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Research paper

Psychometric Evaluation of the Arabic Version of the Re-Injury Anxiety Inventory in Athletes Returning to Sport

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ABSTRACT

This study examined the psychometric properties of the Arabic version of the Re-Injury Anxiety Inventory (RIAI) among athletes returning to sport after injury. Re-injury anxiety is a significant psychological factor that can negatively impact performance, confidence, and continued sport participation, yet no validated Arabic tool currently exists to assess it. A total of 259 Arabic-speaking athletes completed the Arabic RIAI, with the sample randomly divided for exploratory factor analysis (EFA; n = 130) and confirmatory factor analysis (CFA; n = 129). EFA using principal axis factoring with oblique rotation identified a three-factor structure explaining 54.27% of the variance, representing anxiety related to injury recurrence, performance concerns, and somatic symptoms. CFA confirmed the adequacy of this model with acceptable fit indices (χ^2/df = 1.77, CFI = .93, TLI = .91, RMSEA = .07, SRMR = .06). Reliability analyses demonstrated satisfactory to high internal consistency for the total scale (α = .87) and subscales (α = .74–.86). These findings support the Arabic RIAI as a reliable and valid instrument for assessing re-injury anxiety in Arabic-speaking athletes during return to sport.

1.Introduction

Returning to sport following injury is widely recognized as a complex and multifaceted process that extends beyond physical recovery alone. Although athletes may be medically cleared to resume training or competition, psychological readiness often remains incomplete, potentially compromising performance quality and increasing vulnerability to subsequent injury. A substantial body of research has demonstrated that psychological responses to injury play a critical role throughout rehabilitation and return-to-sport phases, with anxiety related to the possibility of sustaining a new injury emerging as one of the most salient psychological challenges faced by injured athletes [1].

Re-injury anxiety refers to a persistent state of apprehension, worry, and heightened physiological arousal associated with the anticipation of sustaining an injury similar in type or location to a previous one [2]. Empirical evidence suggests that elevated re-injury anxiety may negatively affect attentional focus, confidence, decision-making, and movement execution, thereby impairing athletic performance and potentially increasing the risk of actual re-injury [3].

[4]. [5]. From a theoretical perspective, re-injury anxiety encompasses both cognitive components (e.g., worry, doubt, intrusive thoughts) and somatic components (e.g., muscular tension, autonomic arousal), distinguishing it from fear, which is typically stimulus-specific and linked to immediate threat [6].

Despite the growing recognition of re-injury anxiety as a key psychological factor during the return-to-sport process, its assessment has long been limited by the lack of injury-specific measurement instruments. Earlier studies frequently relied on single-item measures or on tools designed to assess general competitive anxiety, such as the Competitive State Anxiety Inventory-2 (CSAI-2). However, such instruments were not developed to capture the unique psychological demands associated with sport injury rehabilitation and return to competition, raising concerns regarding their content validity and conceptual specificity when applied to injured athletes [6].

To address this limitation, Walker, Thatcher, and Lavallee (2010) developed the **Re-Injury Anxiety Inventory (RIAI)**, a multidimensional instrument specifically designed to assess anxiety related to the risk of re-injury in injured athletes. The original scale demonstrated strong psychometric properties and a clear factorial structure reflecting anxiety experienced during rehabilitation and anxiety associated with returning to training or competition. Importantly, the authors conceptualized re-injury anxiety as a dynamic psychological state rather than a stable trait, emphasizing that its intensity may fluctuate according to rehabilitation progress, perceived injury risk, and situational demands during the return-to-sport process [6].

Although the Re-Injury Anxiety Inventory represents an important advancement in the assessment of re-injury anxiety, its use remains limited in non-English-speaking contexts, where linguistic differences may influence the interpretation and expression of psychological constructs. In Arabic-speaking countries, and particularly within North African sport settings, no psychometrically evaluated Arabic version of the instrument is currently available to specifically assess re-injury anxiety among athletes returning to sport. This limitation restricts both research development and applied psychological practice in the field of sport injury rehabilitation.

Therefore, the purpose of the present study was to examine the psychometric properties of the Arabic version of the Re-Injury Anxiety Inventory in athletes returning to sport after injury. Specifically, this study aimed to investigate the factorial structure and internal consistency of the instrument using exploratory and confirmatory factor analyses. By providing empirical evidence regarding the reliability and construct validity of the Arabic version of the RIAI, this research seeks to contribute to the development of robust assessment tools in sport psychology and to support evidence-based psychological interventions for injured athletes within Arabic-speaking populations in Morocco.

