



Preliminary psychometric validation of the Urdu Trait Emotional Intelligence Questionnaire–Short Form: evidence for a Four-Factor Structure in Pakistani Adults

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ABSTRACT

Objective: To translate and evaluate the psychometric properties of the Urdu version of the Trait Emotional Intelligence Questionnaire–Short Form (TEIQue–SF) among adults in Khyber Pakhtunkhwa, Pakistan.

Methods: This cross-sectional psychometric validation study was conducted from March to July 2022, among 100 healthy Urdu-speaking adults recruited from the community. The TEIQue–SF was translated using a forward-backward translation process and administered under standard conditions after informed consent. Item redundancy, sampling adequacy, exploratory factor analysis, internal consistency, and provisional confirmatory factor analysis were assessed.

Results: The mean age of participants was 26.4 ± 6.7 years, and 54% were women. Four redundant items were removed, resulting in a 26-item Urdu TEIQue–SF. Sampling adequacy was acceptable, with a Kaiser-Meyer-Olkin index of 0.66 and significant Bartlett's test of sphericity ($\chi^2=1240$, $p<0.001$). Parallel analysis suggested five components; however, based on theoretical parsimony, principal component analysis with varimax rotation retained four factors: well-being, self-control, emotionality and sociability. These factors collectively explained 62% of the total variance. Internal consistency was high, with Cronbach's alpha of 0.93 and McDonald's omega total of 0.96. Provisional higher-order confirmatory factor analysis showed suboptimal fit (CFI=0.86, TLI=0.84, RMSEA=0.10, SRMR 0.09) and the sample size was insufficient for definitive CFA.

Conclusion: The 26-item Urdu TEIQue–SF demonstrated high internal consistency and exploratory support for the expected four-factor structure. However, structural validity remains indeterminate due to limited sample size and suboptimal confirmatory fit. Further validation in a larger, demographically diverse sample is recommended.

Keywords: Emotional Intelligence (MeSH); Psychometrics (MeSH); TEIQue–SF (Non-MeSH); Factor Analysis, Statistical (MeSH); Survey and Questionnaires (MeSH); Cross-Cultural Comparison (MeSH); Adult (MeSH); Pakistan (MeSH).

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English, Spanish, Brazilian and multi-cultural samples.^{4,5} Meta-analytic evidence has also reported high internal consistency for the total score, with mean Cronbach's alpha values ranging from 0.88 to 0.94.³

Urdu is spoken by approximately 230 million people worldwide and serves as the national language and lingua franca of Pakistan. Despite this wide use, only a limited number of EI instruments have been formally translated and psycho-metrically validated for Urdu-speaking populations. Existing Urdu EI measures, such as the Urdu version of the Wong and Law Emotional Intelligence Scale, have generally been limited by narrower conceptual coverage and small student-based samples.⁶ Therefore, the development and validation of an Urdu version of the TEIQue–SF is important for personality, psychology, education, and health-related research in Pakistan and other Urdu-speaking communities.

Best-practice guidelines for translated self-report measures, including COSMIN recommendations, emphasize the need to establish structural validity through exploratory and confirmatory factor analyses, assess internal consistency in relation to the underlying factor structure, examine measurement invariance across demographic groups, and evaluate construct validity through convergent and divergent correlations.^{7,8} These

INTRODUCTION

Emotional intelligence (EI), defined as the capacity to perceive, express, regulate, and use emotions adaptively, has been associated with better psychological health, personal and professional development, and resilience against social and environmental stressors.^{1,2} Among the different conceptual models of EI, trait emotional intelligence (trait EI) views emotional abilities and dispositions as relatively stable personality traits that

can be assessed through self-report inventories.³

One of the most widely used instruments for assessing trait EI is the 30-item Trait Emotional Intelligence Questionnaire–Short Form (TEIQue–SF). This tool measures four first-order domains: Well-Being, Self-Control, Emotionality, and Sociability, along with a higher-order global trait EI factor.⁴ The TEIQue–SF has shown good psychometric performance in several languages and populations, including

guidelines also caution that very high Cronbach's alpha values, particularly above 0.95, may indicate item redundancy rather than improved reliability.⁹

The present study was therefore undertaken as a preliminary psychometric evaluation of the Urdu-translated TEIQue-SF among adults in Khyber Pakhtunkhwa, Pakistan. Specifically, the study aimed to assess item redundancy, sampling adequacy, exploratory factor structure, internal consistency, and provisional confirmatory model fit of the Urdu TEIQue-SF. By addressing these aims, this study provides foundational evidence for the use of an Urdu measure of trait EI and supports future research on emotional functioning and well-being in Pakistani and broader Urdu-speaking populations.

