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Original Article

Nursing culture assessment tool (NCAT): Empirical validation for use in long-term care

Tracey L. Yap [a,b,*], *Susan M. Kennerly* [c,1], *Elizabeth P. Flint* [a,2]

[a] *Duke University School of Nursing, 307 Trent Dr. Durham, NC 27710, United States*

[b] *Duke University Center for the Study of Aging and Human Development, Box 3003 DUMC, Durham, NC 27710, United States*

[c] *University of North Carolina at Charlotte School of Nursing, United States*

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ABSTRACT

Background: Capturing general aspects of the occupational subculture of nursing is needed in long-term care (LTC) given its latent influence on the quality of care that residents receive and on the ability of nursing staff (licensed nurses and certified nursing assistants) to implement evidence-based practice innovations. The psychometrically validated Nursing Culture Assessment Tool (NCAT) provides a comprehensive assessment using six dimensions (teamwork, communication, satisfaction, professional commitment, behaviors, and expectations), and evaluation of these dimensions could help positively reshape the culture before any change implementation.

Purpose: Aims were to: (1) assess the validity and reliability of the NCAT across nursing staff in a single type of clinical setting – LTC facilities, and (2) present a refined theoretical model of the interaction of culture and practice implementation.

Methods: A cross-sectional, exploratory investigation of the NCAT in LTC settings was conducted. Empirical construct validity of the 19-item NCAT's six subscales was investigated by confirmatory factor analysis using a sample of licensed nurses and certified nursing assistants ($n = 318$).

Results: The model fit was judged using the comparative fit index (0.94) and standardized root mean-square residual (0.05). Cronbach's alpha correlation coefficients of items in each subscale and in the overall scale ranged from 0.76 to 0.94.

Conclusion: A summary of the NCAT development and report on its psychometric properties when administered in LTC settings is provided, extending previous findings of the NCAT's enhanced stability when used in assessing nursing staff perceptions in LTC and by demonstrating that the NCAT is a reliable and valid psychometric screening tool for nursing culture.

* *Corresponding author*. 307 Trent Drive, DUMC 3322, Durham, NC 2770, United States. Tel.: +1 99 613 6170; fax: +1 99 681 8899.
E-mail addresses: tracey.yap@duke.edu (T.L. Yap), skenner2@uncc.edu (S.M. Kennerly), elizabeth.flint@duke.edu (E.P. Flint).

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[1] Tel.: +1 704 687 7955.
[2] Tel.: +1 919 684 9092.

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Quality nursing care in the 16,100 long-term care (LTC) facilities in the U.S. is a national priority [1,2]. The identification of evidence-based innovations to improve LTC – and strategies that ensure their adoption and sustainability – is currently recognized as an essential element of implementation research. The occupational subculture of nursing has a latent influence on the quality of care that LTC residents receive and on the ability of nursing staff, which consists of both licensed nurses and certified nursing assistants (CNAs), to implement evidence-based practice innovations. A collegial relationship between these sets of workers is the cornerstone of individualized patient care. To support implementation research in LTC settings, we extended previous work on the psychometric properties of the Nursing Culture Assessment Tool (NCAT) [3] that was conducted among nurses in multiple care settings, to now focus on its validity and reliability specifically among LTC nursing workgroups and its contribution to refining a theoretical model of nursing's organizational subculture.

1. Background

1.1. *Implementation science*

Implementation research is the scientific study of methods that promote the systematic uptake of research findings or evidence-based practices, with a focus on what happens after the initial adoption of the innovation and the factors that influence sustained adoption and modification [4]. The field of implementation research has grown due to the need to make informed decisions regarding effective clinical policies, programs, and practices. Deployment of new practice innovations or guidelines can disturb current workflow and impair productivity in healthcare systems. Successful deployment is dependent upon not only the function and features of the innovation but also the manner in which the system change is implemented. What, how, and why do specific interventions and innovative approaches work in "real world" settings, and what implementation methods improve outcomes? Implementation science is concerned not only with knowledge development but also with the users of the innovation and the context of its implementation. [4]

Implementation frameworks used to guide innovation deployment in health services [5–10] tend to focus on the sources and the nature of innovations available to staff rather than on the role staff members play as pivotal contributors to adoption and dissemination. The occupational subculture of nursing is the "black box" of the implementation science movement, even though nursing personnel function as pivotal elements and often leaders of implementing evidence-based practices in all types of settings and must be adopters [10] of new evidence/interventions.

