



Research Article

Validity and Reliability of the Korean Version of the Trauma-Informed Climate Scale-10



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SUMMARY

Purpose: The Trauma-Informed Climate Scale-10 is a short form developed to efficiently measure staff perceptions of the values of trauma-informed care within the service environment. This study aimed to evaluate the reliability and validity of the Korean version of the Trauma-Informed Climate Scale-10 (K-TICS-10) among Korean nurses.

Methods: The K-TICS-10 underwent a linguistic validation process, including translation, back-translation, and expert committee review. Data were collected from 218 nurses in a tertiary general hospital in South Korea. Internal consistency reliability was assessed using Cronbach's α . Structural validity was tested through confirmatory factor analysis. Convergent validity was examined using Pearson's correlation with affective commitment and burnout. Item-convergent validity was evaluated to examine the internal structure of the scale.

Results: The Korean version of the TICS-10 demonstrated reliable internal consistency, with Cronbach's α of .82. The fitness of the modified model was acceptable ($\chi^2/Df = 2.85$, goodness-of-fit index = .92, root mean square error of approximation = .09, standardized root mean square residual = .08, Normed fit index = .88, Tucker–Lewis index = .88, and comparative fit index = .91). Convergent validity of the K-TICS-10 was confirmed by significant correlation with affective commitment ($r = .56, p < .001$) and burnout ($r = -.53, p < .001$), respectively. The average extracted variances (.34) and composite reliability (.81) indicated adequate convergent validity of the items.

Conclusion: The findings of this study support the satisfactory psychometric properties of the K-TICS-10, indicating its utility for evaluating the trauma-informed climate within the nursing work environment in Korea.

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Introduction

Trauma is a serious public health issue that can result in negative impacts on an individual's physical, emotional, social, and spiritual well-being. It refers to a single event, a series of events, or a set of circumstances that is physically or emotionally harmful or life-threatening to an individual, affecting their functioning [1]. A significant portion of the population is affected by

trauma. According to the World Health Organization (WHO) World Mental Health Survey, 70.4% of adults experience at least one trauma in their lifetime [2]. In particular, it is reported that about 90% of the young adult population in Korea experiences at least one trauma in their lifetime, indicating a very serious situation [3].

Of various population groups, nurses, in particular, are exposed to numerous traumatic events as they closely interact with and care

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for patients in healthcare environments. These events include witnessing patient deaths, encountering trauma-related injuries, participating in end-of-life care for terminal patients, caring for aggressive patients, facing emotional abuse from patients, families, or colleagues, and sharing the emotions of traumatized patients [4]. As a result, nurses often experience feelings of overwhelm, despair, guilt, and difficulties in performing their duties effectively. To avoid repeated exposure to trauma, they may resort to avoidance behaviors or even leave their jobs [5,6]. In a study conducted in the United States, 28.4% of nurses were found to have a presumed diagnosis of Posttraumatic Stress Disorder (PTSD), a rate significantly higher than the 7–8% prevalence in the general population, indicating a more than fourfold increase [7]. Trauma stress is more severe when there is frequent contact with traumatized patients. Studies conducted on nurses in regional trauma centers in Korea found that 84.4% of respondents reported moderate to severe secondary traumatic stress [8], and 57.2% were classified as high-risk for PTSD [9]. Nurses have been continuously exposed to recurring traumatic events and high-stress work environments over long periods, with the cumulative impact of these experiences negatively affecting their health and well-being. This hinders effective job performance, lowers the quality of care, and increases turnover intentions, posing challenges both at the individual and organizational levels [10]. Therefore, it is urgent for nursing management to seek various strategies to minimize the negative impact of trauma.

Trauma-Informed Care (TIC) emphasizes a “culture change” and introduces a new trend in healthcare environments [11]. TIC expands the understanding of trauma from individuals to all levels of organizations or systems, based on the assumption that patients, families, and staff have all experienced trauma in their lives [1]. This approach operates on the premise of understanding the widespread impact of trauma and the potential paths to recovery, recognizing the signs and symptoms of trauma, and integrating trauma-related knowledge into policies, procedures, and practices to actively prevent retraumatization. It emphasizes the importance of creating environments that are sensitive to and responsive to trauma [1]. Within this framework, trauma-informed organizations highlight the need to recognize and address the impact of stress, trauma, and adversity experienced by both patients and staff, and to develop appropriate measures and strategies [12].

