

Translation, cultural adaptation, and validation of the Greek version of the HERO-36 questionnaire

Tłumaczenie, adaptacja kulturowa i walidacja greckiej wersji kwestionariusza HERO-36

Eleni Karimali^{1,A-F,K} , Zoi Karimali^{1,D,F-G,K} , Olympia Konstantakopoulou^{2,E,G-I} ,
Alexandra Skitsou^{1,G} , Daphne Kaitelidou^{2,G} , Georgios Charalambous^{1,G,L} 

¹School of Health Sciences, Frederick University, Cyprus

²Department of Nursing, National and Kapodistrian University of Athens, Greece

CORRESPONDING AUTHOR:

Eleni Karimali

School of Health Sciences, Frederick University

7 Yianni Frederickou, 1036, Nicosia, Cyprus

e-mail: lenakarimali84@gmail.com

A – Development of the concept and methodology of the study/Opracowanie koncepcji i metodologii badań; B – Query – a review and analysis of the literature/Kwerenda – przegląd i analiza literatury przedmiotu; C – Submission of the application to the appropriate Bioethics Committee/Złożenie wniosku do właściwej Komisji Biotycznej; D – Collection of research material/Gromadzenie materiału badawczego; E – Analysis of the research material/Analiza materiału badawczego; F – Preparation of draft version of manuscript/Przygotowanie roboczej wersji artykułu; G – Critical analysis of manuscript draft version/Analiza krytyczna roboczej wersji artykułu; H – Statistical analysis of the research material/Analiza statystyczna materiału badawczego; I – Interpretation of the performed statistical analysis/Interpretacja dokonanej analizy statystycznej; K – Technical preparation of manuscript in accordance with the journal regulations/Opracowanie techniczne artykułu zgodnie z regulaminem czasopisma; L – Supervision of the research and preparation of the manuscript/Nadzór nad przebiegiem badań i przygotowaniem artykułu

STRESZCZENIE

TŁUMACZENIE, ADAPTACJA KULTUROWA I WALIDACJA GRECKIEJ WERSJI KWESTIONARIUSZA HERO-36

Cel pracy. Celem niniejszego badania było przetłumaczenie, adaptacja kulturowa oraz walidacja kwestionariusza HERO-36 przeznaczonego dla pracowników służby zdrowia w 12 szpitalach publicznych w Attyce w Grecji.

Materiał i metody. Równoważność językową i pojęciową osiągnięto poprzez proces tłumaczenia metodą „forward–backward”. Przeprowadzono badanie pilotażowe z udziałem 30 uczestników, którzy wypełnili kwestionariusz dwukrotnie, w odstępie jednego tygodnia. Rzetelność oceniono za pomocą współczynników korelacji Spearmana i współczynnika alfa Cronbacha. Ponadto sześciu specjalistów (trzech pielęgniarek i trzech pracowników administracyjnych) oraz panel pięciu ekspertów uniwersyteckich dokonał przeglądu ostatecznej wersji w celu zwiększenia przejrzystości i adekwatności kulturowej.

Wyniki. Kwestionariusz HERO-36 przetłumaczony na język grecki wykazał doskonałą rzetelność test-retest (współczynnik Spearmana $r > 0.89$, $p < 0.001$) oraz wysoką spójność wewnętrzną, z wyjątkiem dwóch podskal: „Typowe praktyki” ($\alpha=0.91$), „Nietypowe praktyki” ($\alpha=0.95$) oraz „Miary wyników” ($\alpha=0.89$). Potwierdzająca analiza czynnikowa potwierdziła trafność czynnikową oryginalnej struktury. Wprowadzono niewielkie zmiany w sformułowaniach w celu poprawy zrozumiałości i dostosowania kulturowego.

Wnioski. Grecka wersja kwestionariusza HERO-36 stanowi rzetelne i miarodajne narzędzie do oceny praktyk przywódczych i zarządzania wśród pracowników służby zdrowia w sytuacjach kryzysowych. Może ona okazać się przydatna w badaniach naukowych oraz w zarządzaniu zespołami w greckich szpitalach, choć zaleca się przeprowadzenie dalszej walidacji na większych i bardziej różnorodnych próbach.