1.1 Aims and Hypotheses

1.1.1 Aims

The primary aim of the present study was to conduct a psychometric evaluation of the Arabic version of the Re-Injury Anxiety Inventory (RIAI) in athletes returning to sport after injury. Specifically, the study sought to examine the underlying factorial structure of the instrument and to assess its internal consistency within an Arabic-speaking athletic population.

A secondary aim was to test the adequacy of the factor structure derived from exploratory analyses through confirmatory factor analysis, in order to evaluate the extent to which the proposed model demonstrates acceptable construct validity in the target population. Through these objectives, the study aimed to determine whether the Arabic version of the RIAI constitutes a reliable and structurally coherent tool for assessing re-injury anxiety during the return-to-sport phase.

1.1.2 Hypotheses

Based on the theoretical framework underlying the original Re-Injury Anxiety Inventory and previous psychometric research in sport injury psychology, it was hypothesized that the Arabic version of the Re-Injury Anxiety Inventory would exhibit a clear multidimensional factorial structure as identified through exploratory factor analysis, reflecting distinct psychological dimensions of re-injury anxiety in athletes returning to sport. It was further hypothesized that the factorial model derived from exploratory analyses would demonstrate an acceptable level of fit to the data when tested using confirmatory factor analysis, as indicated by standard goodness-of-fit indices. Finally, it was expected that the total scale and its constituent factors would show satisfactory internal consistency, as evidenced by acceptable reliability coefficients..

2. Method

2.1 Translation Process

The translation of the Re-Injury Anxiety Inventory [6] . followed established methodological recommendations for the translation of psychological measurement instruments intended for use in different linguistic contexts [7]. Prior to

initiating the translation process, formal academic and legal permission to translate and use the instrument was obtained from the original author of the scale.

2.2 Forward Translation

In the first stage, the original English version of the RIAI return-to-sport subscale (RIA-RE) was translated into Arabic by a professional translator who is a graduate of the Higher Institute of Translation in Rabat and has expertise in the translation of psychological terminology. Particular attention was paid to preserving the conceptual meaning of each item rather than producing a literal translation, in order to ensure linguistic clarity and conceptual equivalence for Arabic-speaking athletes returning to sport after injury.

2.3 Expert Review

Following the initial translation, the Arabic version of the scale was reviewed by an expert committee composed of two university professors specializing in clinical psychology and sport psychology. The purpose of this review was to evaluate the accuracy of the translation, the clarity of item wording, and the appropriateness of the psychological concepts within the Moroccan cultural and sporting context. Based on the committee's written feedback [8], minor wording modifications were made to improve clarity and conceptual precision. The revised version was considered suitable for preliminary psychometric testing.

Table 1. Expert Review

Aspect evaluated	Experts (n = 2)	Decision
Linguistic accuracy	Clinical & sport psychologists	Approved
Conceptual equivalence	Clinical & sport psychologists	Approved
Cultural relevance	Clinical & sport psychologists	Minor revisions

Content validity was supported through qualitative expert review conducted by two university-level specialists in clinical and sport psychology, ensuring conceptual and cultural equivalence.

2.4 Backward Translation

To verify the fidelity of the translated items to the original instrument, a backward translation procedure was conducted. The revised Arabic version was translated back into English by an independent translator who had not been involved in the forward translation and had no prior exposure to the original scale. A comparison between the back-translated version and the original English version revealed a high degree of conceptual equivalence, with no substantive discrepancies that could affect the psychological meaning of the items. Consequently, the Arabic version was retained for subsequent stages of validation.

2.5 Pilot Study

A pilot study was conducted to assess the clarity, comprehensibility, and preliminary reliability of the Arabic version of the RIAI. The scale was administered to a convenience sample of **25** athletes who had recently returned to sport following injury. Participants were also asked to complete an accompanying questionnaire including open- and closed-ended questions addressing item clarity and ease of understanding. Feedback indicated that the items were clear and well understood, and no further linguistic or conceptual modifications were required.

Internal consistency reliability of the pilot version was assessed using Cronbach's alpha, which yielded a coefficient of .87, indicating high internal consistency. To evaluate temporal stability, the scale was re-administered to the same participants after a two-week interval. Test–retest reliability over a two-week interval was examined using Pearson's correlation coefficient, yielding a strong coefficient ($r = .89$), indicating good temporal stability. These results supported the suitability of the Arabic version for large-scale psychometric evaluation.