To implement a trauma-informed environment, it is crucial to prioritize the safety of staff, ensure autonomy, and create a work environment where employees can participate in decision-making processes. This fosters the growth and engagement of staff who may have experienced trauma, enhancing their professional quality of life [13]. Internationally, based on the five key principles of TIC proposed by Harris and Fallot—safety, trust and transparency, peer support, collaboration, and empowerment—a Trauma-Informed Climate Scale (TICS) was developed to measure employees' experiences of TIC within organizations. This scale has been psychometrically validated among social workers, and crisis, mental health, and substance use service workers [14,15]. Subsequently, a 10-item short form of the scale, the Trauma-Informed Climate Scale-10 (TICS-10), was developed to facilitate easier use under limited time and resources. Its validity and reliability have been confirmed across various clinical settings, such as hospitals, social services, behavioral health services, and school systems [16]. However, in Korea, TIC is still a relatively new concept, and relevant research is scarce. As a result, there is a lack of measurement tools to assess and compare the trauma-informed climate of organizations.

Understanding the trauma-informed environment within nursing organizations can positively impact not only the well-being of individual nurses and their effectiveness as healthcare providers but also the achievement of the organization's vision and goals [13]. Therefore, this study aims to develop a Korean version of the TICS-

10 scale by Hales et al. [16] and to evaluate the validity and reliability of the K-TICS-10 among Korean nurses. Through this, the study seeks to determine whether the K-TICS-10 can be appropriately used within the culture of Korean nursing organizations.

Methods

Study design

This study is a methodological research that involves translating Hales et al.'s TICS-10 into Korean and validating the reliability and validity of the Korean version of TICS-10.

Study procedures

Phase 1: Translation of the TICS-10

This study aims to validate the Korean version of the TICS-10, which assesses trauma-informed organizational culture. Initially, approval for translating the tool was obtained via email from the developers of TICS-10. The translation process followed the procedures suggested by the WHO [17]. First, two bilingual nursing professors with high expertise in the concept of trauma, along with one professor of social work from an English-speaking university, independently conducted the forward translation (step 1). All three translators had a deep understanding of both languages and cultures, as well as extensive knowledge and experience in instrument development research, making them well-suited to ensure the rigor and reliability of the translation process. The three translators then reviewed the independently translated Korean items, identified any inappropriate or unclear expressions or concepts, and agreed on a draft of the Korean version (step 2). Next, a professional translator from a translation agency, who had no prior information about the original tool, performed the back-translation (step 3). A committee was then formed to compare the original tool and the back-translated version to assess equivalence. The committee included the two nursing professors who participated in the forward translation, one social work professor who had received master's and doctoral degrees in the United States and had lived there for over 30 years, and three nursing doctoral students with research experience related to TIC (step 4). During this process, the committee checked for contextual consistency between the original and back-translated tools, reviewed and revised any unclear or distorted items, and finalized the Korean version of the TICS-10 (Figure 1).

Phase 2: Validation of the Korean version of the TICS-10

(1) Participants

The inclusion criteria for participants in this study were nurses working at tertiary hospitals in South Korea who understood the purpose of the study and voluntarily agreed to participate. Nurses who were inactive or on leave at the time of recruitment were excluded. To determine the appropriate sample size for validating the tool, we referred to the recommendations by Polit and Beck [18], who suggested a sample size of 10 times the number of items for validation studies, and by Coates [19], who recommended a minimum of 4 times the number of items or at least 200 participants for factor analysis. Accordingly, considering that the Korean version of the TICS-10 consists of 10 items, we aimed for a sample size of 200 participants, accounting for a 10% dropout rate, which led to a maximum sample size of 220 participants using convenience sampling. A total of 220 participants took part in the online survey, and after excluding 2 duplicate responses, data from 218 participants were analyzed.