Słowa kluczowe:

rzetelność, Grecja, adaptacja międzykulturowa, walidacja psychometryczna, HERO-36

ABSTRACT

TRANSLATION, CULTURAL ADAPTATION, AND VALIDATION OF THE GREEK VERSION OF THE HERO-36 QUESTIONNAIRE

Aim. The aim of this study was to translate, culturally adapt, and validate the HERO-36 questionnaire for health professionals in 12 public hospitals in Attica, Greece.

Material and methods. Linguistic and conceptual equivalence was achieved through a forward–backward translation process. A pilot test was conducted with 30 participants who completed the questionnaire twice, one week apart. Reliability was assessed through the use of Spearman correlation coefficients and Cronbach's alpha. Additionally, six professional practitioners (three nurses and three administrative staff) and a panel of five university experts reviewed the final version to enhance clarity and cultural relevance.

Results. The HERO-36 questionnaire translated in Greek demonstrated excellent test–retest reliability (Spearman $r > 0.89$, $p < 0.001$) and high internal consistency, except for two subscales: “Typical Practices” ($\alpha=0.91$), “Atypical Practices” ($\alpha=0.95$), and “Outcome Measures” ($\alpha=0.89$). Confirmatory factor analysis supported the factorial validity of the original structure. Minor phrasing changes were made to improve understanding and cultural adaptation.

Conclusions. The Greek version of the HERO-36 is a reliable and valid tool for assessing leadership and management practices among healthcare professionals during crises. It can be useful for research and team management in Greek hospitals, though further validation with larger, more diverse samples is recommended.

Key words:

reliability, Greece, cross-cultural adaptation, psychometric validation, HERO-36

INTRODUCTION

Health systems are stress-tested for their resilience and efficiency during pandemics, earthquakes and large-scale emergencies. Strong leadership and a good management are mandatory for organization of the response, quality of care and to preserve both patients and health staff [1,2]. The outbreak of COVID-19 pandemic brought to the forefront the need for adaptive leadership and systemic management to strengthen organizational resilience [3]. The HERO-36 questionnaire, developed by Atkinson et al. (2022), is a standardized tool designed to evaluate leadership and management actions during crises. It assesses three domains: Typical Practices (response readiness, role standardization, structured communication and transactional interactions), Atypical Practices (adaptability, ad hoc collaboration, interpersonal communication and relational interactions), and Outcome Measures (resilience and performance). It has been validated as a multidimensional measure of healthcare leadership effectiveness in crisis contexts [4,5].

However, instruments developed in one language cannot be directly applied in another without proper cross-cultural adaptation to ensure conceptual and semantic equivalence [6,7]. According to international methodological standards, this process involves forward-backward translation, expert review, pilot testing, and psychometric evaluation [8].

In Greece, the need for validated tools assessing leadership and crisis management competencies in healthcare settings has become urgent. The COVID-19 pandemic revealed critical gaps in coordination and preparedness within hospitals of the 1st Regional Health Authority of Attica [9]. The Greek version of the HERO-36 would thus provide a scientifically reliable instrument for evaluating leadership and management during health crises.

AIM

To translate and culturally adapt the HERO-36 into Greek using a standardized forward-backward process:

- To assess its test-retest reliability and internal consistency, and
- To confirm its construct validity and alignment with the original factor structure.

MATERIALS AND METHODS

Design

The present study followed a cross-sectional validation study for the cross-cultural adaptation process and comprised the analysis of psychometric proprieties of HERO-36 questionnaire. The adaptation followed standard procedures for cross-cultural adaptation of self-report instruments [6,7].

The research was performed in a number of phases: a) pilot test with a Cross-sectional test-retest reliability design, b) the focus group's content validation rounds, c) the final approval by the panel of experts, and d) the

implementation of statistical methods, in particular confirmatory factor analysis (CFA) to assess model fit (how well the model matches the observed data) and evaluate convergent validity (n=604).

The protocol of the study was approved by the ethical review committee of the scientific councils of the participating hospitals. All participants provided their informed consent prior to the completion of the questionnaire. The study was carried out in accordance with the requirements of the Declaration of Helsinki.

Translation and cross-cultural adaptation

Translations were conducted in accordance with the forward-backward translation protocol of the World Health Organization [10]. Bilingual translators twice independently translated the English HERO-36 into Greek (forward translation). Comparison was made between the two translated English versions and an intermediate Greek version was compiled by a third reviewer competent in healthcare language terminology.

