

Army Nurse Readiness Instrument: Psychometric Evaluation and Field Administration

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The purpose of this study was to construct and evaluate the psychometric properties of an instrument to estimate the level of individual readiness among U.S. Army nurses. This study constitute phase II of congressionally sponsored research to establish the degree to which Army nurses are prepared for the expectations of deployment. An expert panel established the validity of the initial readiness questionnaire. Changes were then incorporated into the first Readiness Estimate and Deployability Index (READI) questionnaire. Internal consistency and test-retest techniques assessed multiple reliabilities from pilot administrations. The READI was refined based on the results. Analysis of field administrations of the revised READI to three separate groups of nurses replicated earlier reliability results. Principle component analyses appear to support the hypothesized dimensional structure underlying questionnaire attitude items. The READI produced psychometrically stable ratings and results with great utility for the Army and potential adaptation for other military services.

Introduction

United States military forces are engaged in contingency operations in scores of countries around the world.

Individual readiness of soldiers to meet the expectations of deployment is critical to the success of the operations and to ensure the protection of the force. The purpose of these pilot and field studies was to construct and evaluate the psychometric properties of an instrument to measure individual readiness among U.S. Army nursing personnel. The scope was limited to six dimensions of individual readiness and to testing among active and reserve personnel in the Army Nurse Corps.

Background and Previous Related Work

Phase I was a qualitative study conducted from 1996 to 1997. The Final Report summarizes preliminary work.¹ In phase I, concept clarification took place.² Three focus groups suggested that individual readiness is "a dynamic concept with dimensions at the individual, group, and system levels, which, together, influence one's ability to prepare to accomplish the mission." Six dimensions of individual readiness were identified in phase I: (1) clinical nursing competency, (2) operational competency, (3) soldier/survival skills, (4) personal/physical/psychosocial stress, (5) leadership and administrative support, and (6) group integration and identification. The findings present a rich

description of what was included in each dimension. The purpose of the present phase II study was to bridge the gap in readiness reporting by developing and testing the Readiness Estimate and Deployability Index (READI). Testing involved validity and reliability estimation as well as determining feasibility and ease of administration.

Others have explored the skills, knowledge, and abilities required among health care personnel for the future.³ The future holds the likelihood of an increasing prevalence of military operations other than war. Checklists for personal information, papers, and gear have been developed to aid individuals in their preparation for such operations.⁴ Still missing in individual preparation programs are the six dimensions identified by the focus groups, which emphasize inner preparation ranging from competency to a sense of group integration.

Framework and Focus Groups

The measurement framework for the constructed instrument, the READI, was a combination of measures including self-report of cognition, affect, psychomotor skills, and physical functioning. Internal consistency and test-retest reliabilities were estimated (Table I) on a pilot test sample of 31 nurses in the continental United States. Validity was estimated with content validity testing among eight expert raters. The eight experts rated each item of the READI an average of 3.6 on a scale of 1 (low) to 4 (high) with regard to the relevance, clarity, and uniqueness of each item.

The sample for psychometric testing was representative of the demographic characteristics of active and reserve component Army nursing personnel and allowed sufficient investigation of the instrument's reliability, validity, feasibility, and ease of administration. As in phase I, in which three focus groups were convened, one focus group was held in the summer of 1999 in phase II after quantitative analysis of the pilot sample to provide suggestions on instrument practicality, format, administration, and utility. The focus group also offered suggestions on how to integrate and institutionalize the READI instrument into the Army readiness reporting system.

Methods

Instrument Development

The items were developed by asking subject matter experts in each of the six identified dimensions of individual readiness to draft items to assess the self-report of readiness in those areas. Item writers were given training on how to write items and on the use of scales and various response formats. The principal investigator refined the items for clarity and word choice.

The following steps were followed in phase I item develop-

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TABLE I
INTERNAL CONSISTENCY AND TEST-RETEST RESULTS FOR THE PILOT VERSION AND THE READI INSTRUMENT

Questionnaire Section	Pilot Version (n = 31)				Revised Administrations				
	Items ^a	Coefficient a Reliability		Pearson <i>r</i> Test-Retest	Items ^a	Coefficient a ^b			Total (n = 93)
		Time 1	Time 2			Group A (n = 27)	Group B (n = 34)	Group C (n = 32)	
I Clinical Nursing Competency	28	-	-	0.71	-	-	-	-	-
3-point scale	6	0.88	0.91		-	-	-	-	-
5-point scale	22	0.89	0.86		27	0.95	0.93	0.94	0.94
II Operational Nursing Competency	6 ^c	-	-	0.48					
5-point scale		-	-		6	0.82	0.85	0.81	0.84
III Soldier and Survival Skills	10	-	-	0.83					
5-point scale	10	0.95	0.93		11	0.91	0.94	0.86	0.91
IV Personal/Physical/Psychosocial	8	-	-	0.78					
5-point family (F)	3	0.51	0.46		-	-	-	-	-
5-point stress (S)	5	0.48	0.42		-	-	-	-	-
5-point (F + S)		-	-		11	0.8	0.67	0.71	0.73
V Leadership/Administrative Support	4	-	-	0.69					
3-point scale		-	-		3	0.88	0.82	0.68	0.83
5-point scale	4	0.8	0.77		-	-	-	-	-
VI Group Integration and Identification	3 ^c	-	-	0.69					
5-point scale		-	-		3	0.78	0.79	0.59	0.72

^aNumber of items in each section used for reliability estimates.

