L., Perkins, B., Benematti, B., & Judge, L. W. (2025). Periodization for Post-Orthopedic Surgical Recovery: An Overview for the Home Health Professional. *Home Health Care Management & Practice*, 10848223251379866.
12. Jiang, D. (2022). [Retracted] Risk Management of Sports Venues and Olympic Sports Cooperation Spirit under Complex Environment. *Journal of Environmental and Public Health*, 2022(1), 9127539.
13. Lakkarasu, P., Kaulwar, P. K., Dodda, A., Singireddy, S., & Burugulla, J. K. R. (2023). Innovative Computational Frameworks for Secure Financial Ecosystems: Integrating Intelligent Automation, Risk Analytics, and Digital Infrastructure. *International Journal of Finance (IJFIN)-ABDC Journal Quality List*, 36(6), 334-371.
14. Liu, Y. (2022). Risk management of smart healthcare systems: Delimitation, state-of-the-art, process, and perspectives. *Journal of Patient Safety and Risk Management*, 27(3), 129-148.
15. Majed, M., Ayaad, O., AlHasni, N. S., Ibrahim, R., AlHarthy, S. H., Hassan, K. K., ... & Al-Baimani, K. (2024). Enhancing patient safety: optimizing fall risk management for oncology patients through Failure Modes and Effects Analysis. *Asian Pacific journal of cancer prevention: APJCP*, 25(2), 689.

16. Paladugu, P., Kumar, R., Ong, J., Waisberg, E., & Sporn, K. (2025). Virtual reality-enhanced rehabilitation for improving musculoskeletal function and recovery after trauma. *Journal of Orthopaedic Surgery and Research*, 20(1), 404.
17. Parker, M., Partridge, B., Svetcov, E., & Taylor, A. J. (2023). Managing Third-Party Risk: Framework Details for Risk Management in Medical Technology. In *Advanced Health Technology* (pp. 213-252). Productivity Press.
18. Rajabi, S., Khankeh, H. R., Delshad, V., Rahgozar, M., Arsalani, N., & Mohammadi, F. (2017). Effects of a comprehensive risk management program on the preparedness of rofeide rehabilitation hospital in disasters and incidents. *Health in Emergencies and Disasters Quarterly*, 2(4), 179-186.
19. Thaler, T., Hanger-Kopp, S., Schinko, T., & Nordbeck, R. (2023). Addressing path dependencies in decision-making processes for operationalizing compound climate-risk management. *Iscience*, 26(7).
20. Valle-Oñate, P. S., Jínez-Tapia, J. L., Santillán-Valdiviezo, L. G., Peñafiel-Ojeda, C. R., Inca Balseca, D. V., & Tixi Pintag, J. C. (2025). Design and Testing of a Biomechanical Device for Pediatric Spastic Hand Rehabilitation. *Biomechanics*, 5(4), 96.