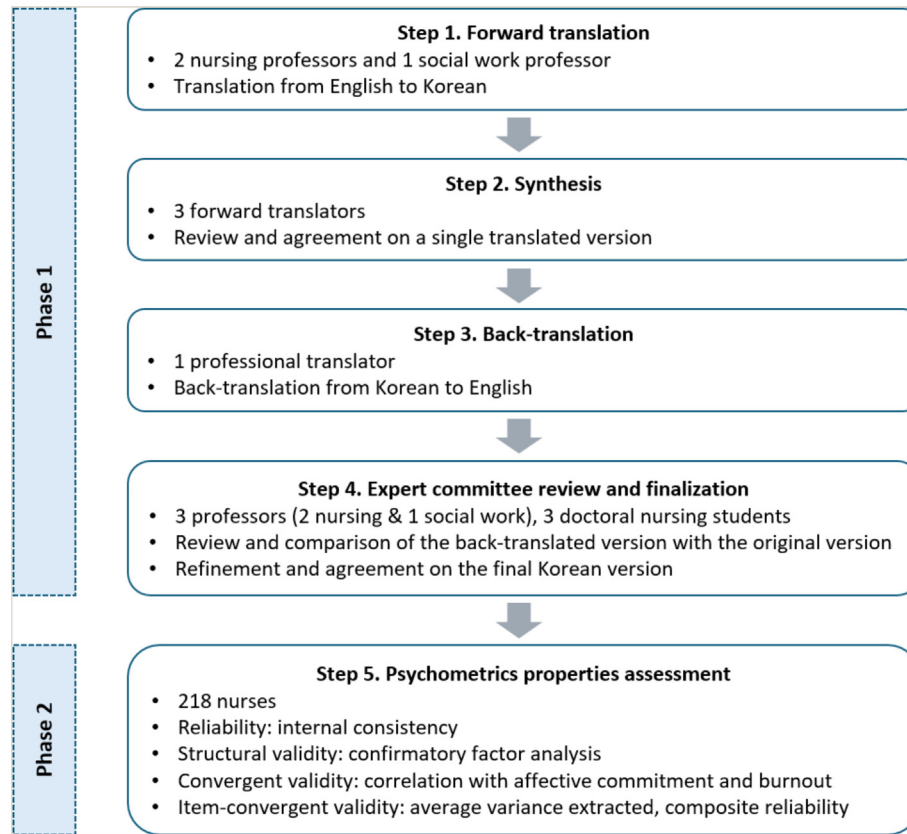


Figure 1. Flowchart of the Translation and Validation Process of the K-TICS-10.

(2) Instruments

The instrument used in this study is a self-report questionnaire composed of general/job-related characteristics of the participants, trauma-informed climate, affective commitment, and burnout. All tools used in the study, except for the burnout scale, which is publicly available, were approved for use by the original authors.

General and job-related characteristics

The general/job-related characteristics of the participants include gender, age, highest education level, religion, position, current working unit, period of clinical career in current working unit, total clinical career, experience of traumatic events (if any) and timing, and experience of turnover due to traumatic events.

Trauma-informed climate

The trauma-informed climate refers to the organizational culture or system that practices Trauma-Informed Care (TIC) [1]. Hales et al.'s TICS-10 was developed as a shortened version of the TICS to assess employees' perceptions of the key principles of TIC, namely Safety, Trust, Choice, Collaboration, and Empowerment, for evaluating and comparing the organization's trauma-informed system and environment. It consists of 10 items, with 2 items extracted from each of the 5 factors of the TICS [16]. The TICS-10 utilizes a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), with higher scores indicating that employees perceive their organization as implementing a trauma-informed environment. During its development, the TICS-10 demonstrated satisfactory psychometric properties, with a Cronbach's α of .91 [16]. The Korean version of the TICS-10 used in this study

underwent translation, back-translation, and expert committee review to ensure its validity and reliability.

Affective commitment

Affective commitment is related to the work environment and characteristics that make employees feel psychologically comfortable and enhance their capabilities, involving identification with, involvement in, and emotional attachment to the organization [20]. For testing the convergent validity, this study utilized 8 items related to affective commitment from the subscale of organizational commitment scale, which was developed by Allen and Meyer [21] and adapted to fit the organizational culture of Korea by Ahn and Lee [22], who validated its internal structure and cross-validity. Allen and Meyer [21] developed the organizational commitment scale from the perspective of a multidimensional conceptual model. This model consists of three factors: affective commitment, which reflects emotional attachment and identification with the organization; continuance commitment, which pertains to the perceived costs associated with leaving the organization; and normative commitment, which relates to a sense of obligation toward the organization. All three factors represent psychological states that bind an individual to the organization. This scale consists of 24 items, measured on a 5-point Likert scale (1 = Not at all, 5 = Very Much), with higher scores indicating greater levels of commitment in each factor. In Ahn and Lee's study [22], the Cronbach's α for the affective commitment subscale was .90, while in this study, it was .88.