^bReduced sample sizes of nurses responding to the se items: *n* = 18 for group A, *n* = 24 for group B, *n* = 21 for group C, and *n* = 63 for the total group.

^cDichotomous items, not scaled.

ment.⁵ (1) Determine the information to be sought. (2) Develop the questions or items. This was done by experts in each dimension. (3) Determine the sequence for the questions or items. (4) Subject the questionnaire to review. Selected experts were asked to review the draft questionnaire before content validity testing. (5) Draft the questionnaire and cover letter. (6) Pretest the questionnaire and make necessary revisions. (7) Administer the READI to a pilot sample and score the questionnaire.

Institutional Review

The study was approved by the Tri-Service Nursing Research Program, Uniformed Services University of the Health Sciences (Bethesda, Maryland), and the Departments of Clinical Investigation of Brooke Army Medical Center (Fort Sam Houston, Texas) and Madigan Army Medical Center (Fort Lewis, Washington). The grant was administered through the Henry M. Jackson Foundation for the Advancement of Military Medicine.

Results of the Pilot Version

The 63 scaled attitude measures in the initial READI (Table I) had high overall rating scores (the possible range of scores was 1 (low) to 4 (high) for all items on fit (3.6), clarity (3.6), and uniqueness (3.6). Internal consistency indices (coefficient *a*) ranged from 0.42 to 0.95 with test-retest coefficients 0.48 or greater (all *p* < 0.05). Members of the phase II focus group examined these results and suggested the addition and deletion of items, all of which suggestions were incorporated into the revised READI instrument.

Description of the Field Administration Samples

Data were based on responses from three separate groups of Army nurses representing both Table of Distribution and Allowances and Table of Organization and Equipment units (Table II). The major commands represented included U.S. Army Medical Command (55%), U.S. Army Forces Command (16%), U.S. Army European Command (20%), Eighth U.S. Army (3%), U.S. Army Reserve (1%), and other (4%). The majority of respondents were captains (79%), but ranks ranged from second lieutenant to colonel. The gender breakdown was 61% female and 39% male, comparable to the actual gender representation in the Army Nurse Corps. The ethnicity was 76% white, 12% black, and 12% all other ethnic backgrounds. Respondents represented all areas of concentration in the Army Nurse Corps and had an average of 5.55 years of experience as a nurse. A little more than one-third (34%) had been previously deployed as a nurse.

The READI has six subscales, each representing a domain of readiness. The READI has six subscales, each representing a domain of readiness. The READI was administered once at time 1 and then again 2 weeks later at time 2. Table II summarizes the Pearson's *r* coefficient for each scale over time and the internal consistency coefficient *a*.

The test-retest reliabilities and internal consistency reliabilities for each of the six subscales on the READI are summarized below. The longest of the scales, the Clinical Nursing Competency Scale, had 28 items (*r* = 0.71, *a* = 0.94). Figure 1 shows a panorama of the close approximation of scores across the pilot nurse sample of 31 respondents measured at time 1 and time 2 displayed above the corresponding 10 soldier survival items on section three of the scale. The competency scores for this section are

