Original Article

A Short Assessment Tool for Management of Knowledge and Alertness in Greek Hospitals

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Abstract

Background: There is an international need for short, valid and reliable tools in order to assess the level of hospital preparedness, to identify the gaps in the functionality of hospitals and to take the appropriate measures for each organization and every major emergency situation. Objective: To create a short-form tool for evaluating hospital readiness. After checking its basic validity and reliability parameters, the tool was used to explore hospital vulnerabilities in relation to knowledge management and staff preparedness**.**
Methodology: A short form preparedness assessment tool was created including 17 closed-ended questions, whose responses were graded on a Likert scale (0-4). The face, content, and structural validity and internal reliability of the questionnaire were tested with a nationwide convenience sample of 208 hospital employees (health and non-health care workers).
Results: The study sample comprised 72 nurses, 63 physicians, 36 physical therapists, 23 administrators, and 14 technologists (20 individuals in total, 155 women). Their mean age was with 42.4±3.5 years old and the mean length of service at the specific hospital was 13.2±3.4 years. Factor analysis revealed three factors (leadership-supportive environment, collaboration-readiness with Cronbach's a values of 0.85, 0.71 and 0.83 respectively. The mean values per factor (dimension) were 1.81±0.76 for leadership, 2.75±0.62 for collaboration and 2.62±0.69 for readiness All three factors were statistically significantly and positively correlated with each other ($p<0.001$).
Conclusions: The proposed short assessment tool shows very satisfactory construct validity and internal reliability. Deficits are highlighted in the leadership factor, with a possible impact on the other two factors as well. The tool is qualified for larger-scale studies and the findings of the study can be used to improve preparedness in Greek hospitals.

Key words: hospital preparedness, knowledge management, research tool , validity, reliability

Introduction

According to the United Nations Disaster Reduction Strategy, "preparedness" refers to the knowledge and skills developed by governments, professional response and recovery organizations, communities and individuals to effectively respond to and recover from the effects of potential, impending or current risk events or conditions (WHO & the World Bank 2022, WHO & PAHO 2015).

Preparedness refers to a series of actions such as emergency planning, equipment and supplies, coordination of various sectors, evacuation and public information, as well as relevant training and field exercises, with the implementation of early warning systems and the corresponding institutional support. Essentially, the term "preparedness" describes the ability to immediately, quickly and appropriately respond to emergency

conditions "when" and "where" required (WHO 2019a, WHO 2019b, WHO 2014)

The mission of hospitals is to treat patients using the latest advances in medicine while providing a high level of quality medical services (WHO 2019b). This raises the need for continuous improvement of the management of the organization and improvement of the skills of the employed doctors and staff. This approach represents a capacity building process that fosters a high-performance culture (Bambra et al., 2008).

The World Health Organization and the Regional Office for Europe have developed the Hospital Emergency Checklist to assist those involved in emergency management in the hospital environment. It refers to practical issues and to general decision-making, aiming at an effective response to disasters, according to the most likely scenarios. (WHO 2019a, WHO 2019b, Fahlevi & Alharbi 2021). The COVID-19 pandemic has highlighted the gaps in the operational readiness of hospitals worldwide and especially in their ability to care for a large number of patients (Al-Romaihi et al., 2021, Bala et al., 2022, Elhadi et al., 2020, Lal et al 2022). Concerns about health system resilience and emergency management have led to efforts to create hospital preparedness assessment tools. There is an international need for short, valid and reliable tools in order to assess the level of preparedness, to identify the gaps in the functionality of hospitals and to take the appropriate measures for each organization and every major emergency situation.

The purpose of this study was to create a short tool for evaluating hospital readiness, to test its validity and reliability parameters and through this to highlight the hospitals' vulnerabilities in relation to knowledge management and staff preparedness/readiness.

Research questions:

- Is the proposed research tool valid and reliable?
- Which are the hospitals' vulnerabilities in relation to knowledge management and staff readiness?

Method

Study Population: The population under study comprised health professionals, who worked in all hospital structures nationwide, mainly in Emergency departments, Nursing departments for suspected or confirmed patients with infection, Artificial Kidney Units, operating rooms where emergency operations were performed and intensive care units of public hospitals. The sample consisted of 208 women and men (convenience sample). It was a cross-sectional study.