A second pair of translators, who were not familiar to the original English version, back-translated the revised scale into English. The backward translation was then compared with the original English version of the questionnaire to detect any semantic differences or conceptual changes.

Pilot testing and test-retest reliability

A pilot study was also performed with 30 hospital workers (nurses, doctors and administrative staff members) of hospitals that were part of the 1st Regional Health Authority of Attica. All participants in this study completed the Greek HERO-36 twice, one week apart, to measure test-retest reliability. A total of 60 filled in questionnaires were received.

The test-retest reliability was explored using Spearman's correlation coefficients, and internal consistency reliability was determined by calculating Cronbach's alpha (α) coefficients. Alpha ≥ 0.70 was judged to be an acceptable reliability [11].

Focus group and content validation

A focus group of six healthcare professionals—three nurses and three administrative officers—was formed to discuss the translated items. Participants were purposively selected based on their professional experience in Greek hospital settings and their familiarity with organizational and communication processes. The group reviewed the clarity, wording and cultural relevance of each question, suggesting modifications where necessary. The focus group discussions were recorded and analyzed qualitatively to identify areas requiring improvement.

Based on the feedback, several items were slightly rephrased to improve clarity and contextual relevance, particularly regarding organizational hierarchy and communication styles in Greek hospitals.

Expert panel review

After the focus group process, five university professors with expertise in nursing or agency administration, health policy and psychometrics reviewed the revised instrument

as a panel of experts. Experts were selected based on their academic background and research experience relevant to the constructs under study. The items were evaluated regarding the content validity, conceptual consistency and linguistic relevance. Their comments resulted in some minor changes in wording, and the final Greek version of HERO-36 was set for subsequent validation studies and field experience.

Statistical analysis

SPSS version 21.0 (IBM SPSS Statistics) was used for all statistical analyses. Descriptive statistics were calculated for the participants' demographic characteristics. Internal consistency was assessed using Cronbach's alpha, while test-retest reliability was evaluated using Spearman's rho correlation coefficient. Confirmatory Factor Analysis (CFA) was applied to investigate the factor structure of the tool. The analysis was implemented with the statistical software jamovi (version 2.7.6), which uses the lavaan package of the language R [12]. Maximum Likelihood was used as the estimation method. The quality of the model fit was evaluated through indicators such as 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) [13-15]. All tests were two-tailed, $p < 0.05$ was considered significant.

RESULTS

Cultural and linguistic adaptation

During the cross-cultural adaptation, all 36 items of the original HERO-36 were translated and reviewed via forward-backward translation method. Some slight adjustments were made to take account of the cultural and conceptual equivalence with the Greek medical terminology. In particular, these substitutions are in line with previous studies on the cultural adaptation of health-related instruments and were implemented to reflect the terminology and practices common in the Greek healthcare system [4]. None of the item content was eliminated nor added and the original tool structure was retained. The focus group feedback ($n = 6$) indicated the content validity for all of the items, and only minor stylistic changes were made after approval by the expert panel ($n = 5$ university staff).

Reliability analysis

Thirty hospital employees who provided informed consent participated in the pilot study and completed the questionnaire at two intervals (one week) (total=60 questionnaires). Reliability: The Greek HERO-36 had adequate internal consistency for all subscales, and test-retest reliability was stable. The reliability coefficients of the Greek HERO-36 ($n = 30$) are presented in Table 1. Cronbach's alpha values above 0.70 indicated acceptable internal consistency [11]. Spearman's coefficients ranged between 0.889 and 1 in Typical practises, in Atypical practises, it ranged between 0.969 and 1 and in Outcome Measures ranged between 0.890 and 1, confirming high test-retest reliability.