TABLE II
DESCRIPTIVE STATISTICS OF DEMOGRAPHIC VARIABLES FOR THREE SAMPLE ADMINISTRATIONS OF THE READI INSTRUMENT

Variables	Group A (n = 27)		Group B (n = 34)		Group C (n = 32)		Total (n = 93)	
	n	%	n	%	n	%	n	%
Military background								
Type unit								
Fixed (TDA)	21	77.78	28	82.35	21	65.63	70	75.27
Filed (TO&E)	6	22.22	6	17.65	11	34.37	23	24.73
Assignment								
Medical command	14	51.86	23	67.65	14	43.76	51	54.84
Forces command	6	22.22	8	23.53	1	3.12	15	16.13
U.S. Army, Europe	2	7.41	1	2.94	16	50.00	19	20.43
8th Army, Korea	2	7.41	1	2.94	-	-	3	3.23
U.S. Army Reserve	1	3.69	-	-	-	-	1	1.07
Other	2	7.41	1	2.94	1	3.12	4	4.30
Military rank								
Second lieutenant	-	-	-	-	4	12.50	4	4.30
First lieutenant	3	11.11	3	8.82	3	9.38	9	9.69
Captain	24	88.89	31	91.18	19	59.38	74	79.57
Major	-	-	-	-	4	12.50	4	4.30
Lieutenant colonel	-	-	-	-	1	3.12	1	1.07
Colonel	-	-	-	-	1	3.12	1	1.07
Gender								
Female	18	66.67	18	52.94	21	65.63	57	61.29
Male	9	33.33	16	47.06	11	34.37	36	38.71
Ethnicity								
White	20	74.07	28	82.35	23	71.87	71	76.34
Black	3	11.12	5	14.71	3	9.38	11	11.83
Other	4	14.81	1	2.94	6	18.75	11	11.83
Nursing Background								
Specialization								
Critical care	12	44.44	9	26.47	5	15.63	26	27.96
Medical surgical	3	11.11	9	26.47	14	43.75	26	27.96
Perioperative	2	7.41	3	8.82	5	15.63	10	10.75
Community health	2	7.41	3	8.82	3	9.38	8	8.6
Emergency	4	14.82	1	2.94	3	9.38	8	8.6
Obstetrics/gynecology	2	7.41	2	5.90	2	6.23	6	6.45
Psychiatric	1	3.70	3	8.82	-	-	4	4.3
Nurse anesthetist	1	3.70	3	8.82	-	-	4	4.3
Nurse practitioner	-	-	1	2.94	-	-	1	1.08
Have been deployed as a nurse	6	22.22	14	41.18	12	37.50	32	34.41
Total years nursing experience ^a								
Mean	4.63		4.53		7.41		5.55	
SD	2.10		2.10		6.00		4.61	

TDA, Table of Distribution and Allowances; TO&E, Table of Organization and Equipment.

^aTotal years includes civilian and military experience.

generally “green” on a red (not ready), amber (moderately ready), green (ready) readiness status framework.

Reliability Results of Three Field Administrations

The Operational Nursing Competency Scale had six dichotomous, unscaled items ($r = 0.48$).

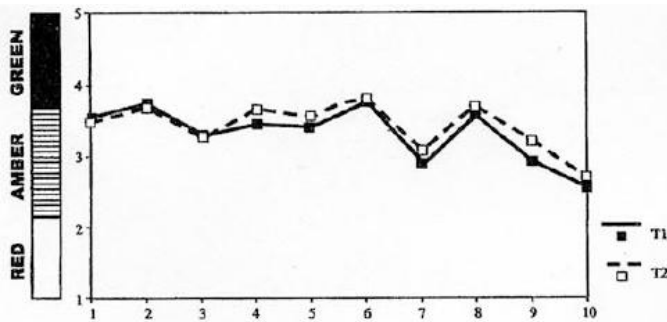
The Soldier and Survival Skills Scale had 10 items. It demonstrated the strongest psychometric results ($r = 0.83$, $\alpha = 0.91$) among all scales. Figure 2 portrays a panorama of the close approximation of scores from time 1 to time 2 displayed above a description of items on this highly reliable scale. Soldier survival skills are generally “amber” in the readiness framework, reflecting the need for additional work

toward full readiness in this area.

The Personal/Physical/Psychosocial Scale had eight heterogeneous items ($r = 0.78$, $\alpha = 0.73$). The Leadership and Administrative Support Scale had four items ($r = 0.69$, $\alpha = 0.83$). The Group Integration and Identification Scale had three dichotomous items ($r = 0.69$, $\alpha = 0.72$).

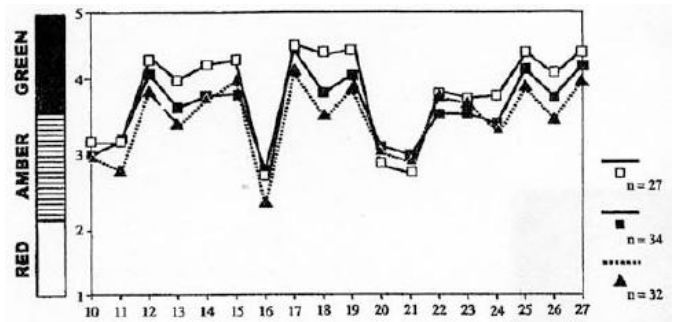
Descriptive Findings

Table III summarizes the descriptive findings for nurse respondent groups on subscale items that pertained to self-reported attitudes. Table IV summarizes the results of self-reported behavioral readiness indicators. Attitudes and behaviors are summarized below for each subscale.



- Section Three: Soldier/Survival Skills (k=10 items)**
1. Familiarity with M-16 rifle and/or the 9mm pistol
 2. Confidence in defending self/and or patients
 3. Confidence in ability to protect self/patients with M40 mask and MOPP gear
 4. Confidence in ability to navigate with map and compass
 5. Confidence in keeping weapon in working condition
 6. Confidence to perform duties under adverse or prolonged field conditions
 7. Confidence in decontaminating yourself/patients using decontamination equipment
 8. Familiarity with status under the Geneva Conventions
 9. Confidence in ability to resist the enemy
 10. Familiarity with standard Army communications equipment

Fig. 1. Panoramic display of soldier/survival item responses from two trials (1 = low, 5 = high; n = 31 respondents).



