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SHORT RESEARCH ARTICLE

Validity and Reliability of the Turkish Version of the Specific Pressure Injury Risk Assessment Scale

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ABSTRACT

This study aimed to adapt the Intensive Care Unit–Specific Pressure Injury Risk Assessment Scale developed by Ingrid Wåhlin et al. (2022) for use in Türkiye. A total of 121 patients with critical illness were included in the study: 21 in the pilot phase and 100 in the main study. The reliability analysis comprised item–total correlation, intraclass correlation coefficients, Cronbach's alpha and receiver operating characteristic analysis. The Content Validity Index of the scale ranged from 0.90 to 1.00. The intraclass correlation coefficients values ranged from 0.911 to 0.983, and the Cronbach's alpha coefficient was 0.859. The findings indicate that the Turkish version of the scale is both valid and reliable.

1 | Background and Rationale

Pressure injuries (PIs) are defined by the National Pressure Injury Advisory Panel (NPIAP) and the European Pressure Ulcer Advisory Panel (EPUAP) as 'localized damage to the skin and/or underlying soft tissue, usually over a bony prominence, resulting from intense and/or prolonged pressure in combination with shear, or associated with the use of a medical device or artifact' [1, 2]. The reported incidence and prevalence of PIs vary widely. According to data from the Agency for Healthcare Research and Quality (AHRQ), approximately 2.5 million individuals develop PIs each year [3]. In intensive care units (ICUs), the global prevalence ranges from 1.54% to 32.7% [4]. A study conducted by Baykara et al. reported a general prevalence of 9.5% and an ICU-specific prevalence of 43.2% in Türkiye [5]. These rates indicate that PIs represent a particularly serious issue among ICU patients [6]. The elevated risk in ICUs can be attributed to multiple factors, including limited mobility, prolonged bed rest, use of anaesthetic and sedative drugs, decreased consciousness, metabolic disorders, circulatory and ventilatory impairments, incontinence and mechanical ventilation [7, 8].

Although PIs are largely preventable, they are associated with numerous adverse outcomes, such as prolonged hospital stays, increased healthcare costs, greater social support needs, reduced quality of life and significant psychological effects [6, 9, 10]. Therefore, PI risk should be assessed in patients with critical illness in accordance with clinical guidelines. Several scales have been developed to assess the risk of PI [11, 12]; however, most of them have limitations and are not specific to ICUs settings. Patients with critical illness in ICUs are exposed to multiple and unique risk factors that differ from those in general hospital populations. Consequently, PI risk assessment tools should be tailored specifically to ICUs patients [13]. To address this gap, Ingrid Wåhlin et al. developed the RAPS-ICU, which was designed based on risk factors unique to ICUs patients [14]. However, a Turkish version of this scale has not yet been available. Given the high prevalence of PIs in Türkiye, there is a clear need for a valid

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Impact Statements

- What is known about the topic
  - Patients with critical illness are at a high risk of developing pressure injuries.
  - The risk factors for pressure injuries in intensive care units (ICUs) differ from those in general hospital settings.
  - Pressure injuries are key indicators of nursing care quality, and their risk should be assessed using appropriate measurement tools.
- What this paper adds
  - This study demonstrated that the Intensive Care Unit–Specific Pressure Injury Risk Assessment Scale (RAPS-ICU) is a valid and reliable instrument for use in Türkiye.
  - As this scale has been adapted into multiple languages and is used internationally, its validation for Türkiye will enable more accurate identification of risk factors among patients with critical illness.

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and reliable instrument specifically designed to assess PI risk among ICUs patients in this context.

1.1 | Study Aim

The aim of this study was to adapt the RAPS-ICU developed by Ingrid Wåhlin et al. [14] for use in Türkiye.

2 | Method and Analysis

2.1 | Study Setting and Sample

The study population consisted of patients admitted to the Anesthesia and Resuscitation Intensive Care Unit of a university hospital in Türkiye. The sample size was determined based on the literature, although no specific recommendation was available [15]. For validity and reliability studies, the literature suggests that the sample size should include 12–35 participants per group for the pilot study and at least 5–10 times the number of items in the scale for the main study [16]. The RAPS-ICU consists of six items. Accordingly, a total of 121 ICUs patients were included in this study: 21 in the pilot study and 100 in the main study.

2.2 | Data Analysis

2.2.1 | Pilot Study

The pilot study was conducted with 21 participants who met the inclusion criteria. The intraclass correlation coefficient (ICC) of the scale was calculated as 0.882 (95% confidence interval: 0.695–0.957). The scale demonstrated satisfactory reliability, and the main study was subsequently conducted.