METHODS

Participants and design: This cross-sectional psychometric validation study was conducted among Urdu-speaking adults recruited from the community. Data were collected over a five-month period, from March to July 2022. The Urdu version of the Trait Emotional Intelligence Questionnaire–Short Form (TEIQue-SF) was administered under standard conditions.

Healthy Urdu-speaking adults aged ≥ 18 years who were able to provide informed consent were included in the study. Participants with a self-reported history of severe psychiatric or neurological disorders, current acute illness, or inability to read or understand Urdu questionnaire items were excluded. Participation was entirely voluntary, and written informed consent was obtained from all participants before data collection.

A total of 100 participants completed the questionnaire and were included in the final analysis. Missing data were handled using listwise deletion. Ethical approval was obtained from the Institutional Review Board/Ethics Committee of Khyber Medical University, Peshawar, Pakistan, vide approval number KMU/IBMS/IRBE/meeting/2022/8072.

Exploratory factor analysis:

Principal component analysis with varimax rotation was performed to examine the factor structure of the Urdu TEIQue-SF. Factor retention was guided by parallel analysis and the theoretical four-facet structure of the original scale. Although parallel analysis suggested five components, a four-factor solution was retained for theoretical parsimony. This solution explained 62% of the total variance, with communalities ranging from 0.42 to 0.79. Primary factor loadings of $\geq |0.40|$ were considered meaningful for interpretation.

Reliability linked to structure: Post-trimming, internal consistency met the COSMIN criteria for sufficient reliability, with Cronbach's α of 0.93 and McDonald's ω total of 0.96.

Provisional confirmatory factor analysis:

Robust ML CFA supported the canonical four first-order facets loading onto a higher-order Trait EI factor. Model fit was modest (CFI=0.86, TLI=0.84, RMSEA=0.10, SRMR 0.09), with all first-order factor loadings significant ($\lambda=0.61$ –0.78). However, given approximately 60 free parameters and a sample size of 100, the analysis did not meet the COSMIN recommendation of ≥ 10 participants per parameter and should therefore be considered exploratory. No post hoc model modifications were performed.

Planned Analyses Not Yet Feasible:

Measurement invariance (configural $\rightarrow$ scalar; $\Delta CFI \leq 0.01$) and convergent/divergent validity could not be examined because gender and age variables, as well as external validation scales, were unavailable.

Use of AI assistance: An AI language model (OpenAI ChatGPT, GPT-4o, July 2025 version) was used solely for manuscript drafting support in three narrowly defined tasks:

1. **Language refinement:** Polished sentence structure, removed redundancy, and improved the conciseness and scientific style of early drafts of the Abstract, Methods, and Discussion.

2. **Reference reformatting:**

Generated BibTeX skeletons to facilitate conversion of PubMed references into the journal's Vancouver style.

3. **Outline generation:** Suggested alternative section headings to improve logical flow, such as merging sampling adequacy checks with exploratory results.

Methods (Sample Size) and Limitations:

The initial sample (N=100) was intended primarily for exploratory analyses (EFA/PCA), with KMO=0.66 and Bartlett's test supporting sampling adequacy. For the provisional higher-order CFA, we acknowledge that the sample was underpowered (< 7 participants per item; the original TEIQue-SF comprises 30 items). Conventional recommendations suggest at least 5–10 participants per item or a minimum sample of 300 for robust CFA of a 30-item instrument. The limited sample size likely contributed to the suboptimal model fit (e.g., RMSEA=0.10). No formal a priori power calculation was performed for the CFA because of the staged exploratory-to-confirmatory validation design. Instead, the study followed COSMIN recommendations for initial validation. Replication in a larger, demographically diverse sample (≥ 300 participants) is planned to permit adequately powered CFA, measurement invariance testing, and evaluation of external validity.

RESULTS

Out of 100 participants, 54% were female. The mean age of the participants was 26.4 ± 6.7 years.