Burnout

Burnout is described as one aspect of the negative effects of caring, associated with feelings of despair and difficulty in coping or performing effectively in one's job [23]. These negative emotions

may reflect a sense that the efforts of individuals in helping professions make no difference and could be related to excessive workload or unsupportive work environments [23]. For testing the convergent validity, this study utilized 10 items related to burnout from the subscale of the Korean version of the Professional Quality of Life Scale (K-ProQOL 5), developed by Stamm [23]. The Professional Quality of Life (ProQOL) consists of three factors: compassion satisfaction, secondary traumatic stress, and burnout. It is used to comprehensively assess both the positive and negative aspects experienced by professionals in their work. This scale consists of 30 items, measured on a 5-point Likert scale (1 = Never, 5 = Very Often), with higher scores indicating higher levels of compassion satisfaction, secondary traumatic stress, or burnout. In Stamm's study [23], the Cronbach's α for the burnout subscale was .75, while in this study, it was .81.

(3) Data collection

From February 21, 2024, to March 7, 2024, data collection was conducted through an online survey using Google Form. To recruit participants, recruitment notices were posted on online communities frequently used by nurses in Korea for information sharing and communication. Those who wished to participate voluntarily were guided to access the online survey link directly via the URL link or QR code included in the recruitment notice. The initial screen of the online survey provided a research description document approved by the Institutional Review Board. This document included information about the purpose and methods of the study, the voluntary nature of participation, the anticipated benefits and potential risks of the research, assurance of privacy protection and anonymity, and a guarantee that the collected data would not be used for purposes other than research. It also informed participants that they could withdraw from participation at any time during the study. Only those who checked the "I agree" box in the voluntary informed consent section after understanding this information were allowed to participate in the survey. After data collection was completed, access to the survey link was restricted to prevent further responses.

(4) Data analysis

The collected data were analyzed using SPSS/WIN 25.0 and AMOS 25.0 (IBM Corp., Armonk, NY, USA) statistical software. A probability value (p -value) of .05 was set for significance. The general/job-related characteristics of the participants were analyzed using frequencies, percentages, means, and standard deviations. To validate the tool, structural validity, convergent validity, and item-convergent validity were evaluated. Structural validity of the tool was assessed using confirmatory factor analysis (CFA). CFA is suitable for applying a tool with a confirmed factor structure based on theoretical grounds to a new population group [24,25].

Before conducting confirmatory factor analysis, we examined the items through item analysis to assess their normality and contribution. Univariate normality of the items was assessed using skewness and kurtosis for each item, while multivariate normality was examined using Mardia's coefficient of multivariate kurtosis in the AMOS 25.0 program. Item contribution was evaluated by analyzing the item-total correlation to check for items with correlations below 0.30. [26].

To evaluate the model fit, we examined the following indices: χ^2 statistic (p -value), normed χ^2 (CMIN/Df), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), goodness of-fit index (GFI), normed fit index (NFI), comparative fit index (CFI), and Tucker-Lewis index (TLI) [27,28]. We considered $\text{CMIN/Df} \leq 3.0$, $\text{RMSEA} \leq .08$, $\text{SRMR} \leq .08$, $\text{GFI} \geq .90$,

$\text{NFI} \geq .90$, $\text{CFI} \geq .90$, and $\text{TLI} \geq .90$ as criteria for judging model fit. If the model fit indices fell short of the criteria, we modified the model by considering modification indices (MI) to set covariances for measurement errors. Additionally, we checked whether the items loaded significantly on their specified factors and examined the standardized factor loadings. According to Hair et al. [28]'s rules of thumb for assessing the practical significance, the cutoff for standardized factor loadings is typically .35 to .40 for a sample size of 200–250. In this study, we set the criterion for standardized factor loadings to be at least .35.

Convergent validity was assessed by setting hypotheses regarding the correlations among measurement scores and conducting Pearson's correlation coefficients. In testing convergent validity, a method involves selecting conceptually related constructs to the one being measured by the tool and setting hypotheses about the magnitude and direction of relationships among the tools [29]. Research on tools measuring trauma-informed climate is still in its early stages, and there is a lack of a gold standard for this concept. However, existing research on trauma-informed climate suggests that creating a culture and environment based on trauma is associated with increased organizational commitment among employees and a reduction in experiences of burnout [13,30].