2.2.2 | Validity Analysis

The language and content validity of the scale were evaluated. The language validity was assessed using an online data collection approach. First, the scale was translated from the original language into Turkish by two linguists whose native language is Turkish and who are proficient in English. Subsequently, it was back-translated into the original language by two other linguists using the back-translation method. The translated versions were then reviewed for conceptual equivalence and item clarity, and the final Turkish version of the scale was established.

The content validity was evaluated using the Davis method. The final Turkish version of the scale and an expert opinion form were sent to 10 experts through online platforms (e.g., WhatsApp and email). The experts were asked to assess both the linguistic accuracy and content relevance of the items and to provide feedback or suggestions for revision.

2.2.3 | Reliability Analysis

The reliability of the scale was evaluated using item–total correlation, ICC and Cronbach's alpha coefficient. Receiver operating characteristic (ROC) curve analysis was performed to determine the cut-off point and assess the discriminatory power of the scale scores [17, 18].

2.3 | Ethics Statement

Prior to the commencement of the study, written approval was obtained from the Non-Interventional Ethics Committee of Pamukkale University (Ethics Committee No: E-60116787-020-277723, Date: 27 September 2022), as well as from the institution where the research was conducted and from the participants' family members. The study was conducted in accordance with the principles of the Declaration of Helsinki.

3 | Results

The mean age of the ICUs patients was 66.84 ± 18.06 years, and 58% of the participants were male. The most common reason for ICUs admission was respiratory failure (35%). The mean length of ICUs stay was 19.54 ± 23.91 days, and the mean APACHE score was 36.39 ± 14.57. At the time of ICUs admission, 32% of the participants had pre-existing PIs, whereas 58% developed new PIs during their ICUs stay (Table S1).

The total Content Validity Index (CVI) was calculated as 0.96 for language validity and 1.00 for content validity. In the Turkish version of the RAPS-ICU, item–total correlation coefficients ranged from 0.423 to 0.770 in the first measurement and from 0.352 to 0.749 in the second measurement. The item–total correlation results are presented in Table 1.

The ICC values for individual items ranged from 0.911 to 0.983, whereas the ICC for the total scale score was 0.969 (Table 1). Cronbach's alpha coefficients were 0.905 for the first

TABLE 1 | Item–total correlation and intraclass correlation coefficient values for scale.

	r_1	r_2	ICC	%95 GA	p
Failure in vital organs	0.423	0.352	0.949	0.915–0.970	0.000*
Mobility	0.743	0.677	0.923	0.932–0.976	0.000*
Moisture due to, for example, sweat, urine or faeces	0.482	0.412	0.911	0.854–0.947	0.000*
Sensory perceptions	0.793	0.772	0.937	0.895–0.962	0.000*
Respiratory devices	0.685	0.714	0.955	0.925–0.973	0.000*
Level of consciousness	0.770	0.749	0.983	0.971– 0.990	0.000*
Total			0.969	0.948–0.982	0.000*

Note: r_1, item–total correlation for first measurement ($n = 100$); r_2, item–total Correlation for second measurement ($n = 57$); ICC, intraclass correlation coefficient ($n = 57$).
*$p < 0.05$.

TABLE 2 | Area under the curve (AUC) value for scale.

Test result variable: The specific pressure injury risk assessment scale

			Asymptotic 95% confidence interval	
Area	Std. error	Asymptotic sig	Lower bound	Upper bound
0.921	0.0423	0.000	0.838	1.000

Note: Reference value: Braden scores between 0 and 14 were combined into a high-risk and risky group.

measurement and 0.813 for the second measurement, indicating high internal consistency.

The mean total score of the scale was 12.04 ± 4.04 in the first measurement and 12.21 ± 4.07 in the second measurement. ROC curve analysis, conducted using the Braden Scale as a reference, showed an AUC value of 0.921 (95% CI: 0.838–1.00) for the Turkish version of the scale (Table 2). The optimal cut-off point was determined to be 14.5, with scores above 14.5 indicating a low risk of PI (Table S2, Figure S1).

4 | Discussion

The aim of this study was to determine the validity and reliability of the Turkish version of the RAPS-ICU. In validity studies, content validity is considered the initial step. According to the Davis method, the CVI for each item of the scale should range between 0.80 and 1.00 [19]. In the present study, the CVI for each item ranged from 0.80 to 1.00, indicating high linguistic and content validity.