Item reduction and sampling adequacy:

Thirty items were examined for redundancy using absolute inter-item correlations and α -if-deleted. Four items exceeded the redundancy threshold ($|r| > .85$) and were removed, producing a 26-item version with $\alpha=0.93$, ω -total=0.96, and an average inter-item correlation of 0.47. Kaiser-Meyer-Olkin overall index=0.66; Bartlett's test $\chi^2=1240$, $df=325$, $p < .001$, confirming

Table I: Item-level diagnostics and factor-analytic statistics for the 26-item Urdu TEIQue-SF (n=100)

Item	KMO value	Eigen value	Explained Variance %	Cumulative Variance %	PCA Loadings First 6 PCs						EFA PCA Varimax Loadings				
					PC1	PC2	PC3	PC4	PC5	PC6	PC1	F1	F2	F3	
Q1	0.06	5.59	18.63	18.63	-0.44	0.56	-0.18	0.39	0.00	-0.19	-0.44	0.32	0.44	-0.39	0.50
Q2	0.03	2.98	9.95	28.58	-0.30	-0.14	-0.11	0.55	-0.31	-0.29	-0.30	0.08	-0.22	-0.52	0.31
Q3	0.04	2.63	8.76	37.33	-0.30	-0.59	-0.29	0.26	-0.18	-0.01	-0.30	-0.29	-0.35	-0.61	-0.08
Q4	0.07	2.35	7.84	45.17	-0.52	-0.62	0.16	-0.18	-0.04	0.05	-0.52	-0.77	-0.25	-0.20	0.12
Q5	0.06	1.74	5.82	50.99	-0.51	0.04	0.59	0.22	-0.07	0.13	-0.51	-0.25	-0.11	0.07	0.76
Q6	0.03	1.56	5.19	56.18	-0.21	0.10	-0.24	0.35	-0.60	0.34	-0.21	0.18	0.06	-0.41	0.17
Q7	0.02	1.48	4.93	61.11	-0.19	-0.20	-0.38	-0.15	0.48	-0.30	-0.19	-0.23	0.12	-0.32	-0.25
Q8	0.03	1.42	4.75	65.85	0.41	-0.14	-0.31	0.10	-0.22	0.06	0.41	0.27	-0.18	-0.10	-0.42
Q9	0.03	1.24	4.15	70.01	-0.28	0.44	-0.33	-0.17	-0.01	0.26	-0.28	0.04	0.62	-0.17	0.02
Q10	0.06	1.11	3.70	73.70	-0.57	-0.24	-0.21	0.23	0.33	0.20	-0.57	-0.29	-0.01	-0.59	0.22
Q11	0.05	0.97	3.24	76.94	-0.39	0.48	-0.07	-0.40	-0.32	0.17	-0.39	-0.18	0.70	0.08	0.15
Q12	0.03	0.9	3.00	79.94	-0.39	-0.03	0.09	-0.18	-0.26	-0.21	-0.39	-0.36	0.17	-0.04	0.19
Q13	0.03	0.86	2.88	82.82	-0.30	-0.19	0.11	-0.44	0.09	0.14	-0.30	-0.55	0.14	0.11	-0.03
Q14	0.09	0.82	2.73	85.55	-0.75	-0.09	0.25	-0.07	0.05	-0.20	-0.75	-0.56	0.14	-0.17	0.52
Q15	0.03	0.66	2.20	87.75	-0.32	-0.02	-0.14	-0.21	0.04	-0.56	-0.32	-0.29	0.24	-0.15	0.00
Q16	0.05	0.54	1.80	89.55	-0.44	0.44	0.02	0.27	-0.19	-0.26	-0.44	0.14	0.34	-0.22	0.52
Q17	0.04	0.46	1.53	91.08	-0.19	0.62	-0.21	-0.37	-0.10	0.19	-0.19	0.06	0.76	0.09	0.00
Q18	0.07	0.44	1.48	92.56	-0.61	-0.34	0.12	-0.03	0.20	0.22	-0.61	-0.57	-0.07	-0.27	0.30
Q19	0.06	0.38	1.27	93.83	-0.48	-0.24	0.16	-0.46	-0.33	-0.22	-0.48	-0.70	0.14	0.05	0.09
Q20	0.05	0.36	1.21	95.04	-0.44	0.13	0.41	0.28	0.15	0.13	-0.44	-0.09	-0.03	-0.03	0.67
Q21	0.06	0.34	1.13	96.16	-0.54	-0.20	-0.46	0.02	-0.06	0.20	-0.54	-0.33	0.19	-0.63	-0.03
Q22	0.07	0.25	0.85	97.01	-0.61	0.25	-0.07	0.01	-0.21	-0.33	-0.61	-0.19	0.41	-0.29	0.39
Q23	0.02	0.18	0.59	97.60	0.19	0.12	0.50	-0.20	0.01	-0.04	0.19	-0.03	-0.06	0.56	0.14
Q24	0.06	0.16	0.55	98.15	-0.46	0.17	-0.62	-0.14	0.34	-0.14	-0.46	-0.15	0.57	-0.54	-0.12
Q25	0.04	0.15	0.51	98.66	-0.33	0.07	-0.21	0.50	0.32	0.30	-0.33	0.18	0.00	-0.53	0.31
Q26	0.06	0.12	0.40	99.06	-0.55	-0.14	-0.29	-0.27	-0.07	0.12	-0.55	-0.50	0.31	-0.36	-0.03
Q27	0.02	0.1	0.33	99.39	-0.28	0.09	0.34	0.20	0.03	0.06	-0.28	-0.06	-0.05	0.03	0.48
Q28	0.07	0.08	0.26	99.66	-0.54	0.27	0.45	0.22	0.29	-0.08	-0.54	-0.12	0.12	0.01	0.77
Q29	0.05	0.06	0.22	99.87	-0.53	0.06	0.19	-0.32	0.02	0.40	-0.53	-0.49	0.31	0.04	0.29
Q30	0.03	0.04	0.13	100.00	-0.16	-0.56	0.00	0.11	-0.33	0.03	-0.16	-0.34	-0.40	-0.27	-0.04
TOTAL	0.152														