- Section One: Clinical Nursing Competency Continued (k=18 items - see Table III)**
10. Competence in caring for patient with NBC injuries
 11. Competence in caring for patient with ballistic missile injuries
 12. Competence in recognition of tension pneumothorax
 13. Competence in providing fluid resuscitation for burn patient
 14. Competence in using universal blood donor protocol
 15. Competence in caring for patient with disease and non-battle injury
 16. Competence in using field ventilator
 17. Competence in airway management
 18. Competence in implementing triage categories
 19. Competence in assuming clinical team leadership
 20. Competence in caring for refugees
 21. Competence in providing antepartum/postpartum care
 22. Competence in field infection control
 23. Competence in orthopedic nursing
 24. Competence in neurological nursing
 25. Able to identify the components of a physical exam
 26. Able to list five examination techniques to perform physical examination
 27. Able to perform a complete nursing assessment and interpret abnormal finding

Fig. 2. Panoramic display of selected clinical nursing competency item responses across three groups (1 = low, 5 = high).

Clinical Nursing competency (n = 93)

Attitudes

Nurses reported a high degree of competency caring for patients in shock, triaging, calculating burn body surface area, airway management, and implementing the universal blood donor protocol. Moderate competency was reported with use of a field ventilator and antepartum and postpartum care. None of the respondents reported the highest level of competence on any of the clinical nursing competency items.

Behaviors

Eight-nine percent of respondents reported that they had delivered direct patient care within the last 6 months. Seventy-three percent practiced triage in a field environment and 83.4% had the opportunity to learn triage through formal military or civilian training courses. Within the last 6 months, 74.2% manually calculated medication dosages and administered intravenous medications without electronic devices. However, nearly 9% had that experience more than 4 years ago.

Operational Nursing Competency (n = 93)

Moderate competency was reported in such procedures as use of the field 12-lead electrocardiogram, evacuation procedures, and knowledge of echelons of care. A higher level of competency was reported for reporting an unlawful act or conduct, field sanitation and hygiene, and setting up the deployable medical system. However, none of the respondents reported the highest level of competence on any of the operational nursing competency items.

Soldier and Survival Skills (n = 93)

The strongest skill competencies were reported in familiarity with the M-16 rifle, ability to defend oneself and

the patient, ability to maintain one's weapon, performing the job in adverse conditions, and knowledge of the Geneva Conventions. Respondents reported weak levels of competence in ability to resist the enemy if captured and familiarity with standard Army communications equipment.

Personal/Physical/Psychosocial Readiness (n = 93)

Attitudes

Respondents reported a generally high level of current family support and preparation for long hours when deployed. Moderate amounts of stress were reported related to work, family, and finances. Additionally, respondents indicated moderate but not high levels of readiness to cope with death, dying, carnage, one's own possible death, battle stress, weather extremes, and lack of privacy.

Behaviors

Only one respondent indicated an Army Physical Fitness Test failure on the most recent test. The majority scored 221 to 240 points, compared with 180 as the passing score. Eighty-nine percent of respondents had a dental examination within the last year. Two respondents had not been to the dentist in more than 2 years. Eighty-five percent reported that they did not have a physical profile. With regard to legal affairs, 66% had a current will and 88% had no pending legal matters. Seventy-seven percent reported that they know how to access emotional support while deployed, and 80% indicated that they knew how to access mental health services when deployed.

TABLE III
DESCRIPTIVE STATISTICS FOR 61 REVISED READI SCALED ATTITUDE QUESTIONNAIRE ITEMS FROM
THREE NURSE SAMOLE ADMINISTRATIONS