1.2. *Theoretical framework of a nursing culture*

The nursing culture within any healthcare facility or unit is an occupational subculture of the overall organizational culture. Existing instruments for measuring organizational culture have had several limitations: they lack agreement on the essential dimensions of culture that should be measured [11], they focus on environmental influences on culture rather than how the workers' relationships reflect culture, their measurement capabilities are often limited to a specific task application, and they typically focus on organizational culture, not occupational subcultures such as the nursing culture [12–14]. Nursing culture is comprised of the behavior of the workgroup within the organization and the meanings that the staff members attach to their work and worker relationships. Culture includes the values, visions, norms, nomenclature, systems, symbols, beliefs, and habits that occur within the workgroup. It is also the pattern of such collective behaviors and assumptions that are taught to new members as a way of perceiving, thinking, and even feeling. Nursing culture affects the way nursing staff and other groups interact with each other, with patients and/or residents, and with various stakeholders.

The Nursing Culture Assessment Tool (NCAT) was developed in response to the need to assess nursing's occupational subculture and was initially validated in a cross-sectional study using a sample of nurses from across a variety of healthcare workplace settings, including LTC [3]. Administering the NCAT to a homogenous nursing staff population within long-term care enabled additional psychometric testing to further assess functionality of the NCAT's dimensions and ascertain whether the reliabilities of NCAT subscales would improve.

Nursing culture was manifested along six dimensions (Fig. 1): behaviors, expectations, teamwork, communication, satisfaction, and professional commitment [3]. These dimensions reflect shared values, beliefs, norms, rituals, and other assumptions and meanings that guide the actions and interactions of nursing staff in the service of quality care outcomes [15]. The nursing culture gives rise both to the goals pursued by members of this group and to their views of standards of behavior appropriate for achieving these goals.

1.3. *The long-term care setting*

In LTC, the context of care plays a key role in evidence-based practice changes and implementation of research innovations for at least four reasons. First, quality outcomes rely on the structure and function of each element in LTC's multidimensional system, including the roles and influence of government entities, private providers, staff, and family members. Second, the LTC setting poses a further challenge to system change because it is both a clinical and a social setting. Some LTC facility environments enhance the social setting by de-emphasizing the institutional nature of the environment as much as possible and personalizing resident spaces to recognize individual resident autonomy and support a more homelike situation. Third, LTC services are labor intensive, with the quality of care depending largely on the performance of the care giving personnel. Thus, staff characteristics and interactions are critical structural elements contributing to the residents' quality of life and care provided and to the successful execution and uptake of evidence-based practice in LTC settings. Finally, these authors suggest that nurse-sensitive care quality indicators such as pressure ulcers (PrU) and

falls that are sometimes perceived as a reflection of ineffective practice may be partly explained by dimensions of a setting's nursing culture.

In LTC, certified nursing assistants (CNAs) make up the largest portion of the nursing workgroup and are responsible for 80–90% [16] of the hands-on care provided to the residents. CNAs in LTC have an unacceptably high turnover rate, which reduces morale and safety and is disruptive to the quality of care; furthermore, it is costly to both the provider and payer [17]. An exploratory study of CNAs' intent to leave, reported by the U.S. Department of Health and Human Services in 2008, identified the two most frequently cited reasons for disliking their job as co-workers (30%) and nurse supervisors (23%) [17]. This report stressed that the supervisor and work environment were pivotal in stabilizing this segment of the nursing workforce and that LTC facilities needed regular assessments of employee satisfaction among Registered Nurses (RN), Licensed Practical Nurses (LPN), and CNAs [17]. Understanding of employee relationships, values, and beliefs that contribute to the "norms" of care delivery may contribute insights into how the nursing team functions and how to facilitate practice transformation to improve care delivery.