Instruments of Data Collection: A questionnaire with closed-type questions was used. The questionnaire was created according to the international literature on the issue of hospital preparedness, (Al-Hajj et al., 2020, Karamitri et al., 2017, Khan et al., 2018,Mehmood et al., 2018, Miller, 2011, Ortiz-Barrios et al., 2020,Rong, 2015, Seyedin et al., 2021, Shammah, 2018, Wurmb et al., 2020) and included 17 closed-ended questions about the assessment of perceptions, knowledge and attitudes regarding knowledge management in health structures, in relation to preparedness (preparedness in emergency situations e.g. COVID-19 pandemic), with the proposed answers provided on a Likert scale (0-4: not at all-little -moderate-very-very much). The English and Greek version of the proposed questionnaire is presented in the Appendix (appendix tables 1 & 2)

Data Collection: The data were collected during the period from December 2020 to February 2021, using a properly designed questionnaire that was distributed online using google forms.

Statistics: The statistical processing of the data was carried out with the SPSS 22.0 program. The level of statistical significance was set at $p = 0.05$.

Questionnaire Validity: Questionnaire validity refers to the extent to which a questionnaire measures what it is designed to measure. The aspects of the validity of a questionnaire that are usually examined are face, content and construct validity. In face validity assessment, experienced researchers evaluate the ease the questionnaire id answered and the ability to understand the questions by the target population. For the questionnaire under study, this examination was carried out by 2 professors of the postgraduate program. Content validity refers to the adequacy of questionnaire items, so that it is conceptually supported. This validity aspect in the present study was examined with a pilot study of

selected population of 30 physical therapists. Participants wrote comments for each question regarding the clarity of meaning contained in each sentence. Minor adjustments followed, based on their feedback. With regard to the structural validity of the research instrument, an exploratory factor analysis was performed with principal component analysis with Varimax rotation, in order to study the structure of the scale (structural validity analysis). The criteria used to select factors were eigenvalue > 1 and factor loading > 0.30. The Bartlett Test of Sphericity showed statistically significant values ($p<0.0005$) in all subscales, while the Kaiser-Meyer-Olkin Measure of Sampling Adequacy test showed a value > 0.60 (value 0.771), arguing for the suitability of the data for analysis. The Varimax rotation revealed three factors (work passion, motivation, information seeking). With a criterion loading value greater than 0.3, three factors were extracted.

Reliability analysis: The reliability of the subscales of the questionnaire was investigated with the internal consistency (with the Cronbach index). The index ranges from 0-1 and is evaluated follows: adequate >0.60, satisfactory 0.70-0.80, very satisfactory between 0.80-0.90 and excellent above 0.90. Of note, values above 0.97 should be treated with caution as they indicate very limited dispersion of responses. Cronbach 's reliability coefficients a for the three factors were 0.71 for collaboration, 0.85 for leadership, and 0.83 for readiness. The intraclass correlation coefficient (ICC) was 0.807 (SD: 0.766-0.843). The loadings of the instrument items per factor, the internal reliability coefficients and the mean values per item-sentence of the questionnaire are presented in table 1.

Ethical Issues: The study was approved after review by the ethical review board of the postgraduate program affiliated institution and the research institution. “Global Health Disaster Medicine”(NKUA). Each respondent was asked to fill in an introductory consent form. The contact details of the interviewees were obtained through the online groups of the students of the “global health-crisis and disaster management” master's degree of the National and Kapodistrian University of Athens, as well as the association of Physiotherapists of Greece. The participants were informed that the obtained data and interview content would not be used for any purposes other than the research. The materials and data obtained in this study were stored in a secure location accessible only to the principal investigator.

Results

The study involved 208 people (155 women), aged 42.4±3.5 years old with a mean length of service at the specific hospital of 13.2±3.4 years. The sample comprised 72 nurses, 63 physicians, 36 physical therapists, 23 administrators, and 14 technologists; 31.25% of the participants (65 people) worked in Attica hospitals and 26.4% (55 people) in university clinics.

Descriptive statistics and correlations of factors with each other

The mean value in the factor of leadership-supportive environment was 1.81±0.76, in the scale of collaboration 2.75±0.62 and in the factor of readiness 2.62±0.69, which reduced to a percentage scale correspond to 45%, 69% and 66%, showing the significant lag in the factor of leadership (Fig.1).

The lowest value (1.63±1.03) was recorded in the sentence ″ The leadership of the hospital creates communication channels that support knowledge." (in the leadership factor) and the highest in the sentence "When I encounter difficulties, I ask my colleagues." (in the cooperation factor). The mean score values per item of the questionnaire are shown in table 1. All three factors were statistically significantly and positively correlated to each other ($p <0.001$).(table 2).