■ Tab. 1. Reliability coefficients of the Greek HERO-36 ($n = 30$)

Subscale	Cronbach's α	p-value
Typical Practices	0.91	< 0.001
Atypical Practices	0.95	< 0.001
Outcome Measures	0.89	< 0.001

Study sample demographics

The study population consisted of 604 healthcare professionals. Table 2 presents the demographic characteristics of the study participants. The majority of participants were women (72.0%), and most were of Greek nationality (98.0%). Regarding age, most participants belonged to the 45-54 year age group (32.9%), followed by the 35-44 year group (24.0%) and the 25-34 year group (20.2%). Healthcare professionals under the age of 25 accounted for only 3.0%, whereas those aged 55 years and older represented 19.9% of the sample. With respect to educational level, most participants held a master's degree (35.9%), followed by university graduates (bachelor's degree holders from universities; 23.3%) and graduates of Technological Educational Institutes (19.4%). Additionally, 14.1% had completed studies at Vocational Institutes or Higher Schools, while 7.3% had completed a doctoral degree. Overall, the sample is characterized by a predominance of female healthcare professionals, of middle and older age, and with a high educational level, as more than 4 out of 10 participants (43.2%) possessed a postgraduate or doctoral qualification.

■ Tab. 2. Demographic characteristics ($n=604$)

Characteristic	N	%
Gender		
Male	169	28.0
Female	435	72.0
Nationality		
Greek	592	98.0
Non-Greek	12	2.0
Age		
< 25 years	18	3.0
25-34 years	122	20.2
35-44 years	145	24.0
45-54 years	199	32.9
55 years and older	120	19.9
Educational level		
University degree (Bachelor's, AEI)	141	23.3
Technological Institute degree (TEI)	117	19.4
Vocational Institute / Higher School	85	14.1
Master's degree	217	35.9
Doctoral degree	44	7.3

Construct validity

The CFAs corroborated the three-factor structure posited by Atkinson et al. (2022) [4]. The SRMR (=0.058) and RMSEA (=0.062, 95% CI: 0.059–0.064) showed that the model had a good to acceptable fit, but the CFI and TLI indices were < 0.90 (=0.863 and 0.851, respectively), suggesting that the model was not ideal and could be improved [16] (Tab. 3). All loadings of the items were significant ($p < 0.001$) which ascertains the structural validity of the Greek version (Tab. 4).

■ Tab. 3. Model fit and fit measures

Model Fit							
Test for Exact Fit							
χ^2		df		p			
4263		942		<.001			
Fit Measures							
				RMSEA 90% CI			
CFI	TLI	SRMR	RMSEA	Lower	Upper	AIC	BIC
0.802	0.792	0.0620	0.0764	0.0741	0.0787	69300	69907

DISCUSSION

The present study aimed to produce a culturally adapted Greek version of the HERO-36 questionnaire and to evaluate its psychometric properties in a large sample of healthcare professionals. The findings confirm that the Greek translation maintains the conceptual integrity of the original scale while demonstrating robust reliability and satisfactory construct validity. These results highlight the relevance and applicability of the tool within the Greek healthcare context, particularly considering the heightened need for structured crisis leadership assessment following the COVID-19 pandemic.

A key strength of this study lies in the rigorous methodological approach used during the translation and adaptation process. The forward - backward translation procedures, complemented by a focus group of healthcare workers and an expert panel review, ensured conceptual, linguistic and cultural equivalence. Minor terminological refinements were required, especially concerning hierarchical communication practices and managerial terminology commonly used in Greek hospitals, but the overall item structure remained unchanged. This high level of equivalence reinforces the appropriateness of the instrument in capturing leadership behaviors in Greek healthcare environments, aligning with established cross-cultural adaptation guidelines cited in the article [6,7].

Reliability tests further strengthened the instrument's credibility. Internal consistency values for all subscales exceeded the recommended threshold of 0.70, with Cronbach's alpha coefficients ranging from 0.89 to 0.95, indicating excellent coherence among items [4].

These findings are consistent with the reliability levels reported in the original HERO-36 validation, suggesting that the Greek sample interpreted and responded to the items in a consistent manner [11]. Furthermore, the high test-retest correlations ($\rho = 0.889-1.0$) indicate exceptional