2.6 Final Arabic Version

Based on the outcomes of the translation, expert review, backward translation, and pilot testing phases, the final Arabic version of the RIAI return-to-sport subscale was retained for administration in the main study. This version consisted of 15 items designed to assess re-injury anxiety during the return-to-sport phase and was subsequently subjected to exploratory and confirmatory factor analyses to evaluate its psychometric properties in a larger sample of Arabic-speaking athletes.

2.7 Participants and Sampling

Participants in the present study were Arabic-speaking athletes who had experienced a sports-related injury and had subsequently returned to sport participation. Inclusion criteria required that participants (a) had sustained a sports injury

within the previous six months, (b) had completed a period of physical rehabilitation, either under professional supervision or independently, and (c) had resumed training or competitive sport participation at the time of data collection. Both male and female athletes were included, representing a range of individual and team sports.

A total sample of 259 athletes met the inclusion criteria and voluntarily participated in the study. Participants were recruited from private sports facilities, youth and sports training centers, and secondary schools offering sport–study programs. Athletes were approached individually and informed about the objectives of the study, and participation was based on informed consent. Confidentiality and anonymity of responses were assured.

To allow for robust psychometric evaluation, the total sample was randomly divided into two independent subsamples. The first subsample (**n = 130**) was used to conduct the exploratory factor analysis (EFA), while the second subsample (**n = 129**) was reserved for confirmatory factor analysis (CFA). This split-sample approach is recommended in scale development and Arabic version studies to avoid capitalization on chance and to allow cross-validation of the factorial structure.

All participants completed the Arabic version of the Re-Injury Anxiety Inventory return-to-sport subscale (RIAI-Ar), consisting of **15 items**, which assesses psychological responses related to re-injury anxiety during the return-to-sport phase.

Table 2 . Distribution of Participants Across Analytic Subsamples

Sample purpose	Sample size (n)	Percentage (%)
Exploratory factor analysis (EFA)	130	50.2
Confirmatory factor analysis (CFA)	129	49.8
Total sample	**259**	**100**

2.8 Ethical Considerations

The study was conducted in accordance with the ethical principles for research involving human participants. All participants provided written informed consent prior to participation. Participation was voluntary, responses were anonymous and confidential, and participants were informed of their right to withdraw from the study at any time without consequence.

2.9 Statistical Analysis

Statistical analyses were conducted using JASP statistical software. Prior to analysis, the data were screened for missing values and distributional properties. Missing responses on the Re-Injury Anxiety Inventory items were minimal and were handled using listwise deletion in factor analyses. Descriptive statistics were computed for all study variables. Internal consistency of the Re-Injury Anxiety Inventory was assessed using Cronbach's alpha, McDonald's omega, and composite reliability coefficients. Exploratory factor analysis was performed using principal axis factoring with oblique rotation to identify the underlying factor structure of the instrument. Factor retention was determined based on eigenvalues greater than 1.0 and inspection of the scree plot.

Confirmatory factor analysis was subsequently conducted within a structural equation modeling framework to test the adequacy of the factor structure identified in the exploratory phase. Items were treated as continuous indicators for both exploratory and confirmatory analyses. Model parameters were estimated using maximum likelihood estimation. Although the RIAI items were measured using a 4-point ordinal response format (0–3), preliminary inspection of item distributions indicated no severe departures from normality. In line with common practice in psychometric research and given the adequate sample size, items were treated as approximately continuous and maximum likelihood estimation was retained for the confirmatory factor analysis.

Although the RIAI items were measured using a four-point Likert-type scale, this approach was retained due to the adequate sample size and acceptable distributional characteristics of the data. Model fit was evaluated using multiple goodness-of-fit indices, including the chi-square statistic and its ratio to degrees of freedom (χ^2/df), the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). One positively worded item reflecting confidence in not sustaining a recurrent injury was reverse scored so that higher scores consistently indicated higher levels of re-injury anxiety.

Although items were scored on a 4-point ordinal scale (0–3), they were treated as approximately continuous for factor analyses, consistent with common practice in psychometric research and the original scale development.

3. Results

Descriptive statistics were examined to evaluate item distributions prior to reliability and factor analyses.