Section and Items	Group A (n = 27)		Group B (n = 34)		Group C (n = 32)		Combined (n = 93)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
I. Clinical Nursing Competency								
1. Familiar with types of shock	4.4	0.6	4.0	0.9	4.0	1.0	4.1	0.9
2. Care for hemorrhage shock patients	4.5	0.6	4.2	1.0	3.8	1.1	4.1	1.0
3. Clinical documentation in the field	3.9	0.9	3.4	1.2	3.5	1.1	3.6	1.1
4. Calculate intravenous drip without book	4.2	0.9	4.0	1.1	3.6	1.2	4.0	1.1
5. Institute standing orders intravenous, X-ray	4.5	0.8	4.3	1.0	4.1	1.0	4.3	1.0
6. Calculate burn patient body surface area	4.4	0.08	4.1	0.9	3.9	0.8	4.1	0.8
7. Decide which patients to see first	4.3	0.8	3.9	0.8	3.8	1.0	4.0	0.9
8. Perform advanced cardiac life support protocol without doctor	3.9	1.2	3.7	1.3	3.1	1.3	3.5	1.3
9. Care for life-threatening injuries	4.0	1.0	3.9	0.9	3.7	1.0	3.9	1.0
10. Care of patients with nuclear-biological-chemical injuries	3.2	1.2	3.0	1.1	3.0	1.0	3.1	1.1
11. Care of ballistic missile injuries	3.3	1.4	3.4	1.1	2.8	1.0	3.1	1.2
12. Recognize tension pneumothorax	4.3	1.0	4.1	1.0	3.8	1.0	4.1	1.0
13. Fluid resuscitation burn patient	4.0	0.9	3.7	0.9	3.4	1.2	3.7	1.0
14. Universal blood donor protocol	4.2	0.8	3.8	1.1	3.8	0.8	4.0	0.8
15. Disease, nonbattle injuries	4.3	0.7	3.8	0.9	4.0	0.8	4.0	0.8
16. Use of field ventilator	2.8	1.4	2.9	1.5	2.4	1.3	2.7	1.4
17. Airway management	4.5	0.9	4.4	0.7	4.1	0.9	4.3	0.9
18. Implement triage categories	4.4	0.8	3.9	1.0	3.7	1.0	4.0	1.0
19. Clinical team leadership	4.4	0.8	4.1	0.7	3.8	1.0	4.1	0.9
20. Care for refugees	3.1	1.2	3.2	1.2	3.1	1.3	3.2	1.2
21. Antepartum/postpartum care	2.9	1.4	3.2	1.3	3.0	1.5	3.0	1.4
22. Field infection control	3.8	1.0	3.5	1.2	3.8	1.1	3.7	1.1
23. Orthopedic nursing	3.7	0.9	3.5	0.9	3.6	1.1	3.6	1.0
24. Neurologic nursing	3.8	1.1	3.4	1.2	3.2	1.2	3.4	1.2
25. Identify components of physical examination	4.4	0.7	4.1	0.9	3.8	1.0	4.1	0.9
26. List five techniques for physical examination	4.1	1.0	3.8	1.4	3.4	1.4	3.7	1.3
27. Perform examination, interpret findings	4.4	0.9	4.2	1.0	4.0	1.0	3.5	1.4
II. Operational Nursing Competency								
1. Obtain 12-lead electrocardiogram in the field	4.2	1.4	3.0	1.4	4.0	1.0	3.5	1.4
2. Competent in evacuation procedures	3.7	1.1	3.3	1.0	3.1	0.9	3.3	1.0
3. Competent in echelons of care	4.2	0.8	3.4	1.1	3.1	0.9	3.3	1.0
4. Reporting unlawful acts or conduct	4.2	0.9	3.8	1.0	3.7	1.0	3.9	1.0
5. Field sanitation/hygiene competence	3.8	1.1	3.6	1.1	3.6	1.0	3.7	1.0
6. Competent with deployable medical system setup	4.0	1.1	3.7	1.1	3.7	1.3	3.8	1.2
III. Soldier and survival Skills								
1. Familiarity with the M-16 rifle	4.1	1.1	4.3	1.0	3.8	1.0	4.1	1.0
2. Familiarity with the 9-mm pistol	3.7	1.1	4.0	1.0	4.1	1.1	3.9	1.1
3. Ability to defend self and patient	3.7	1.2	4.1	1.1	4.0	0.9	4.0	1.1
4. Protect self and patient's mask/MOPP gear	4.3	0.8	4.2	0.9	3.9	1.1	3.9	1.0
5. Ability to navigate with map and compass	3.6	1.2	4.1	1.0	3.8	1.0	3.9	1.0

(Table continues)

Means and standard deviations were calculated from responses to five-point rating scales; item scale anchors vary by topic and section. Item ratings to section V were based on three-point scales.

MOPP, mission-oriented protective posture.

^aRespondents checked all that apply; therefore, percentages of individual categories may sum to greater than 100%.

^bEFMB, Expert Field Medical Badge; OAC, Officer Advanced Course.

^cThe last two questionnaire sections contained not applicable questions specific to deployment units, which reduced the sample sizes $n = 18$ for group A, $n = 24$ for group B, $n = 21$ for group C, and $n = 63$ for all groups combined.