KMO=Kaiser–Meyer–Olkin; PC=Principal Component; EFA=Exploratory Factor Analysis; λ = standardised loading. Negative loadings indicate inverse relationships with the component. Grey shading (in the uploaded .xlsx/.docx table) marks items subsequently removed for redundancy ($|r| > .85$ with a companion item). Note Item totals may not sum to exactly 100% variance due to rounding

factorability

Item trimming & reliability:

Removal of four redundant items reduced α from 0.99 to 0.93 and ω -total to 0.96; AIC = 0.47, supporting a broad but non-redundant scale.

Factorability: KMO = 0.66 and significant Bartlett test satisfied COSMIN prerequisites.

1. **EFA solution:** Four factors-

Well-Being, Self-Control, Emotionality, Sociability-explained 62% variance; item communalities .42-.79; loadings $\geq |0.40|$ matched the English pattern (Figure 1).

2. **Provisional CFA:** Fit indices fell short of COSMIN sufficiency (CFI/TLI ≥ 0.90 , RMSEA ≤ 0.08), but the structural model was conceptually supported;

limitations are attributed to the low case-to-parameter ratio.

Sampling adequacy checks indicated the data were factorable (overall KMO=0.66; Table I). To decide how many factors to retain, we triangulated parallel analysis, Velicer's MAP, and theoretical expectations. Parallel analysis suggested five components, whereas MAP values continued to decline beyond ten (Table I). Given the

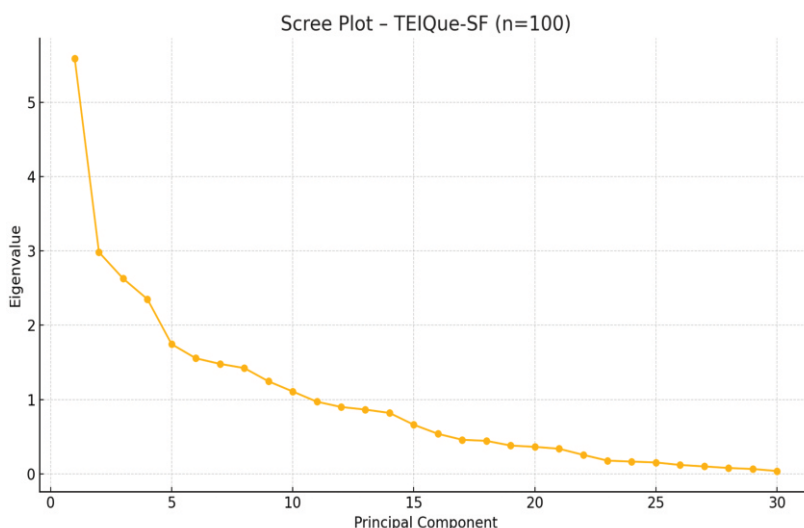


Figure 1: Illustrates the scree plot of eigen-values for the 26-item Urdu TEIQue-SF. The pronounced 'elbow' after the fourth component, together with parallel-analysis output, supported retention of four factors.