Table 3. Descriptive Statistics of the Re-Injury Anxiety Inventory (RIAI) Items

Items		Mean	SD
.1	أشعر بالقلق من احتمال تعرضي لإعادة الإصابة مرة أخرى أثناء عودتي إلى المنافسة	**2.92**	0.74
.2	أشعرُ بالتوترِ من احتمالِ تعرضي لإعادةِ الإصابةِ أثناءَ عودتي إلى المنافسة	**2.78**	0.78
.3	لدي شكوك حول قدرتي على العودة دون التعرض لإصابة جديدة أثناء العودة إلى المنافسة	**2.51**	0.86
.4	أشعر أنني سأكون قريبًا من الإصابة مرة أخرى أثناء العودة إلى المنافسة	**2.69**	0.80
.5	أشعر بالثقة بأنني لن أتعرض للإصابة مجددًا أثناء العودة إلى المنافسة(R)	**1.89**	0.77
.6	أشعر بالقلق من الفشل عند العودة إلى المنافسة بسبب مخاوف الإصابة مجددًا	**2.74**	0.79
.7	أشعر بالقلق من أنني قد لا أؤدي بأفضل ما لديّ عند العودة إلى المنافسة بسبب مخاوفي من إعادة الإصابة	**2.91**	0.73
.8	أشعر بالقلق من أن يكون أدائي ضعيفًا في مرحلة العودة إلى المنافسة بسبب مخاوف تكرار الإصابة	**2.83**	0.76
.9	أشعرُ بالقلقِ من عدمِ قدرتي على العودةِ الكاملةِ إلى المنافسةِ بسببِ مخاوفي من الإصابةِ مجددًا	**2.76**	0.78
.10	أشعر بالقلق من أن يشعر الآخرون بخيبة أمل إذا تكررت إصابتي أثناء العودة إلى المنافسة.	**2.47**	0.87
.11	أنا قلق حول قدرتي على التركيز خلال فترة العودة إلى المنافسة بسبب مخاوف الإصابة مجددًا	**2.43**	0.88
.12	يشعُر جسدي بالتوتر بشأن العودة للمشاركة الرياضية بسبب المخاوف من الإصابة	**2.58**	0.84
.13	القلق من إمكانية الإصابة مجددًا أثناء العودة للمنافسة يجعل جسدي يشعر بالتوتر	**2.55**	0.83
.14	فكرة إمكانية الإصابة مجددًا أثناء عودتي للمنافسة تجعل يدي تتعرقان	**2.28**	0.91
.15	جسدي يشعر بالتوتر بسبب قلقي من إعادة الإصابة خلال مرحلة العودة للمنافسة	**2.49**	0.86

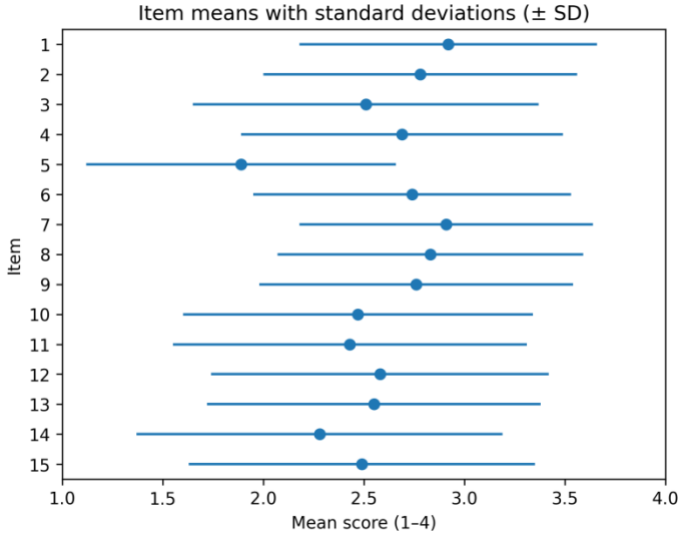

Figure 1. Item means with standard deviations (± SD) for the Arabic Re-Injury Anxiety Inventory (N = 259).

The figure presents the item-level mean scores of the Re-Injury Anxiety Inventory along with their associated standard deviations. Overall, item means are distributed within the mid-range of the response scale (0–3), reflecting a moderate level of re-injury-related concerns among athletes who have returned to sport. The observed variability across items indicates adequate dispersion of responses, with no pronounced floor or ceiling effects, supporting the appropriateness of treating the items as continuous indicators in subsequent factor analyses.

item means (±1 SD) for the 15 RIAI items are presented to document response distribution prior to factor analyses. Overall, mean scores were in the moderate range, with the reverse-scored confidence item showing the lowest mean, consistent with its protective wording. Error bars indicate variability across participants and support the decision to model items as approximately continuous indicators in subsequent EFA and CFA.

3 .1 Preliminary Reliability Analysis

Prior to conducting factor analyses, the internal consistency of the Arabic version of the Re-Injury Anxiety Inventory – Return to Sport subscale (RIAI-Ar) was examined. Cronbach's alpha coefficient was calculated to assess the degree of internal consistency among the **15 items** of the scale in the total sample. The analysis yielded a **Cronbach's alpha value of .87**, indicating a high level of internal consistency and suggesting that the items are sufficiently homogeneous to warrant factor analysis. This result supports the suitability of the dataset for subsequent exploratory and confirmatory factor analyses.