TABLE III
CONTINUED

Section and Items	Group A (<i>n</i> = 27)		Group B (<i>n</i> = 34)		Group C (<i>n</i> = 32)		Combined (<i>n</i> = 93)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
6. Ability to maintain your weapon	3.8	1.4	4.1	1.1	4.0	1.1	4.0	1.2
7. Perform job in adverse conditions	4.3	1.0	4.5	0.7	4.0	0.9	4.3	0.9
8. Decontaminate self and patient	3.8	1.0	3.7	0.9	3.8	0.8	3.8	0.9
9. Familiar with Geneva Conventions	4.3	0.7	3.7	1.0	4.0	0.9	4.0	0.9
10. If captured, ability to resist enemy	3.7	1.1	3.6	1.0	3.5	1.1	3.6	1.1
11. Familiarity with standard Army communications equipment	3.1	1.3	3.5	1.1	3.2	1.2	3.3	1.2
IV. Personal/Physical/Psychosocial								
1. Quality of current family support	4.2	0.9	4.3	1.0	4.0	1.2	4.2	1.0
2. Stress experienced from main work	3.2	0.8	2.8	1.2	3.1	1.2	3.0	1.1
3. Stress experienced from family	3.5	1.2	3.7	0.9	3.5	1.2	3.6	1.1
4. Stress experienced from finances	3.9	1.2	3.5	0.9	3.6	1.2	3.7	1.1
5. Other stress experienced	3.8	1.0	3.5	0.9	2.9	2.0	3.4	1.4
6. Prepared for death, dying, carnage	3.7	1.2	3.5	1.0	3.5	1.1	3.6	1.1
7. Prepared for own possible death	3.2	1.4	3.1	1.0	3.3	1.3	3.2	1.2
8. Prepared for battle stress	3.5	1.2	3.4	0.8	3.3	1.1	3.4	1.0
9. Prepared for weather extremes	3.9	1.1	3.8	0.9	3.6	1.0	3.8	1.0
10. Prepared for long hours	4.3	1.0	4.4	0.7	4.1	1.0	4.3	0.9
11. Prepared for lack of privacy	4.2	1.0	3.4	1.0	3.6	1.2	3.9	1.1
V. Leadership/Administrative Support ^a (in deployment unit)								
1. Leader's concern for unit soldiers	1.7	1.2	1.5	1.1	1.9	1.2	1.7	1.2
2. Leader's sense of responsibility	1.6	1.2	1.5	1.2	1.7	1.4	1.6	1.2
3. Leader's ability to inform unit	1.3	1.1	1.4	1.1	1.6	1.2	1.5	1.1
VI. Group Integration and Identification ^a (in deployment unit)								
1. Adjust to crowded and co-ed sleeping quarters while deployed	4.3	0.8	4.1	1.0	3.9	1.3	4.1	1.1
2. Familiar with unit's mission/values	3.0	1.8	2.9	1.9	2.8	1.9	2.9	1.8
3. Familiar with role/duty assignment	3.2	2.0	3.2	1.9	3.0	2.0	3.2	1.9

Means and standard deviations were calculated from responses to five-point rating scales; item scale anchors vary by topic and section. Item ratings to section V were based on three-point scales.

MOPP, mission-oriented protective posture.

^aRespondents checked all that apply; therefore, percentages of individual categories may sum to greater than 100%.

^bEFMB, Expert Field Medical Badge; OAC, Officer Advanced Course.

^cThe last two questionnaire sections contained not applicable questions specific to deployment units, which reduced the sample sizes *n* = 18 for group A, *n* = 24 for group B, *n* = 21 for group C, and *n* = 63 for all groups combined.

Leadership and Administrative Support (*n* = 63)

Of the 93 nurse respondents, only 63 responded to specific items dealing with deployment with their respective units. The lowest scores among all scales were reported in this scale. Respondents perceived low levels of leader concern for soldiers, low sense that the unit leader felt responsible for the unit, and low rating of the leader's ability to keep the members of the unit informed.

Group Integration and Identification (*n* = 63)

Attitudes

Respondents reported a high level of readiness to adjust to crowded and co-ed sleeping quarters while deployed. However, they reported only a moderate degree of familiarity with the unit's mission and values, their individual roles, and duty assignments.

Behaviors

The number of days respondents had trained with their deployment unit in the last year varied from 0 (23.8%) to more than 14 (38.1%). Only 57.1% had spent at least 7 days

in the field with their units in the last year.

Factorial Structure of the READI: A Preliminary Analysis

Data on the 61 attitude variables were complete for 63 of the cases from the three nurse samples. Inspection of the zero-order correlation matrix among items within hypothesized READI dimensions indicated strong and statistically significant relationships ($p < 0.05$), but item correlations between dimensions tended to be substantially weaker, exhibiting fewer statistically significant patterns. An exploratory multivariate principle components analysis was conducted to investigate the extent of these general trends. Although promising, the evidence from these results, because of the small sample size, must remain tenuous until larger READI samples are collected to confirm and verify the highly suggestive and suspected psychometric trends presented here.

Six dimensional components emerged from the analysis, representing 58.23% of the item variances accounted for by

TABLE IV
 FREQUENCY AND PERCENTAGE SUMMARY FOR READI SELF-REPORT BEHAVIORAL READINESS INDICATORS FROM
 THREE NURSE SAMPLE ADMINISTRATIONS