■ Tab. 4. Factor loadings

Factor	Indicator	Estimate	SE	95% Confidence Interval		Z	p	Stand. Estimate
				Lower	Upper			
Factor 1	e1	0.503	0.0367	0.431	0.574	13.7	<.001	0.531
	e3	0.759	0.0419	0.677	0.841	18.1	<.001	0.666
	e4	0.855	0.0437	0.770	0.941	19.6	<.001	0.706
	e5	0.898	0.0441	0.811	0.984	20.3	<.001	0.727
	e6	0.894	0.0408	0.814	0.974	21.9	<.001	0.765
	e7	0.656	0.0440	0.570	0.743	14.9	<.001	0.570
	e8	0.742	0.0408	0.662	0.822	18.2	<.001	0.667
	e9	0.821	0.0404	0.741	0.900	20.3	<.001	0.726
	e10	0.935	0.0399	0.856	1.013	23.4	<.001	0.801
	e11	0.862	0.0417	0.781	0.944	20.7	<.001	0.736
	e12	0.724	0.0374	0.650	0.797	19.4	<.001	0.701
	e13	0.769	0.0383	0.694	0.844	20.1	<.001	0.720
	e14	0.691	0.0446	0.604	0.778	15.5	<.001	0.588
	e15	0.770	0.0403	0.691	0.849	19.1	<.001	0.694
	e16	0.653	0.0371	0.580	0.725	17.6	<.001	0.651
	e18	0.621	0.0455	0.532	0.710	13.7	<.001	0.530
	e19	0.681	0.0426	0.597	0.764	16.0	<.001	0.604
Factor 2	e20	0.568	0.0394	0.491	0.646	14.4	<.001	0.556
	e21	0.614	0.0414	0.533	0.695	14.8	<.001	0.568
	e22	0.647	0.0453	0.559	0.736	14.3	<.001	0.551
	e23	0.580	0.0383	0.505	0.655	15.1	<.001	0.579
	e24	0.567	0.0440	0.481	0.653	12.9	<.001	0.504
	e25	0.671	0.0412	0.590	0.752	16.3	<.001	0.613
	e26	0.785	0.0413	0.704	0.866	19.0	<.001	0.690
	e27	0.630	0.0470	0.537	0.722	13.4	<.001	0.521
	e28	0.562	0.0418	0.480	0.644	13.4	<.001	0.523
	e29	0.915	0.0393	0.838	0.992	23.3	<.001	0.800
	e30	0.925	0.0394	0.848	1.002	23.5	<.001	0.805
	e31	0.770	0.0420	0.688	0.853	18.3	<.001	0.671
	e32	0.886	0.0389	0.810	0.962	22.8	<.001	0.788
	e33	0.810	0.0391	0.733	0.887	20.7	<.001	0.735
	e34	0.917	0.0400	0.839	0.996	22.9	<.001	0.791
	e35	0.817	0.0405	0.737	0.896	20.2	<.001	0.722
	e36	0.799	0.0401	0.720	0.877	19.9	<.001	0.716
Factor 3	e37	0.777	0.0370	0.705	0.850	21.0	<.001	0.747
	e38	0.591	0.0361	0.520	0.661	16.3	<.001	0.618
	e39	0.700	0.0371	0.627	0.773	18.9	<.001	0.690
	e40	0.774	0.0410	0.694	0.855	18.9	<.001	0.691
	e41	0.697	0.0363	0.626	0.768	19.2	<.001	0.699
	e43	0.814	0.0410	0.734	0.895	19.9	<.001	0.718
	e44	0.815	0.0434	0.730	0.900	18.8	<.001	0.688
	e45	0.856	0.0410	0.775	0.936	20.9	<.001	0.744
	e46	0.884	0.0391	0.807	0.960	22.6	<.001	0.785
	e47	0.686	0.0396	0.609	0.764	17.3	<.001	0.648
	e48	0.770	0.0403	0.691	0.849	19.1	<.001	0.696

temporal stability overtime, meaning that participants' responses remained stable over the one-week interval. This stability is particularly important for tools measuring leadership behaviors, which may be influenced by organizational culture, workplace pressures or individual perceptions. The stability observed here demonstrates that Greek healthcare professionals show consistent interpretations of leadership behaviors across time, even within dynamic hospital environments.

Construct validity was examined through Confirmatory Factor Analysis, which confirmed the original three-factor model consisting of Typical Practices, Atypical Practices and Outcome Measures. Although the fit indices RMSEA (0.062) and SRMR (0.058) suggested good model fit, the CFI (0.863) and TLI (0.851) were slightly below ideal thresholds, indicating that the model could benefit from further refinement or re-examination in more diverse samples [16].