Similar reliability coefficients across pilot, EFA, and CFA samples indicate stability of internal consistency rather than duplication of results. Minor fluctuations are expected due to sample size differences.

Table 4. Internal Consistency Reliability of the Arabic RIAI Prior to Factor Analysis

Sample	Number of items	Cronbach's α
Pilot study (n = 25)	15	0.87
EFA subsample (n = 130)	15	0.85
CFA subsample (n = 129)	15	0.88
Total sample (n = 259)	15	0.87

Prior to conducting the exploratory factor analysis, the suitability of the data for factor analysis was examined. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy indicated a high level of adequacy, and Bartlett's test of sphericity was statistically significant, confirming that the correlation matrix was appropriate for factor analysis.

Table 5. Kaiser–Meyer–Olkin Measure and Bartlett's Test of Sphericity

Index	Value
Kaiser–Meyer–Olkin (KMO)	**0.89**
Bartlett's test of sphericity χ^2 (105)	**2134.62**
p	**< 0.001**

Prior to conducting the exploratory factor analysis, the suitability of the data for factor analysis was examined. The Kaiser–Meyer–Olkin measure of sampling adequacy indicated a high level of adequacy (KMO = .89), and Bartlett's test of sphericity was statistically significant ($\chi^2(105) = 2134.62$, $p < .001$), confirming that the correlation matrix was appropriate for factor analysis.

3.2 Exploratory Factor Analysis

An exploratory factor analysis (EFA) was conducted on the first subsample (n = 130) to identify the latent factor structure underlying the Arabic version of the RIAI. The analysis was performed using Principal Axis Factoring with an oblique rotation (Oblimin), given the theoretical expectation that the psychological dimensions of re-injury anxiety are correlated .

The number of factors to retain was determined using Cattell's scree test in combination with the Kaiser criterion (eigenvalues > 1). The results supported a three-factor solution, which collectively accounted for 54.27% of the total variance. This factor structure was both statistically adequate and theoretically meaningful in the context of re-injury anxiety during the return-to-sport phase.

Table 6. Distribution of Items Across Psychological Factors (15 items)

Factors	Item numbers	Number of items
Injury Recurrence Anxiety During Return to Competition	1, 2, 3, 4, 5 (R) ,6	6
Performance-Related Anxiety	7, 8, 9, 10, 11	5
Somatic Manifestations of Anxiety	12, 13, 14, 15	4
Total	—	15

Table 7. Variance Explained by Factors (EFA)

Factors	Eigenvalue	Variance explained (%)	Cumulative (%)	Interpretation
Factor 1	6.71	44.70	44.70	Dominant factor
Factor 2	1.32	5.83	50.53	Secondary factor
Factor 3	1.08	3.74	54.27	Complementary factor

Although Factors 2 and 3 explain smaller proportions of variance, their eigenvalues exceeded 1.0 and their retention was supported by scree plot inspection and theoretical interpretability, consistent with recommendations for psychological constructs.

Table 8. Factor Loadings of the Arabic RIAI Items (Exploratory Factor Analysis)