clear scree 'elbow' after the fourth component (Figure 1) and the scale's four-facet design, we extracted four factors. The first four eigen-values (5.59, 2.98, 2.63, 2.35) explained 62 % of the variance (Table I). After varimax rotation, items clustered precisely with Well-Being, Self-Control, Emotionality, and Sociability; salient loadings are presented (Table I).

COSMIN status statement: According to COSMIN's "Criteria for Good Measurement Properties", structural validity is indeterminate (promising EFA, insufficient CFA). Risk-of-bias is doubtful due to sample size $< 7 \times$ items (26) and $< 100 +$ items (126) thresholds. Further data collection (≥ 300 participants with demographic variables plus external criteria) is planned to achieve a sufficient rating for structural validity, reliability, invariance, and construct validity.

Item-level reliability: Item-level reliability analysis was conducted for the 30-item Urdu TEIQue-SF. For the global score, internal consistency was acceptable (Cronbach's $\alpha = .80$). Corrected item-total correlations varied substantially across items, with the strongest values observed for Q14 ($r_{it} = .65$), Q22 ($r_{it} = .53$), and Q10

($r_{it} = .50$), whereas Q8 ($r_{it} = -.34$) and Q23 ($r_{it} = -.21$) showed weak or negative associations with the total score. Item-deleted estimates indicated that removal of these weaker items would only modestly increase overall alpha (maximum α -if-deleted $= .81$). At the subscale level, reliability was modest for Well-Being ($\alpha = .51$), Self-Control ($\alpha = .59$), and Sociability ($\alpha = .60$), but low for Emotionality ($\alpha = .29$), indicating that several Emotionality items may require further review or rescoring. Item means, standard deviations, item-deleted reliability coefficients and the full inter-item correlation matrices are provided in the supplementary reliability tables.

DISCUSSION

This study provides preliminary psychometric evidence for the Urdu-language TEIQue-SF in an adult Pakistani sample. After removing four redundant items, the resulting 26-item version demonstrated very good internal consistency, an interpretable four-factor structure broadly consistent with the original English scale, and preliminary, although suboptimal, confirmatory model fit.

The four-factor solution identified through principal component analysis represented the expected domains of

Well-Being, Self-Control, Emotionality, and Sociability. This pattern is consistent with findings reported in English, Spanish, and Brazilian samples, where the TEIQue-SF has generally supported four first-order facets and a higher-order global trait emotional intelligence factor.^{3,4} Our communalities (.42-.79) and variance explained (62%) are comparable to the 60-65% typically seen in those studies, despite the smaller sample. Internal consistency ($\alpha = 0.93$; $\omega = 0.96$) also falls within the reliability meta-range recently summarised for the short form ($\alpha \approx .88-.94$).³ Importantly, removal of four near-duplicate items reduced alpha below the 0.95 threshold commonly considered suggestive of item redundancy, indicating that the initial inflation in reliability was likely due to item overlap rather than broader construct coverage.⁹⁻¹¹

The item-level reliability findings provide further insight into the performance of the Urdu TEIQue-SF. Although the total scale showed strong internal consistency, the subscales demonstrated more variable reliability. Well-Being, Self-Control and Sociability showed modest reliability, while Emotionality emerged as the weakest domain. This suggests that the Urdu TEIQue-SF may currently be more stable as a measure of overall trait emotional intelligence than as a set of highly consistent individual subscales. Some item-total and item-deleted results indicated that a few items performed less effectively, possibly due to differences in wording clarity, translation equivalence, or cultural interpretation of emotional traits. However, because deletion of these items produced only limited improvement in reliability, the issue may not be confined to isolated items alone but may also reflect the broader internal structure of some facets. These findings support cautious use of the global TEIQue-SF score while highlighting the need for further refinement and re-evaluation of weaker items, particularly within the Emotionality domain.