Section and Items	Group A (n = 27)		Group B (n = 34)		Group C (n = 32)		Combined (n = 93)	
	n	%	n	%	n	%	n	%
I Clinical Nursing Competency								
When was the last time you provided direct patient care?								
Within the last 6 months	24	88.9	32	94.2	27	84.3	83	89.2
Within the last year, but more than 6 months ago	1	3.7	0	0.0	0	0.0	1	1.1
Within the most recent 1 to 4 years	1	3.7	1	2.9	2	6.3	4	4.3
More than 4 years ago	1	3.7	1	2.9	3	9.4	5	5.4
What types of triage experience and education have you had" (check all that apply) ^a								
Practiced triage in a field environment on Real and/or moulaged patients	20	74.1	24	70.6	24	75.0	68	73.1
Practiced triage in an educational setting	13	48.1	16	47.1	15	46.9	44	47.3
Learned through in-services courses, nursing courses, journals	21	77.7	26	76.5	24	75.0	71	76.3
Learned through military or civilian courses (i.e., EFMP, OAC, Medical Management of Chemical Casualties Course, etc.) ^b	24	88.9	28	82.4	26	81.3	78	83.4
Have not learned about triage yet	0	0.0	0	0.0	1	3.1	1	1.1
When was the last time you had to reconstitute medications, calculate dosages, and administer intravenous medication?								
Within the last 6 months	23	85.2	25	73.5	21	65.6	69	74.2
Within the last year, but more than 6 months ago	1	3.7	4	11.8	3	9.4	8	8.6
Within the most recent 1 to 4 years	1	3.7	4	11.8	3	9.4	8	8.6
More than 4 years ago	2	7.4	1	2.9	5	15.6	8	8.6
IV Personal Readiness								
Last Army Physical Fitness Test score								
270 to 300+	3	11.1	7	20.6	6	18.8	16	17.2
241 to 269	9	33.3	5	14.7	10	31.2	24	25.8
221 to 240	11	40.8	12	35.3	10	31.2	33	35.5
180 to 220	4	14.8	9	26.5	6	18.8	19	20.4
Less than 180	0	0.0	1	2.9	0	0.0	1	1.1
Last dental examination								
Less than 6 months	14	21.9	14	41.2	19	59.5	47	50.5
6 to 12 months	6	22.2	20	58.8	10	31.2	36	38.6
13 to 18 months	5	18.5	0	0.0	1	3.1	6	6.5
19 to 24 months	1	3.7	0	0.0	1	3.1	2	2.2
More than 24 months	1	3.7	0	0.0	1	3.1	2	2.2
Nurses who do not have a physical profile								
Legal issues	26	96.3	28	82.4	25	78.1	79	85.0
Do you have a current will?	20	74.1	25	73.5	21	65.6	66	71.0
Do you have power of attorney?	18	66.7	21	61.8	23	71.9	62	66.7
Do not have any pending legal matters (i.e., divorce or other legal problems?)	27	100.0	33	97.1	28	87.5	88	94.6
Know how to access emotional support while deployed	24	88.9	27	79.4	26	81.3	77	82.8
Know how to access mental health services while deployed	24	88.9	28	82.4	28	87.5	80	86.0
VI Group Integration and Identification ^c								
Number of days you have trained with your deployment unit in the last year								
More than 14	5	27.8	10	41.6	9	42.9	24	38.1
7 to 14	4	22.2	6	25.0	2	9.5	12	19.0
2 to 6	4	22.2	4	16.7	2	9.5	10	15.9
1	0	0.0	1	4.2	1	4.8	2	3.2
None	5	27.8	3	12.5	7	33.3	15	23.8

^aRespondents checked all that apply; therefore, percentages of individual categories may sum to greater than 100%.

^bEFMB, Expert Field Medical Badge; OAC, Officer Advanced Course.

^cSection VI sample sizes include only nurses who answered questions about their deployment units. Group sizes were n = 18 for group A, n = 24 for group B, n = 21 for group C, and n = 63 for all groups combined.

the solution; all dimensions achieved initial eigenvalues greater than 2.29, well over an acceptable minimum criterion of 1.0. However, because of the small sample size, the average associated with extracted commonalities obtained only a moderate value of 0.582 across 61 items. A subsequent Kaiser Varimax rotation clarified the six dimensional factor loadings and suggested that scaled attitude item scores generally appear to be expressible as a linear combination of six common factors underlying the READI. The three strongest dimensions clearly supported this assertion, with most items loading 0.5 or greater on their respective dimension and much less on the other dimensions. The first three factors accounted for nearly 40% (39.79%) of the cumulative variance. Dimensions, with individual percentage variance accounted for in parentheses, emerged in the following order. The number of items with loadings greater than 0.5 was 21 of the 27 hypothesized items reflecting the Clinical Nursing Competency dimension (18.70%), 5 of the 6 hypothesized items for Operational Nursing Competency (11.21%), and 9 of the 11 hypothesized Soldier Survival Skills items (9.98%). Items for the remaining three hypothesized factors emerged in a somewhat rearranged order, consolidating the Leadership/Administrative Support and Group Integration dimensions together, loading 5 of the 6 hypothesized items (>0.5) into a single dimension (6.45%). The other dimension, Personal/Physical/Psychosocial Readiness, experienced a split into what appeared to be an Individual/Physical Stress dimension and a Social Stress dimension. The Individual/Physical Stress dimension accounted for 7.67% of additional variance, with 6 items loading at 0.486 and above. The Social Stress dimension added another 4.33%, with 5 items loading between values of 0.441 and 0.716. These preliminary results offer a promising and anticipatory framework for structuring future planned, scheduled, and programmed READI administrations.