Furthermore, during the psychometric validation of the TICS-10, a significant positive correlation was found between scores obtained from the TICS-10 and the affective commitment subscale of Allen and Meyer's Organizational Commitment Scale [20], while a significant negative correlation was found between scores obtained from the TICS-10 and the burnout subscale of Stamm's Professional Quality of Life Scale (ProQOL) [16,23]. Based on this, in this study, convergent validity of the hypothesis testing construct validity was examined. It was hypothesized that there would be a significant positive correlation between K-TICS-10 and affective commitment, and a significant negative correlation between K-TICS-10 and burnout. A correlation strength criterion of $r > |.50|$ was used to assess the adequacy of the correlations [26].

In addition, as a supplementary method to confirm the internal structure of the tool, the average variance extracted (AVE) and composite reliability (CR) were utilized to evaluate the convergent validity of the items. The criteria for satisfactory convergent validity were set at AVE above .50 and CR above .70 [28]. In cases where AVE was below .50, a CR greater than .60 was considered acceptable, indicating sufficient internal consistency reliability of the scale items [31]. The reliability of the tool was assessed using Cronbach's α coefficient as a measure of internal consistency reliability.

Ethical consideration

This study was conducted after obtaining approval from the Research Ethics Committee of Seoul National University (Approval No. 2402/004-007). The research description included assurances of anonymity and confidentiality of the collected data, voluntary participation, commitment to using the data solely for research purposes, assurance that no data would be collected if participants chose to discontinue the survey, and that there would be no repercussions for withdrawal or discontinuation. Subsequently, participants who voluntarily agreed to participate were provided with online informed consent, along with contact information for the researchers and the Research Ethics Committee of Seoul National University. Personal information and research data collected from participants were coded to ensure that only the researchers could identify them, and were securely stored on a computer equipped with security locks and password protection. Participants who completed the online survey were offered a token of appreciation.

Results

General characteristics of participants

The participants were predominantly female, accounting for 95.0% (207 individuals), with a mean age of 32.0 years (Table 1). Regarding educational level, 70.6% (154 individuals) held a bachelor's degree, while 29.4% (64 individuals) had received education beyond the undergraduate level. In terms of positions, 84.9% (185 individuals) were staff nurses, followed by charge nurses at 10.5% (23 individuals). The majority of participants, 56.0% (122 individuals), worked in medical and surgery units. The average length of service in the current working unit was 4.66 years, with a total average length of service of 8.40 years. Sixty-two participants (28.4%) reported experiencing traumatic events in the workplace, with 54.8% of them having experienced such events within the past year. Furthermore, seven individuals (3.2%) reported having changed jobs due to traumatic events experienced in the workplace.

Item analysis

The range of skewness for each item ranged from $-.37$ to $.37$, and the range of kurtosis ranged from $-.97$ to $.56$, satisfying the assumption of univariate normality where the absolute values of skewness should be less than 3 and the absolute values of kurtosis should be less than 10 [25]. Additionally, the multivariate kurtosis index (Mardia's multivariate kurtosis) was 7.35, and the critical ratio was 3.50, satisfying the assumption of multivariate normality at a significance level of $.05$ (± 1.96). The range of item-total correlation coefficients ranged from $.20$ to $.75$, with item 6 having a correlation coefficient less than $.30$. However, since the change in the overall reliability coefficient Cronbach's α was negligible at $.02$, the item was retained.

Validity testing

1) Confirmatory factor analysis

Table 1 Descriptive Characteristics of Participants (N = 218).

Variables	Categories	n	%	Mean \pm SD
Gender	Women	207	95.0	32.00 \pm 6.11
	Men	11	5.0	
Age (yr)				
Educational level	Undergraduate school	154	70.6	32.00 \pm 6.11
	Graduate school	64	29.4	
Religion	Yes	75	34.4	32.00 \pm 6.11
	No	143	65.6	
Position	Staff nurse	185	84.9	32.00 \pm 6.11
	Charge nurse	23	10.5	
	\geq Head nurse	10	4.6	
Current working unit	Medical and surgery unit	122	56.0	32.00 \pm 6.11
	Special unit	61	27.9	
	Outpatient and administration	35	16.1	
Period of clinical career in current working unit (yr)				4.66 \pm 4.29
Total clinical career (yr)				8.40 \pm 5.94
Experience of traumatic event at work	Yes	62	28.4	32.00 \pm 6.11
	No	156	71.6	
Time of most recent traumatic event at work	<1 month	14	22.6	32.00 \pm 6.11
	1 month to 1 yr	20	32.2	
	1–3 yrs	21	33.9	
	>3 yrs	7	11.3	
Experience of turnover due to a traumatic event at work	Yes	7	3.2	32.00 \pm 6.11
	No	211	96.8	

Note. SD = Standard deviation.