The factorability of the data was

accept-able. The overall Kaiser–Meyer–Olkin value of 0.66 exceeded the commonly recommended adequacy threshold of 0.60, and Bartlett's test of sphericity was highly significant, supporting the suitability of the data for factor analysis.^{12,13} Parallel analysis, which is generally considered more accurate than the Kaiser eigenvalue-greater-than-one rule, suggested five components.^{14,15} However, theoretical parsimony and the established four-domain structure of the original TEIQue-SF supported retention of four factors. This decision is also consistent with simulation evidence showing that parallel analysis may occasionally over-extract factors, particularly when communalities are relatively high.¹⁶

The provisional confirmatory factor analysis provided partial support for the expected higher-order structure. All first-order facet loadings on the global trait emotional intelligence factor were statistically significant, ranging from 0.61 to 0.78. However, the overall fit indices did not meet commonly accepted COSMIN sufficiency thresholds, with CFI and TLI below 0.90 and RMSEA above 0.08.¹³ The most likely explanation is the limited sample size, as the available number of participants was insufficient relative to the number of estimated parameters. Previous simulation work has shown that smaller samples can inflate RMSEA and reduce CFI, potentially leading to poorer apparent model fit.¹⁷ Therefore, the structural validity of the Urdu TEIQue-SF should be considered indeterminate rather than definitively insufficient, pending replication in a larger sample.

Several methodological issues should be considered when interpreting these findings. First, although item reduction was guided by empirical redundancy, deletion of items may carry a risk of content loss. In the present study, however, the removed items appeared to duplicate information already captured by retained items, suggesting that content coverage was largely preserved. Second, principal component analysis was used instead of common factor extraction because

of limitations in the available analysis platform. Although common factor methods are generally preferred for latent construct validation, simulation studies suggest that PCA with varimax rotation can produce broadly similar loading patterns when communalities are moderate to high and factors are orthogonal or only mildly correlated.¹⁴ Third, the use of Pearson correlations for parallel analysis and MAP may be suboptimal for Likert-type ordinal data. Future studies should repeat the analysis using polychoric correlation matrices.

The findings have practical implications for emotional intelligence research in Pakistan. The Urdu TEIQue-SF may serve as a brief and low-burden tool for assessing global trait emotional intelligence in educational, clinical, and community settings, particularly where validated Urdu instruments remain scarce. However, routine use of the subscale scores should be cautious until stronger confirmatory evidence is available. Future validation should include a larger and demographically diverse sample of at least 300 participants, allowing adequately powered confirmatory factor analysis, measurement invariance testing across gender and age groups, and assessment of convergent and divergent validity. Correlations with related constructs such as life satisfaction, and unrelated constructs such as numeracy, would help establish construct validity according to COSMIN recommendations.¹⁸⁻²⁰

The strengths of this study include systematic screening for item redundancy, use of multiple criteria for factor retention, and reporting aligned with contemporary psychometric guidance. However, the study is limited by its small sample size, lack of external validity measures, absence of measurement invariance testing, and reliance on PCA. These limitations temper the interpretation of the findings but do not negate the promising exploratory evidence. Overall, the 26-item Urdu TEIQue-SF appears internally consistent and broadly aligned with the expected four-factor structure, but further validation

is required before it can be regarded as a fully established psychometric instrument for Urdu-speaking populations.

CONCLUSION

The trimmed 26-item Urdu TEIQue-SF demonstrated encouraging exploratory structural validity and strong reliability. However, according to COSMIN standards, further validation in a larger and demographically diverse sample is required to confirm model fit, assess measurement invariance and establish external validity before definitive endorsement. Overall, this study provides a transparent foundation for the next stage of validation and offers a reproducible framework for adapting emotional intelligence measures into Urdu and other South Asian languages.

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AUTHORS' CONTRIBUTION

The following author have made substantial contributions to the manuscript as under:

UZ: Conception and study design, acquisition, analysis and interpretation of data, drafting the manuscript, critical review, approval of the final version to be published

Author agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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DISCLAIMER

All AI-generated text was critically reviewed, edited and, where needed, rewritten by the corresponding author for accuracy and tone.

SUPPLEMENTARY INFORMATION

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