The reliability of the scale was evaluated using item–total correlation, ICC and Cronbach's alpha coefficient. Item–total correlation is a key indicator of internal consistency, and values above 0.30 are considered acceptable in the literature. In this study, all item–total correlation coefficients were above 0.30 in both the first and second measurements. Moreover, these

coefficients were consistent with those reported for the original version of the scale.

The ICC is another important indicator of reliability. Based on the 95% CI, an ICC value below 0.50 indicates poor reliability, between 0.50 and 0.75 indicates moderate reliability, between 0.75 and 0.90 indicates good reliability, and above 0.90 indicates excellent reliability [17]. In the present study, the ICC value was calculated as 0.969, demonstrating excellent reliability and high internal consistency for the Turkish version of the scale. The ICC values reported for the original version ranged from 0.85 to 0.90, showing that the results of both versions are comparable.

A Cronbach's alpha coefficient above 0.70 indicates a high level of reliability [18]. In this study, Cronbach's alpha coefficients were calculated as 0.859 in the first measurement and 0.836 in the second measurement, both of which demonstrate high internal consistency. However, the Cronbach's alpha coefficient for the original version of the scale was not reported, and therefore, no comparison could be made.

The mean total score of the Turkish version of the scale (12.04 ± 4.04 and 12.21 ± 4.07) for the first and second measurements, respectively, was lower than that of the original version (16.1 ± 4.3). This difference is likely attributable to cross-cultural variations between the study populations. According to the ROC analysis, the optimal cut-off point in this study was 14.5, whereas in the original study it was 17.5. Although the cut-off points of the two versions are relatively close, this difference is also thought to be related to cultural and sample characteristics.

5 | Limitations

This study was conducted in a single institution, which may limit the generalisability of the findings to other ICUs.

6 | Conclusion

This study demonstrated that the Turkish version of the RAPS-ICU is both valid and reliable. Intensive care units are highly specialised settings characterised by unique patient

conditions, treatment protocols and nursing care requirements. Consequently, the risk factors for PIs in ICUs patients differ from those observed in general hospital populations. Therefore, assessment tools specifically designed for intensive care settings are essential for accurately identifying PI risk. In this context, the present study contributes to addressing this gap in Türkiye.

The incidence of PIs remains high in ICUs [13, 20, 21]. Furthermore, the risk factors for PIs among ICUs patients—such as the use of sedatives, decreased consciousness, metabolic disorders and mechanical ventilation—differ markedly from those of general patients [3, 13, 22]. This underscores the need for a specific and reliable measurement tool for monitoring PIs in these settings. The successful adaptation of the RAPS-ICU into Turkish, together with the high validity and reliability coefficients obtained, indicates that the scale is suitable for use in Türkiye. It is anticipated that the implementation of this scale in clinical practice will facilitate early detection of PIs, enhance patient quality of life, and reduce the individual and institutional burden associated with wound care.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. National Wound Care Strategy Programme, *Pressure Ulcer Recommendations and Clinical Pathway* (NHS, 2023), 1–23.

2. J. Kottner, J. Cuddigan, K. Carville, et al., "Prevention and Treatment of Pressure Ulcers/Injuries: The Protocol for the Second Update of the International Clinical Practice Guideline. Tissue Viability Society," 28, no. 2 (2019): 51–58, https://doi.org/10.1016/j.jtv.2019.01.001.

3. AHRQ, *Preventing Pressure Ulcers in Hospitals* (Agency for Healthcare Research and Quality, 2024), https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/index.html.

4. R. J. d. B. R. Picoito, S. M. M. P. d. C. Lapuente, A. C. P. Ramos, I. C. M. Rabiais, S. J. Deodato, and E. M. G. T. Nunes, "Risk Assessment Instruments for Pressure Ulcer in Adults in Critical Situation: A Scoping Review," *Revista Latino-Americana de Enfermagem* 31 (2023): 1–15, https://doi.org/10.1590/1518-8345.6659.3983.

5. Z. G. Baykara, A. Karadag, H. Bulut, et al., "Pressure Injury Prevalence and Risk Factors: A National Multicenter Analytical Study," *Journal of Wound, Ostomy, and Continence Nursing* 50 (2023): 289–295, https://doi.org/10.1097/WON.0000000000000995.

6. L. Q. Liu, J. Kelly, M. Di Cesare, H. T. Allan, and M. Traynor, "The Knowledge and Attitudes Regarding Pressure Ulcer Prevention Among Healthcare Support Workers in the UK: A Cross-Sectional Study," *Journal of Tissue Viability* 32 (2023): 130–135, https://doi.org/10.1016/j.jtv.2022.11.004.