Nonetheless, the statistically significant factor loadings for every item ($p < .001$) demonstrate that each item contributes meaningfully to the underlying constructs. One possible explanation for the slightly lower fit indices may be related to cultural differences in leadership expectations within Greek hospitals, where hierarchical structures and centralized decision-making remain dominant. These cultural dynamics may influence the extent to which leadership practices, especially atypical or adaptive behaviors, are expressed or perceived by staff. Future research could explore whether Greek healthcare professionals conceptualize certain leadership dimensions differently compared with their counterparts in other countries, particularly regarding shared decision-making, adaptive collaboration and relational practices.

Another salient aspect of this study concerns the demographic characteristics of the sample. The high educational attainment of participants (over 43% with postgraduate or doctoral studies) and the predominance of women (72%) reflect the composition of the Greek healthcare workforce but may also influence how leadership practices are evaluated [9].

Prior studies have shown that highly educated healthcare practitioners tend to place greater emphasis on communication quality, organizational transparency, and participatory leadership, all of which are domains assessed by the HERO-36. Thus, the strong psychometric performance of the tool in this study may be partly attributed to the professional maturity and experience level of the sample. However, this also suggests the importance of future validation studies that include younger professionals, staff from smaller regional hospitals, and more diverse clinical settings.

From a practical standpoint, the Greek HERO-36 provides a much-needed standardized instrument for evaluating crisis leadership and management capacity in Greece. The COVID-19 pandemic exposed significant vulnerabilities in the Greek healthcare system, including fragmented communication channels, inconsistent crisis preparedness, and limited adaptive management capacity. The validated questionnaire HERO-36 enables systematic assessment of these domains, allowing hospital administrators

and policymakers to identify organizational weaknesses, allocate resources strategically and design targeted training programs that enhance resilience. Moreover, the tool supports benchmarking across hospitals and regions, opening the path for longitudinal monitoring of leadership performance.

The study also contributes to the international literature by expanding the availability of the HERO-36 to a new linguistic and cultural context. Cross-national comparability is crucial for resilience research, especially given the global nature of health crises. The Greek adaptation aligns with similar efforts conducted in other countries and sectors, reinforcing the argument that leadership behaviors linked to resilience such as adaptability, structured communication, and collaborative problem-solving are universal yet must be assessed through culturally sensitive tools.

Finally, this work provides an evidence-based foundation for integrating leadership assessment into the healthcare quality improvement frameworks in Greece. The questionnaire HERO-36 can support leadership development initiatives, staff training programs, organizational diagnostics, and crisis preparedness planning. It can also complement broader resilience assessment models used internationally, thereby situating Greek healthcare research within the global discourse on crisis management and health systems readiness.

Limitations of study

Several limitations should be considered when interpreting the findings of this study. Firstly, although the main validation sample was substantial ($n = 604$), the test-retest reliability sample consisted of only 30 participants, all drawn from hospitals within the 1st Regional Health Authority of Attica. This may restrict the generalizability of the reliability estimates to other healthcare regions or professional groups.

Secondly, the one-week interval for test retest assessment, despite being sufficient to evaluate short-term stability, may not fully capture response consistency over longer periods or in differing crisis conditions. Future studies might employ longer intervals and repeated assessments to further explore temporal stability.

Thirdly, although analysis of the CFA supported the three-factor structure, certain fit indices (CFI, TLI) fell below ideal levels, suggesting that future research with larger and more diverse samples may be necessary to confirm whether cultural, systemic, or occupational differences influence the factorial configuration of the tool.

Fourthly, the study relied entirely on self-reported data, which may introduce social desirability bias, particularly since the questionnaire addresses perceptions of leadership behavior an inherently sensitive topic among employees. Healthcare workers may have provided responses they perceived as socially acceptable or professionally aligned with expected organizational norms.

Finally, the study focused primarily on translation accuracy and psychometric evaluation and did not assess other important validity components such as predictive validity or sensitivity to interventions. Further research

examining the tool's ability to predict crisis performance or detect changes following leadership training would significantly enhance its practical utility.