Table 1. Validity and reliability analysis with item loadings and mean values

N=208	MT±TA	Collaboration Culture (item loadings)	Leadership-supportive environment (item loadings)	Readiness feeling (item loadings)
1.When I encounter difficulties, I ask my colleagues.	3.36±0.71	0.718		

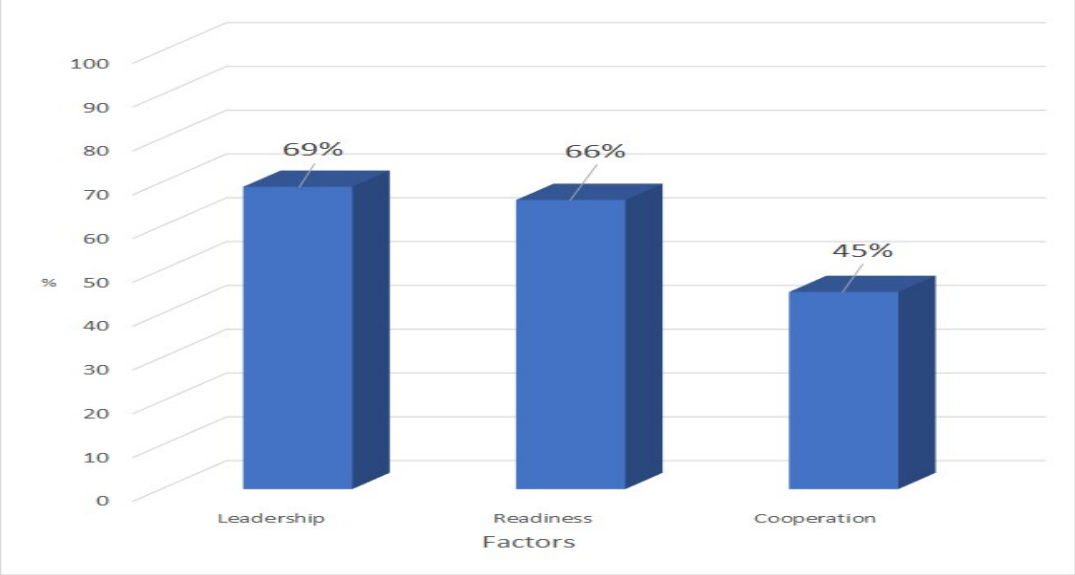
2.When I know the work of others, this also improves my own performance.	3.11±0.77	0.667		
3.My supervisor provides the required knowledge to solve problems.	2.43±1.01	0.593		
4.My boss rewards people who share their knowledge.	2.15±1.10	0.598		
5.Collaboration strengthens the culture of knowledge management in my department.	2.73±0.93	0.696		
6.There are knowledge management strategies in the hospital.	1.69±0.98		0.346	
7.Hospital leadership creates communication channels that aid knowledge.	*1.63±1.03*		0.721	
8.In this particular hospital, staff are encouraged to innovate if they have a new idea.	1.68±1.00		0.743	
9.This particular hospital supports the research.	2.06±1.01		0.844	
10.This particular hospital is a Knowledge Creation Organization.	1.78±1.01		0.777	
11.In this hospital there are shared files available for employee information.	2.01±1.03		0.820	
12.Are you prepared to deal with emergencies emotionally?	2.67±1.03			0.667
13.Are you sufficiently trained to apply basic triage principles?	1.84±1.25			0.485
14.Have you got confidence in yourself to handle with difficult	2.86±0.88			0.756

situations?				
15.Do you comprehend your role in the event of an emergency?	2.67±1.07			0.852
16.Do you understand the role of your colleagues during the emergency?	2.75±0.90			0.751
17.Do you realize the impact of the situation during the event?	3.00±0.74			0.699
Cronbach's a		0.71	0.85	0.83

Table 2. Correlation of the three questionnaire factors

N=208		Collaboration	Readiness
Leadership	r	0.250	0.281
	p	<0.001	<0.001
Collaboration	r		0.981
	p		<0.001

Fig 1. Factors score (expressed % max)



Discussion

The present study proposes a short tool for assessing hospital preparedness. This tool has both particularly satisfactory structural validity and internal reliability and its application to the sample of the study highlighted the leadership-supportive environment factor as the one that needs further improvement.

The positive correlation of all three factors shows the interconnectedness between collaboration-leadership-readiness, as well as the essential role that leadership can play in increasing collaboration and ultimately the readiness of hospitals (Fahlevi et al., 2022, Gooding et al., 2022, Zheng et al., 2010). A high score on the self-assessment of readiness is inconsistent with low scores on the leadership factor, a fact that needs further investigation. If the employees' sense of self-sufficiency is objectively confirmed (e.g. with simulation exercises), this finding may mean that employees rely exclusively on their own strengths by putting in extra effort, in conjunction with their direct supervisor.

It is characteristic that the loadings on the specific items concerning the supervisor allowed them to be categorized in the factor of cooperation and not leadership, a term that was probably taken by the respondents as a synonym of hospital management or some more impersonal leadership, in relation to their supervisor (whom they work directly with) Otherwise, it will be an illusion carrying the risk of overestimating the capabilities of the employees.