The CFA results for K-TICS-10 are as follows (Figure 2). Firstly, the fit indices of the model were $\chi^2 = 167.20$ ($p < .001$), CMID/Df = 4.78, GFI = .84, RMSEA = .13, SRMR = .10, NFI = .77, TLI = .75, and CFI = .81 (Table 2). Accordingly, to improve the model fit, modification indices of error terms were examined, and covariance was sequentially set between the error terms of item 2 and item 3, item 3 and item 4, and item 1 and item 5. Then, CFA was conducted three times with each modification, comparing whether each model significantly improved compared to the previous one. After three rounds of CFA, the fit indices of the final model were $\chi^2 = 91.33$ ($p < .001$), CMID/Df = 2.85, GFI = .92, RMSEA = .09, SRMR = .08, NFI = .88, TLI = .88, and CFI = .91, indicating an improved fit. Although the RMSEA, NFI, and TLI indices did not meet the criteria, the overall model fit was deemed acceptable.

Subsequently, we examined whether the items significantly loaded onto a single factor and assessed the standardized factor loadings. The results showed that all items significantly loaded onto a single factor, and the range of standardized factor loadings was $.15$ to $.84$, with all but one item meeting the criterion of $.35$ or above. The one item with a standardized factor loading below the criterion was item 6, which had previously shown the lowest item-total correlation. Consequently, we conducted CFA after removing this item. However, the fit indices of the modified model did not show a satisfactory improvement compared to the model before item removal, with $\chi^2 = 78.04$ ($p < .001$), CMID/Df = 3.25, GFI = .93, RMSEA = .10, SRMR = .08, NFI = .89, TLI = .88, and CFI = .92. Considering the overall model fit and the theoretical perspective of

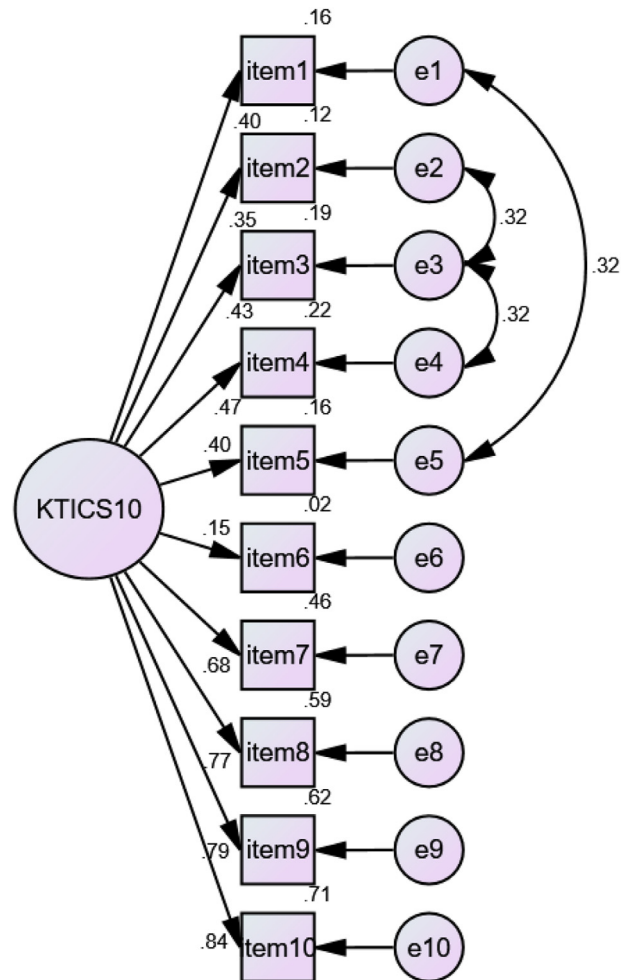


Figure 2. Modified Single-factor Model of the K-TICS-10.