7. S. R. Eachempati, L. J. Hydo, and P. S. Barie, "Factors Influencing the Development of Decubitus Ulcers in Critically Ill Surgical Patients," *Critical Care Medicine* 29 (2001): 1678–1682, https://doi.org/10.1097/00003246-200109000-00004.

8. C. Fife, G. Otto, E. G. Capsuto, et al., "Incidence of Pressure Ulcers in a Neurologic Intensive Care Unit," *Critical Care Medicine* 29 (2001): 283–290, https://doi.org/10.1097/00003246-200102000-00011.

9. L. Demarré, K. Vanderwee, T. Defloor, S. Verhaeghe, L. Schoonhoven, and D. Beeckman, "Pressure Ulcers: Knowledge and Attitude of Nurses and Nursing Assistants in Belgian Nursing Homes," *Journal of Clinical Nursing* 21 (2012): 1425–1434, https://doi.org/10.1111/J.1365-2702.2011.03878.X.

10. S. Khojastehfar, T. Najafi Ghezeljeh, and S. Haghani, "Factors Related to Knowledge, Attitude, and Practice of Nurses in Intensive Care Unit in the Area of Pressure Ulcer Prevention: A Multicenter Study," *Journal of Tissue Viability* 29 (2020): 76–81, https://doi.org/10.1016/j.jtv.2020.02.002.

11. B. Braden and N. Bergstrom, "A Conceptual Schema for the Study of the Etiology of Pressure Sores," *Rehabilitation Nursing* 12 (1987): 8–12.

12. J. Waterlow, "A Risk Assessment Card," *Nursing Times* 81 (1985): 51–55.

13. M. H. Ahtiala, R. Kivimäki, R. Laitio, and E. T. Soppi, "The Association Between Pressure Ulcer/Injury Development and Short-Term Mortality in Critically Ill Patients: A Retrospective Cohort Study," *Wound Management & Prevention* 66 (2020): 14–21, https://doi.org/10.25270/wmp.2020.2.1421.

14. I. Wåhlin, A. C. Ek, M. Lindgren, S. Geijer, and K. Årestedt, "Development and Validation of an ICU-Specific Pressure Injury Risk Assessment Scale," *Scandinavian Journal of Caring Sciences* 35, no. 3 (2021): 769–778, https://doi.org/10.1111/SCS.12891.

15. D. Abu-Alhaija, E. Miller, E. Shaughnessy, and T. Bakas, "Psychometric Testing of the Oncology Nurses Health Behaviors Determinants Scale: A Cross-Sectional Study," *Seminars in Oncology Nursing* 39 (2023): 39, https://doi.org/10.1016/j.soncn.2023.151515.

16. A. R. Kunselman, "A Brief Overview of Pilot Studies and Their Sample Size Justification," *Fertility and Sterility* 121 (2024): 899–901, https://doi.org/10.1016/j.fertnstert.2024.01.040.

17. T. K. Koo and M. Y. Li, "A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research," *Journal of Chiropractic Medicine* 15 (2016): 155–163, https://doi.org/10.1016/J.JCM.2016.02.012.

18. M. Tavakol and R. Dennick, "Making Sense of Cronbach's Alpha," *International Journal of Medical Education* 2 (2011): 53–55, https://doi.org/10.5116/IJME.4DFB.8DFD.

19. D. F. Polit and C. T. Beck, "The Content Validity Index: Are You Sure You Know What's Being Reported? Critique and Recommendations," *Research in Nursing & Health* 29 (2006): 489–497, https://doi.org/10.1002/NUR.20147.

20. S. Ünver, Ü. Y. Fındık, Z. K. Özkan, and Ç. Sürücü, "Attitudes of Surgical Nurses Towards Pressure Ulcer Prevention," *Journal of Tissue Viability* 26 (2017): 277–281, https://doi.org/10.1016/J.JTV.2017.09.001.

21. B. G. Halász, A. Bérešová, L. Tkáčová, D. Magurová, and L. Lizáková, "Nurses' Knowledge and Attitudes Towards Prevention of Pressure Ulcers," *International Journal of Environmental Research and Public Health* 18 (2021): 1–9, https://doi.org/10.3390/IJERPH18041705.

22. E. Niyongabo, E. Gasaba, P. Niyonsenga, et al., "Nurses' Knowledge, Attitudes and Practice Regarding Pressure Ulcers Prevention and Treatment," *Open Journal of Nursing* 12 (2022): 316–333, https://doi.org/10.4236/OJN.2022.125022.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** nicc70329-sup-0001-Appendix.docx.