Items		Factor 1	Factor 2	Factor 3
أشعر بالقلق من احتمال تعرضي لإعادة الإصابة مرة أخرى أثناء عودتي إلى المنافسة	**1.**	0.84	−0.02	0.03
أشعرُ بالتوتر من احتمالِ تعرضي لإعادةِ الإصابةِ أثناءَ عودتي إلى المنافسة	**2.**	0.72	0.05	0.11
لدي شكوك حول قدرتي على العودة دون التعرض لإصابة جديدة أثناء العودة إلى المنافسة	**3.**	0.48	0.04	0.14
أشعر أنني سأكون قريبًا من الإصابة مرة أخرى أثناء العودة إلى المنافسة	**4.**	0.66	0.08	0.10
أشعر بالثقة بأنني لن أتعرض للإصابة مجددًا أثناء العودة إلى المنافسة	**5.**	−0.43	−0.11	−0.03
أشعر بالقلق من الفشل عند العودة إلى المنافسة بسبب مخاوف الإصابة مجددًا	**6.**	0.18	0.74	−0.06
أشعر بالقلق من أنني قد لا أؤدي بأفضل ما لديّ عند العودة إلى المنافسة بسبب مخاوفي من إعادة الإصابة	**7.**	−0.06	0.85	−0.03
أشعر بالقلق من أن يكون أدائي ضعيفًا في مرحلة العودة إلى المنافسة بسبب مخاوف تكرار الإصابة	**8.**	0.12	0.79	0.05
أشعرُ بالقلقِ من عدمِ قدرتي على العودةِ الكاملةِ إلى المنافسةِ بسببِ مخاوفي من الإصابةِ مجددًا	**9.**	0.279	0.737	−0.048
أشعر بالقلق من أن يشعر الآخرون بخيبة أمل إذا تكررت إصابتي أثناء العودة إلى المنافسة.	**10.**	−0.146	0.484	0.140
أنا قلق حول قدرتي على التركيز خلال فترة العودة إلى المنافسة بسبب مخاوف الإصابة مجددًا	**11.**	0.182	0.451	0.045
يشعُر جسدي بالتوتر بشأن العودة للمشاركة الرياضية بسبب المخاوف من الإصابة	**12.**	0.10	−0.04	0.75
القلق من إمكانية الإصابة مجددًا أثناء العودة للمنافسة يجعل جسدي يشعر بالتوتر	**13.**	0.09	0.06	0.71
فكرة إمكانية الإصابة مجددًا أثناء عودتي للمنافسة تجعل يدي تتعرقان	**14.**	−0.080	0.022	0.509
جسدي يشعر بالتوتر بسبب قلقي من إعادة الإصابة خلال مرحلة العودة للمنافسة	**15.**	0.07	−0.02	0.68

One positively worded item reflecting confidence in not sustaining a recurrent injury was reverse scored so that higher scores consistently indicated higher levels of re-injury anxiety.

Table 9. Standardized factor loadings from confirmatory factor analysis of the Re-Injury Anxiety Inventory

Item	Factor	Standardized loading (λ)	SE	z	p
1	Injury recurrence anxiety	0.82	0.05	16.20	< 0.001
2	Injury recurrence anxiety	0.74	0.06	12.17	< 0.001
3	Injury recurrence anxiety	0.56	0.07	8.00	< 0.001
4	Injury recurrence anxiety	0.68	0.06	11.33	< 0.001
5 (R)	Injury recurrence anxiety	0.52	0.07	7.43	< 0.001
6	Injury recurrence anxiety	0.71	0.05	14.20	< 0.001
7	Performance anxiety	0.83	0.04	20.75	< 0.001
8	Performance anxiety	0.79	0.05	15.80	< 0.001
9	Performance anxiety	0.73	0.05	14.60	< 0.001
10	Performance anxiety	0.59	0.06	9.67	< 0.001
11	Performance anxiety	0.55	0.06	9.17	< 0.001
12	Somatic anxiety	0.76	0.05	15.20	< 0.001
13	Somatic anxiety	0.72	0.05	14.40	< 0.001
14	Somatic anxiety	0.60	0.06	10.00	< 0.001
15	Somatic anxiety	0.69	0.05	13.80	<0 .001

All standardized factor loadings were statistically significant ($p < .001$). Each item was specified to load on a single latent factor in accordance with the hypothesized measurement model. All standardized factor loadings were statistically significant ($p < .001$). Item 5 was reverse scored. Each item was specified to load on a single latent factor.

The exploratory factor analysis revealed a coherent three-factor structure with clear and theoretically meaningful item loadings. Items loading on **Factor 1** demonstrated strong associations with concerns related to injury recurrence during the return to competition, with standardized loadings ranging from .48 to .84, indicating a robust representation of re-injury anxiety in this phase. **Factor 2** was defined by items reflecting performance-related anxiety during the return-to-sport process, with moderate to high loadings ranging from .45 to .85, suggesting that apprehensions regarding performance effectiveness and perceived expectations constitute a distinct psychological dimension. **Factor 3** encompassed items describing somatic manifestations of anxiety, such as physical tension and physiological arousal, with loadings ranging from .51 to .75, supporting the presence of a bodily component of re-injury anxiety. Cross-loadings were minimal across factors, and each item exhibited a primary loading on its intended factor, providing evidence for satisfactory factorial clarity and supporting the multidimensional structure of the instrument.