Table 2 Summary of Model Fit Indices for the K-TICS-10 from Confirmatory Factor Analysis.

Criteria	Absolute fit index						Incremental fit index		
	χ^2 (p-value)	df	CMIN/Df	SRMR	GFI	RMSEA	NFI	TLI	CFI
Original TICS-10	229.80	-	≤3.00	≤.08	≥.90	≤.08	≥.90	≥.90	≥.90
K-TICS-10				.03	-	.08	-	.96	.94
Model 1	167.20 ($p < .001$)	35	4.78	.10	.84	.13	.77	.75	.81
Model 2 (item 2–3)	137.22 ($p < .001$)	34	4.04		.88	.12	.81	.80	.85
Model 3 (item 3–4)	113.92 ($p < .001$)	33	3.45	.08	.90	.11	.84	.83	.88
Model 4 (item 1–5)	91.33 ($p < .001$)	32	2.85	.08	.92	.09	.88	.88	.91

Note. CFI = Comparative fit index; CMIN = Minimum value of the discrepancy function; df = Degree of freedom; GFI = Goodness-of-fit index; K-TICS-10 = Korean version of the Trauma-Informed Climate Scale-10; NFI = Normed fit index; RMSEA = Root mean square error of approximation; SRMR = Standardized root mean square residual; TICS-10 = Trauma-Informed Climate Scale-10; TLI = Tucker-Lewis index.

the instrument, we decided to retain the original 10 items of the K-TICS-10.

2) Hypothesis-testing construct validity (convergent validity)

The results of the Pearson's correlation analysis examining the relationships between the measurements revealed that the K-TICS-10 showed a significant positive correlation with affective commitment ($r = .56, p < .001$) and a significant negative correlation with burnout ($r = -.53, p < .001$). The strength of the correlations, which exceeded $|\text{.50}|$, indicated that the convergent validity criteria were met (Table 3).

3) Item-convergent validity

The convergent validity of the items in the K-TICS-10 was evaluated to ascertain whether they effectively captured the same concept. The results indicated that while the AVE of the K-TICS-10 was .34, which was lower than the criterion, the CR was .81, meeting the standard. As a more conservative measure used adjunctively to evaluate the internal structure of the scale, even if the AVE is less than .50, if the CR is above .60, the validity of convergent validity of the items is considered appropriate. Therefore, it was concluded that the convergent validity of the items in the K-TICS-10 was established.

4) Reliability

The internal consistency of the K-TICS-10 was verified by calculating Cronbach's α coefficient, yielding a value of .82, indicating good reliability.

Discussion

This study attempted to validate the reliability and validity of the Korean version of the TICS-10, which was translated into Korean and administered to Korean nurses, aiming to measure their perception of the service environment based on the five key values of TIC. The shortened scale, TICS-10, was selected as a single-factor structure after item reduction. Therefore, in this study, to ensure psychometric

equivalence with the original tool, a single-factor model was chosen, and confirmatory factor analysis (CFA) was conducted.

The CFA results for structural validity confirmed the model fit of the K-TICS-10 using an improved model, in which three pairs of items with high modification indices were sequentially connected via covariance paths. No items were deleted; however, a deeper examination was conducted on one item that did not meet the standardized factor loading criteria. This was the 6th item, which addresses employee autonomy ("I don't have many choices when it comes to doing my job"). In the context of TIC, choice implies ensuring individuals across the organization and system have the opportunity to voice their opinions and receive clear and appropriate messages about their rights and responsibilities. Amini et al. [32] mentioned that nurses' professional autonomy can be influenced to varying degrees by institutional factors such as hospital regulations, protocols, and hierarchical relationships between nurses and physicians. These factors may hinder nurses' professional autonomy. In this context, it can be interpreted that the unique characteristics of nursing work, distinct from other professions, may have influenced the responses to this item. Clinical settings often lack sufficient recognition of nurses' independent decision-making or autonomous authority, and this distinctive nursing work environment may have intervened in the validation of the tool's internal structure.