When RNs, LPNs, and CNAs work together to execute evidence-based protocols and provide quality care outcomes in LTC settings, they have shared *expectations* about the duties of each group. However, a healthy work environment goes beyond these shared role expectations to include values, norms, and other aspects of a positive occupational culture, including *teamwork*, clear and respectful *communication*, and appropriate *behavior* toward both colleagues [18] and residents, leading to enhanced employee *satisfaction* and *professional commitment*. These dimensions of the nursing culture

Dimension	Definition
Teamwork	A group of persons working in an environment of trust and collaborating in order to co-create effectively toward reaching a goal; facilitating positive interdependence with supporting interactions in order to carry out their expected roles.
Communication	A clear and respectful process of interchange of thoughts to effectively transfer/exchange information and establish understanding between sender and receiver.
Satisfaction	The positively toned state of being and contentment that results from a match between worker and workplace expectations.
Professional commitment	Sense of personal covenant between the worker and profession — responsibility or obligation to the profession of nursing.
Behaviors	Appropriate action or reaction toward both colleagues and residents that workers bring to the work situation/circumstance or environment.
Expectations	Strong belief that leaders and colleagues hold for each other's actions within their defined roles.

Fig. 1 – Occupational subculture of nursing.

support development of an effective LTC workforce, successful adoption of evidence-based best practices, achievement of high quality care outcomes, and optimal worker performance [19].

Identifying effective strategies to guide culture change in areas that affect quality of care depends upon understanding the nursing culture of a facility. To this end, the aims of the current study were to: (1) assess the validity and reliability of the NCAT across licensed nurses and CNAs in a single type of clinical setting – LTC facilities and (2) present a refined theoretical model of the interaction of culture and practice implementation.

2. Methods

2.1. Design and sample

The current study was based on cross-sectional data from two studies described previously [3,21]. The sample consisted of the subset of LTC nursing staff ($n = 107$) from the original NCAT validation study [20] and all nursing staff participants in an LTC pressure ulcer (PU) prevention study ($n = 211$) [21]. The combined effective sample ($n = 318$) from these two studies included RNs, LPNs, and CNAs working in LTC settings in the Midwestern U.S. There was no overlap of participants from the two studies. The University of Cincinnati institutional review board approved the study.

2.2. Measures

The NCAT is a 19-item scale that assesses six dimensions of nursing culture: expectations, behavior, satisfaction, teamwork, communication, and professional commitment [3]. The first five dimensions/subscales were considered to represent the respondent's assessment of the nursing culture of the respective LTC facility; the sixth subscale was considered to represent the respondent's commitment to his or her profession. Items used a four-level (1–4) Likert scale, with a total score range = 19–76. The original sample included nurses working in acute, home, ambulatory and LTC; medical offices; occupational health; rehabilitation; cancer centers; schools; and insurance companies. The NCAT's content and construct validity were assessed as acceptable through principal components confirmatory factor analyses and structural analyses of item functioning, and the Cronbach's alpha reliability of dimensions that were assessed according to George and Mallery [22] ranged from excellent (Professional Commitment), good (Expectations, Teamwork), acceptable (Communication, Satisfaction), to questionable (Behavior) [3]. Nursing workgroup (RN, LPN, CNA) self-reported demographic characteristics were only retrievable from the original NCAT validation study data set.

2.3. Statistical analysis

To answer the first research question (assess validity and reliability of the NCAT among licensed nurses and CNAs in LTC clinical setting), the empirical construct validity of the six subscales was investigated by confirmatory factor analysis using Mplus software [23]. First, the Maximum Likelihood with Missing Value (MLMV) estimator was used to adjust for non-normality of the four-level response scales of each item. Then, the comparative fit index (CFI) and the standardized root mean-square residual (SRMR) [24] were used to judge the model fit to the six principal subscales; CFI $\geq$0.90 and an SRMR < 0.05 indicate appropriate fit [24,25]. Finally, standardized loadings for each item measured its relative importance for its respective subscale, and Cronbach's alpha reliability correlation coefficients [26,27] measured the internal consistency of items in each subscale and of the 19 items in the overall instrument; a commonly accepted threshold of

Table 1 – Standardized Factor Loadings ($n = 318$).