Institutionalizing the READI

Several subsequent actions were recommended as priorities to help institutionalize the READI. The initial steps recommended were to (1) further refine READI items, (2) conduct convergent validity testing by comparing READI scores with other measures of readiness, such as personnel measures in the unit status report, (3) administer the READI to several categories of students attempting programs at the Army Medical Department Center and School, and (4) prepare the results in the familiar red (not ready), amber (partially ready), and green (ready) format.

Discussion

The psychometric evaluation of the READI for content validity, internal consistency reliability, test-retest reliability, inter-item correlation, preliminary principle components analysis, and future utility provide initial formal testing of an instrument that has the potential as both a research and leadership tool.

The content validity inventory provided a good framework for systematically and quantitatively

evaluating the validity of the READI (i.e., estimating whether it measures what it purports to measure). Although the READI appears to have high reliability, it should be noted that the length might contribute to the high reliability. The importance of deleting knowledge items and keeping scales measuring no more than one concept was clear.

The instrument needs preparation for electronic format and institutionalization in the readiness reporting system. Arrangements for adaptation to the U.S. Air Force and further testing of the instrument are being made with a doctoral student in long-term health education and training at The University of Maryland at Baltimore. With development of a self-scoring guide and dissemination in several media formats, the READI has great promise to provide a richer, more comprehensive estimate of readiness and deployability among military health care personnel in today's exceptionally high operational and personnel tempo environment.

When the cold war was raging, the United States had a single, primary enemy. In the present geopolitical environment, war is no longer the sole reason for deployment. Now more than ever, military operations that include peacekeeping, nation building, humanitarian endeavors, and, most recently, homeland defense are added to the missions performed by the military services. Readiness for these multiple and unpredictable missions is the consummate priority of the Army Chief of Staff, the Army Surgeon General, and commanders in the field.

Then Army Surgeon General, Lieutenant General Ronald R. Blanck, stated in an electronic message on October 1, 1999, that the core functions of the Army Medical Department, deployed in more than 110 countries, are to (1) project and sustain a healthy and medically protected force; (2) train, equip, and deploy the medical force; and (3) manage and promote the health of the soldier family and military family. He referred to the spectrum of health-related services from health promotion and prevention in Army clinics in Tazsar and Skopje to sophisticated trauma surgery in Army hospitals in Bosnia and Kosovo. Returning from a visit to Hungary, Macedonia, Bosnia, and Kosovo, the Surgeon General remarked that, "we clearly have gone beyond the time when many of the elements of care in the field (i.e., training and deployments) were seen as detractors to providing interventional care in our fixed facilities. We are far closer to the seamless system of care."⁶

This research contributes in a significant way to the sustainment of the seamless system of care to which the Army Surgeon General referred. The READI is a valid, reliable, and easy-to-use assessment instrument of individual readiness among Army nursing personnel. The READI provides self-assessment for individual members of military medical units on which training programs and focused mentoring can be based.

The operational readiness scale demonstrated the strongest reliability estimates. Operational readiness can be considered as the capability of a unit/formation, ship, weapon system, or equipment to perform the missions or

functions for which it is organized or designed. The objective nature of the items on the scale led to minimal ambiguity regarding this important domain of readiness.

The humanitarian assistance part of the spectrum of health-related services to which the Surgeon General referred was addressed in a study of 35 personnel deployed to Kazakhstan.⁷ Team members underestimated how much stress they would experience in terms of isolation and inability to help the local population. The top two stressors were trouble communicating and feeling far away from familiar surroundings. The READI addresses the “feeling far away” issue but may be improved by adding an item relating to inability to help the local population. Coping strategies in the READI may be improved by addressing increased alcohol consumption and reframing the situation.

Outcomes

The development and testing of the Readiness Instrument Psychometric Evaluation resulted in the production of a valid and reliable instrument that has already been used in military units. Soon after this research was completed, the READI was used in an Army medical center supporting a caretaker hospital and in a multicomponent hospital preparing for deployment for relief in Nicaragua. The READI has also been used to assess the individual readiness of one active and one reserve component Army hospital in support of the deployment to Bosnia and in a 30th Medical Brigade hospital on mission rehearsal before deployment to Kosovo.

Conclusion

The READI is a valid and reliable instrument for use with Army nursing populations. Content experts agreed strongly that the instrument items are relevant, clear, and unique. Administration of the READI by mail for reliability estimation resulted in findings that internal consistency estimates range from 0.78 to 0.95 and test-retest reliability estimates range from 0.48 to 0.83. Results from field

administration of the revised instrument indicated an enduring stability of response patterns. A focus group concurred that the READI has great utility for the future. Recommendations included preparing the READI in several media formats, preparing an easy scoring guide, and institutionalizing the READI in operations channels as part of personnel status reporting.

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