In this study, the K-TICS-10, which measures trauma-informed climate, established convergent validity within hypothesis-testing construct validity using the concepts of organizational affective commitment and burnout. Alongside the growing interest in the values of TIC, research on the impact of work environments based on these values on organizations, employees, and service recipients has been actively conducted. Hales et al. [13] found that the implementation of TIC brings about positive changes in workplace satisfaction, organizational climate and procedures, client satisfaction, and treatment retention among staff in residential addiction treatment agencies. Keesler [30] emphasized that an organizational culture combining TIC can enhance the quality of life for direct support professionals. Hales et al. [16] suggested that a trauma-informed environment can reduce staff burnout, increase organizational commitment, positively influence staff performance, organizational effectiveness, treatment retention, and completion rates among service recipients.

Although research on TIC in nursing remains relatively scarce, the nursing work environment has been found to have a significant positive correlation with nurses' job performance and organizational commitment [33]. Im et al. [34] investigated the level of organizational commitment among nurses working in comprehensive hospitals in Korea and suggested that nursing organizations should pay attention to nurses' emotional involvement to enhance nursing performance and productivity. Particularly, it was noted that hospital management could increase nurses' emotional attachment to the organization by soliciting and incorporating nurses' opinions into the decision-making process or providing

Table 3 Hypothesis-testing Construct Validity (Convergent Validity) of the K-TICS-10.

Variables	Mean \pm SD	r (p)		
		K-TICS-10	Affective commitment	Burnout
K-TICS-10	28.74 \pm 6.11	1		
Affective commitment	25.33 \pm 5.98	.56 ($p < .001$)	1	
Burnout	28.19 \pm 5.24	-.53 ($p < .001$)	-.50 ($p < 0.001$)	1

Note. SD = Standard deviation.

opportunities for participation. It is suggested that a nursing work environment based on TIC principles could positively impact nursing performance, productivity, and affective commitment.

Furthermore, the American Association of Critical Care Nurses emphasizes the role of a healthy work environment in reducing nurse burnout and advocates for active involvement from healthcare institutions in creating and maintaining such environments [35]. Munnangi et al. [36] also highlight the critical role of the work environment in the occurrence of burnout among trauma nurses. They suggest that nursing administrators should strategically improve the work environment at the nursing administrative level to break the cycle of burnout resulting from prolonged exposure to stressful work environments. Additionally, demonstrating the possibility and willingness of nursing managers to support work-related or personal challenges can foster a supportive atmosphere where nurses feel valued and empowered.

As a result of reviewing the standardized factor loadings of the items in this study, an issue was found where one item did not meet the required criteria. To address this, we further evaluated the AVE and CR to ensure that the individual items of the instrument accurately and consistently represent the theoretical construct they are intended to measure. Although the AVE slightly fell short of the recommended threshold, the CR met the criteria, confirming that the convergent validity of the items was adequately established. Additionally, the reliability of the instrument was supported by a Cronbach's α of .82, indicating a satisfactory level of internal consistency, which substantiates the applicability of the K-TICS-10 in Korean nursing organizations.

Despite the limitations of the study, including the model fit and some standardized factor loadings not meeting the criteria, it is important to consider conducting further research to reevaluate the factor structure and model fit through exploratory factor analysis. Nevertheless, this study holds significance as it validates the reliability and validity of the Korean version of the TICS-10 for the first time in Korea, focusing on nurses in healthcare organizations. The K-TICS-10, a self-report measure consisting of a few items, can contribute to enhancing understanding of trauma-informed organizational culture in Korea. Moreover, it can be valuable for assessing, developing, and evaluating organizational cultures practicing trauma-informed care across various clinical settings.

Conclusion

This study translated and validated the TICS-10, a shortened scale measuring trauma-informed organizational climates based on Hales et al. [16], into Korean and examined its reliability and validity among 218 nurses working in tertiary hospitals in Korea. The results indicated that the K-TICS-10 demonstrated satisfactory psychometric properties among Korean nurses. Based on the findings and discussion of this study, several recommendations are proposed. First, it is necessary to validate the reliability and validity of the K-TICS-10 with a larger sample size. Second, considering the limited research on trauma-informed climates in nursing, it is essential to accumulate foundational data by measuring the awareness and implementation of TIC values in various nursing settings. Third, when developing guidelines and policies for improving the nursing work environment, it is hoped that strategies for enhancing organizational TIC practices identified through the K-TICS-10 will be considered.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors utilized ChatGPT both to translate Korean into English and to check

grammar in English. After using this tool, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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