Leadership within an organization significantly influences the achievement of good organizational performance. Achieving the highest level of employee development, human resource management, harmonious working relationships among employees and leadership styles is expected to increase work productivity (Kadiyono et al.,2020). The transformation of a structure such as the hospital into a modern unit for dealing with emergencies demands a thorough and in-depth evaluation of its operation.

At the organizational level, actions can be taken that will facilitate the diffusion and management of knowledge and collaboration under the auspices of the leadership, such as the use of shared files, the patient's medical record and communication between employees. In this context, supervisors could organize regular meetings with staff on an interdisciplinary basis, about new knowledge, cooperation and exchange of views. It is all about transforming the culture of hospitals into a pool of knowledge; knowledge now becomes an element that promotes collaboration.

Regarding the limitations of the study, it should be mentioned that the sample, although nationwide, was not representative of the hospitals and their employees. Also, only some aspects of validity were examined and only internal reliability was tested. As for the finding of a low score in the leadership factor, the cross-sectional nature of the research does not allow safe conclusions to be drawn. However, the very good performance of the tool predisposes its use in subsequent research with the aim of weighing it and investigating the deficits in the operational readiness of Greek hospitals.

Conclusions: The proposed instrument shows very satisfactory construct validity and internal reliability and is qualified for large-scale studies In the study sample, deficits emerged in the leadership factor and an impact on the other two factors is possible. The findings of the study can be used to improve preparedness in Greek hospitals and foster further studies in the field.

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APPENDIX

Table 1. English version of the questionnaire

1.When I encounter difficulties, I ask my colleagues.
2.When I know the work of others, this also improves my own performance.
3.My supervisor provides the required knowledge to solve problems.
4.My boss rewards people who share their knowledge.
5.Collaboration strengthens the culture of knowledge management in my department.
6.There are knowledge management strategies in the hospital.
7.Hospital leadership creates communication channels that aid knowledge.
8.At this particular hospital, staff are encouraged to innovate if they have a new idea.
9.This particular hospital supports the research.
10.This particular hospital is a Knowledge Creation Organization.
11.In this hospital there are shared files available for employee information.
12.Are you prepared to deal with emergencies emotionally?
13.Are you sufficiently trained to apply basic triage principles?
14.Have you got confidence in yourself to handle with difficult situations?
15.Do you comprehend your role in the event of an emergency?
16.Do you understand the role of your colleagues during the emergency?
17.Do you realize the impact of the situation during the event?

Table 2. Greek version of the questionnaire

1.Όταν συναντώ δυσκολίες, ρωτώ τους συναδέλφους μου.
2.Όταν γνωρίζω την εργασία των άλλων, αυτό βελτιώνει και τη δική μου απόδοση.
3.Ο προϊστάμενός μου παρέχει την απαιτούμενη γνώση για να λυθούν τα προβλήματα.
4.Ο προϊστάμενός μου, επιβραβεύει τα άτομα που μοιράζονται τις γνώσεις τους.
5.Η συνεργασία ενισχύει την κουλτούρα διαχείρισης της γνώσης στο τμήμα μου.
6.Υπάρχουν στρατηγικές ΔτΓ (διαχείρισης της γνώσης) στο νοσοκομείο.
7.Η ηγεσία του νοσοκομείου δημιουργεί κανάλια επικοινωνίας που υποβοηθούν στη γνώση.
8.Στο συγκεκριμένο νοσοκομείο, το προσωπικό παροτρύνεται να καινοτομήσει εάν έχει μια νέα ιδέα.
9.Το συγκεκριμένο νοσοκομείο υποστηρίζει την έρευνα.
10.Το συγκεκριμένο νοσοκομείο είναι ένας Οργανισμός δημιουργίας γνώσης.
11.Σε αυτό το νοσοκομείο υπάρχουν κοινόχρηστα αρχεία διαθέσιμα για πληροφόρηση των εργαζομένων.
12. Είστε προετοιμασμένος να αντιμετωπίσετε επείγουσες καταστάσεις συναισθηματικά;
13.Έχετε εκπαιδευτεί επαρκώς να εφαρμόσετε της βασικές αρχές διαλογής (triage);
14.Έχετε εμπιστοσύνη στον εαυτό σας να χειρίζεστε δύσκολες καταστάσεις
15.Έχετε αντίληψη του ρόλου σας σε περίπτωση συμβάντος έκτακτης ανάγκης;
16.Αντιλαμβάνεστε το ρόλο των συναδέλφων σας κατά τη διάρκεια του έκτακτου συμβάντος;
17.Αντιλαμβάνεστε τον αντίκτυπο της κατάστασης κατά τη διάρκεια του συμβάντος;