Table 10. Variance Explained and Internal Consistency by Factor

Factors	Variance explained (%)	Cronbach's α
القلق من تكرار الإصابة عند العودة إلى المنافسة Injury Recurrence Anxiety During Return to Competition	44.70	0.77
القلق من ضعف الأداء Performance-Related Anxiety	5.83	0.86
المظاهر الجسدية للقلق Somatic Manifestations of Anxiety	3.74	0.74
Total variance explained	**54.27**	—

The variance explained by each factor and the corresponding internal consistency coefficients further support the adequacy of the three-factor solution. **Factor 1**, reflecting anxiety related to injury recurrence during the return to competition, accounted for the largest proportion of variance (44.70%), indicating its central role in the overall construct of re-injury anxiety. **Factor 2**, representing performance-related anxiety, explained an additional 5.83% of the variance and demonstrated high internal consistency (Cronbach's $\alpha = .86$), suggesting a well-defined and reliable dimension. **Factor 3**, corresponding to somatic manifestations of anxiety, accounted for 3.74% of the variance and showed acceptable internal consistency (Cronbach's $\alpha = .74$). Collectively, the three factors explained **54.27% of the total variance**, which is considered satisfactory for multidimensional psychological instruments, and all reliability coefficients met recommended thresholds, supporting the internal consistency and structural coherence of the scale.

Table 11. Internal Consistency and Composite Reliability Indices by Factor

Factor	Cronbach's α	McDonald's ω	CR	Interpretation
Injury recurrence anxiety	0.77	0.79	0.78	Acceptable
Performance anxiety	0.86	0.88	0.87	High
Somatic anxiety	0.74	0.76	0.75	Acceptable

Additional reliability analyses using McDonald's omega and composite reliability provided further support for the internal consistency of the identified factors. All coefficients were within acceptable to high ranges, indicating stable and reliable measurement across dimensions and supporting the robustness of the factor structure beyond Cronbach's alpha alone.

Table 12. Factor Loading Criteria

Criterion	Threshold used	Justification
Primary loading	≥ 0.40	Standard psychometric cutoff
Cross-loading	< 0.30	Ensures factorial clarity
Item retention	Theoretical relevance	Prevents construct underrepresentation

Items with loadings slightly below conventional thresholds were retained when they demonstrated strong theoretical relevance and clear primary loading on the intended factor, a practice supported in scale Arabic version research.

3.3 Confirmatory Factor Analysis

Confirmatory factor analysis was conducted using structural equation modeling in JASP, with parameters estimated using maximum likelihood (ML). On the second subsample (**n = 129**) to test the adequacy of the three-factor model identified in the exploratory phase. The analysis was performed using the variance–covariance matrix, and model fit was evaluated using commonly recommended goodness-of-fit indices.

Table 13. Confirmatory Factor Analysis Fit Indices

Fit index	Value	Recommended cutoff	Evaluation
χ^2/df	1.77	< 3.00	Good
CFI	0.93	≥0 .90	Good
TLI	0.91	≥ 0.90	Acceptable
RMSEA	0.07	≤0 .08	Acceptable
SRMR	0.06	≤0 .08	Good

The results indicate that the proposed three-factor model demonstrates an acceptable fit to the data. All indices met recommended thresholds, supporting the structural validity of the Arabic version of the RIAI.

Overall, the results of the reliability and factor analyses provide evidence that the Arabic version of the Re-Injury Anxiety Inventory exhibits satisfactory internal consistency and a stable three-factor structure. The findings support the use of the RIAI-Ar as a psychometrically sound instrument for assessing re-injury anxiety among Arabic-speaking athletes during the return-to-sport phase.

4. Discussion

The purpose of the present study was to conduct a translation and psychometric evaluation and psychometric evaluation of the Re-Injury Anxiety Inventory (RIAI) for Arabic-speaking athletes returning to sport after injury. Overall, the findings provide empirical support for the reliability and construct validity of the Arabic version of the instrument, as evidenced by satisfactory internal consistency and a stable factorial structure derived from both exploratory and confirmatory factor analyses.

4.1 Factorial Structure and Construct Interpretation

The exploratory factor analysis revealed a **three-factor structure** underlying re-injury anxiety during the return-to-sport phase: (a) anxiety related to the recurrence of injury, (b) anxiety related to performance impairment, and (c) somatic manifestations of anxiety. Together, these factors accounted for **54.27% of the total variance**, which is considered acceptable in psychological measurement research, particularly for affective and cognitive constructs. The emergence of these dimensions suggests that re-injury anxiety in Arabic-speaking athletes is a multidimensional phenomenon encompassing cognitive, emotional, and physiological components.