CONCLUSIONS

The study successfully translated and culturally adapted the HERO-36 questionnaire into Greek, producing an instrument with strong psychometric properties and theoretical coherence. The Greek version demonstrated excellent internal consistency, high test retest reliability, and a validated three-factor structure consistent with the original tool. These results confirm the conceptual, semantic, and cultural equivalence of the Greek adaptation and support its use in evaluating leadership and management resilience during crises within Greek healthcare environments.

The Greek version of the HERO-36 represents an important advancement for healthcare administration research in Greece, enabling systematic assessment of organizational readiness, leadership effectiveness and crisis management capacity. By providing a reliable and culturally appropriate measurement tool, the study enhances opportunities for national benchmarking, organizational development, and participation in international leadership research. Continued validation in broader populations and diverse healthcare settings is recommended to further strengthen its applicability and inform evidence-based improvements in crisis leadership and health system resilience.

ORCID

Eleni Karimali  <https://orcid.org/0009-0007-9401-9720>
 Zoi Karimali  <https://orcid.org/0009-0004-0021-6693>
 Olympia Konstantakopoulou  <https://orcid.org/0000-0002-7241-6860>
 Alexandra Skitsou  <https://orcid.org/0000-0001-9537-3595>
 Daphne Kaitelidou  <https://orcid.org/0000-0002-4881-3567>
 Georgios Charalambous  <https://orcid.org/0000-0001-6384-732X>

REFERENCES

1. Northouse PG. Leadership: Theory and practice. 9th ed. SAGE Publications. 2022
2. Hartley J, Peters K, Pahl S. Leadership and management in health and social care. Routledge. 2020. <https://doi.org/10.4324/9780429266523>
3. World Health Organization. Building health systems resilience for universal health coverage and health security during the COVID-19 pandemic and beyond. World Health Organization. 2021
4. Atkinson MK, Biddinger PD, Chughtai MA, et al. Assessing health care leadership and management for resilience and performance during crisis: The HERO-36. *Health Care Manage Rev.* 2024;49(1):14-22. <https://doi.org/10.1097/HMR.0000000000000387>
5. Wang X, Shao J, Lian J, et al. Measuring the Nursing Work Environment during Public Health Emergencies: Scale Adaptation and Validation. *J. Nurs. Manag.* 2024;9910079. <https://doi.org/10.1155/2024/9910079>
6. Beaton DE, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine.* 2000;25(24):3186-3191. <https://doi.org/10.1097/00007632-200012150-00014>
7. Sousa VD, Rojjanasirak W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: A clear and user-friendly guideline. *J. Eval. Clin. Pract.* 2011;17(2):268-274. <https://doi.org/10.1111/j.1365-2753.2010.01434.x>
8. Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice (11th ed.). Wolters Kluwer. 2021
9. Giannopoulou I, Tsobanoglou GO. COVID-19 pandemic: challenges and opportunities for the Greek health care system. *Ir. J. Psychol. Med.* 2020;37(3):226-230. <https://doi.org/10.1017/ipm.2020.35>

10. Cruchinho P, López-Franco MD, Capelas ML, et al. Translation, Cross-Cultural Adaptation, and Validation of Measurement Instruments: A Practical Guideline for Novice Researchers. *J. Multidiscip. Healthc.* 2024;17:2701-2728. <https://doi.org/10.2147/JMDH.S419714>
11. Tavakol M, Dennick R. Making sense of Cronbach's alpha. *Int. J. Med. Educ.* 2011;2:53-55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
12. Rosseel Y, et al. lavaan: Latent Variable Analysis. [R package]. 2024. Retrieved from <https://cran.r-project.org/package=lavaan>.
13. The jamovi project. jamovi. (Version 2.7) [Computer Software]. 2025. Retrieved from <https://www.jamovi.org>.
14. CoreTeam R. R: A Language and environment for statistical computing. (Version 4.5) [Computer software]. 2025. Retrieved from <https://cran.r-project.org>. (R packages retrieved from CRAN snapshot 2025-05-25)
15. Epskamp S. semPlot: Path Diagrams and Visual Analysis of Various SEM Packages' Output. [R package]. 2022. Retrieved from <https://cran.r-project.org/package=semPlot>.
16. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling.* 1999;6(1):1-55. <https://doi.org/10.1080/10705519909540118>

Manuscript received: 15.10.2025

Manuscript accepted: 03.12.2025