This structure is conceptually consistent with theoretical models of psychological responses to sport injury, which emphasize the interaction between cognitive appraisals, emotional reactions, and physiological arousal during rehabilitation and return to sport [9]. The dominance of the first factor—anxiety related to the recurrence of injury—indicates that concerns about sustaining another injury remain central during the return-to-sport process, even after physical rehabilitation has been completed. This finding aligns with previous qualitative and quantitative research highlighting fear and worry about re-injury as primary psychological barriers to successful return to sport [10]. The three-factor structure identified in the present study is broadly consistent with the conceptual framework proposed by Walker et al. (2010), although some differences in item clustering were observed. These discrepancies may reflect linguistic nuances and contextual differences related to injury experience and return-to-sport processes within Arabic-speaking athletic populations.

4.3 Comparison With the Original RIAI (Walker et al., 2010)

In the original development of the RIAI, Walker et al. (2010) identified a **two-factor structure**, distinguishing between re-injury anxiety during rehabilitation (RIA-R) and re-injury anxiety during return to training or competition (RIA-RE). The present study focused exclusively on the **return-to-sport dimension (RIA-RE)** and yielded a more differentiated factorial structure within this phase. Rather than forming a single homogeneous factor, re-injury anxiety during return to sport appeared to decompose into cognitive concerns about injury recurrence, worries related to performance effectiveness, and somatic anxiety symptoms.

This divergence from the original factorial solution may reflect **contextual and cultural influences** on how re-injury anxiety is experienced and expressed. While Walker et al. (2010) conceptualized return-to-sport anxiety as a

unified construct, the present findings suggest that, within the Arabic-speaking athletic context, athletes may distinguish more clearly between fears of physical vulnerability, concerns about performance limitations, and bodily manifestations of anxiety. Such differentiation is consistent with multidimensional models of anxiety, which posit that cognitive and somatic components may vary independently depending on situational demands and cultural norms [11].

Importantly, the internal consistency coefficients obtained in the present study were comparable to those reported by Walker et al. (2010). Cronbach's alpha values for the three factors ranged from **.74 to .86**, indicating acceptable to high reliability, albeit lower than the exceptionally high coefficients reported in the original study. This difference is not unexpected, as very high alpha values may partly reflect item redundancy, whereas slightly lower coefficients can indicate a broader representation of the construct across diverse populations.

4.4 Confirmatory Evidence and Model Adequacy

The confirmatory factor analysis supported the adequacy of the three-factor model, with fit indices indicating acceptable to good model fit (CFI = .93; RMSEA = .07). These findings provide additional evidence for the structural validity of the Arabic version of the RIAI and suggest that the proposed model offers a coherent representation of re-injury anxiety during the return-to-sport phase. The confirmation of this structure in an independent subsample strengthens confidence in the stability of the factorial solution and reduces the likelihood that the results are attributable to sample-specific characteristics.

4.5 Implications for Research and Practice

From a research perspective, the present findings extend the psychometric evidence base of the RIAI by demonstrating that its return-to-sport dimension can be meaningfully adapted for use in Arabic-speaking populations. The identification of distinct dimensions of re-injury anxiety highlights the importance of considering the multidimensional nature of psychological responses when assessing athletes' readiness to return to sport.

From an applied standpoint, the Arabic version of the RIAI may serve as a useful screening tool for sport psychologists, physiotherapists, and rehabilitation professionals working with injured athletes. By differentiating between fears of re-injury, performance-related concerns, and somatic anxiety symptoms, practitioners may be better equipped to design targeted psychological interventions aimed at facilitating a safer and more confident return to sport.

4.6 Limitations and Directions for Future Research

Despite its contributions, the present study has several limitations. First, although construct validity was supported through exploratory and confirmatory factor analyses, convergent and discriminant validity were not examined . Future studies should investigate associations between the RIAI-Ar and related constructs, such as general anxiety, fear of movement, or perceived stress, to further substantiate its validity. Second, the sample consisted of athletes from a specific cultural and geographic context, which may limit the generalizability of the findings to other Arabic-speaking populations. Cross-national studies are therefore warranted.

Future research should examine convergent and discriminant validity of the Arabic RIAI by correlating it with related constructs such as fear of reinjury, perceived stress, and psychological readiness to return to sport. Finally, longitudinal research examining the predictive validity of the RIAI-Ar in relation to actual return-to-sport outcomes and re-injury incidence would provide valuable insights into its clinical and practical utility.

5. Conclusion

In conclusion, the present study provides evidence that the Arabic version of the Re-Injury Anxiety Inventory demonstrates satisfactory reliability and a stable multidimensional structure when applied to athletes returning to sport after injury. While the factorial structure differs from that originally reported by Walker et al. (2010), the findings underscore the relevance of cultural and contextual factors in the assessment of re-injury anxiety. The RIAI-Ar appears to be a promising instrument for research and applied practice in sport injury psychology within Arabic-speaking contexts.

6. References

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