Subscale	Item#	Item Stem	Factor loading
Expectations	1	Standards of care are clearly defined in this facility	0.86
	2	Standards of care tasks and rules are spelled out and well understood	0.83
	3	Standards of care tasks and rules are followed by staff in their daily duties	0.74
Behaviors	4	The Director of Nursing effectively carries out his or her role and responsibilities	0.69
	5	Nurses effectively carry out their roles and responsibilities	0.71
	6	Certified Nursing Assistants effectively carry out their roles and responsibilities	0.65
Teamwork	7	Staff help each other in daily tasks	0.79
	8	Staff show respect for one another	0.83
	9	Staff trust one another	0.84
	10	Staff feel connected to one another	0.87
	11	Staff use appropriate language with other staff	0.76
Communication	12	Staff use appropriate language with residents and family	0.69
	13	Staff are helped and urged to do a good job	0.81
Satisfaction	14	Staff are satisfied with their jobs	0.82
	15	Overall, the culture of this organization is positive and helps to make sure residents are given high-quality care	0.86
Professional commitment	16	I feel very loyal to the nursing profession	0.86
	17	For me nursing is the best of all professions	0.76
	18	I am proud to tell others that I am part of this profession	0.94
	19	I really care about the nursing care profession	0.94

Table 2 – Reliability statistics ($n = 318$).

Scale	Scale Items	Cronbach's alpha
Expectations	1, 2, 3	0.86
Behavior	4, 5, 6	0.76
Teamwork	7, 8, 9, 10	0.92
Communication	11, 12, 13	0.85
Satisfaction	14, 15	0.85
Professional commitment	16, 17, 18, 19	0.94
NCAT Total scale score	1–19	0.95

0.70 is expected for the Cronbach's alpha [27]. Spearman rho correlation coefficients [28] were calculated between item scores and between subscale scores to assess construct validity.

To test the tool's ability to discriminate between responses of nursing staff (RNs, LPNs, CNAs), each item was analyzed using analyses of variance (ANOVA) in the subset of respondents ($n = 211$) in the PU prevention study, for whom we had licensure data. Prior to the ANOVA, responses to each item were adjusted by dividing the value of each subject's response to that item by the total of the same subject's responses to all items in the respective cultural assessment category. For each ANOVA, significance levels for evaluating the overall differences among groups for each of the 19 items were adjusted using the Holm-Sidak method, which provides a more powerful multiple comparison test than Bonferroni [28]. Paired differences across nursing staff categories were evaluated, using an *a priori* significance cutoff of $p < 0.01$.

3. Results

The CFI of the six subscales was 0.94, and the SRMR was 0.05. Standardized loadings for each item ranged from 0.65 to 0.94 (Table 1). Item 6 loaded exclusively as part of the Behavior subscale. Cronbach's alpha correlation coefficients of items in each subscale and in the overall scale ranged from 0.76 to 0.94 (Table 2). NCAT revealed a mean General Nursing Culture score of 44.9 (SD = 8.6; range of 15–60) and a mean Total NCAT Scale score of 59.4 (SD = 9.6) with a range from 19 to 76.

Spearman rho correlation coefficients between each pair of the 19 NCAT items for the total sample ($n = 318$) of this study are shown in Table 3 and ranged from 0.11 to 0.92 [28]. Correlations between each pair of subscales are shown in Table 4 and ranged from a low correlation of 0.12 between the Behavior and Communication subscales to a high correlation of 0.66 between the Expectations and, each, the Teamwork and Satisfaction subscales. The total score of each subscale was highly correlated with the NCAT total scale score except for the moderate correlations of the total score with the Behavior (*rho* = 0.46) and Professional Commitment (*rho* = 0.50) subscales, respectively.

The empirical means and standard deviations of each item and subscale and the test results of paired differences across nursing staff ($n = 211$) categories are shown in Table 5, together with adjusted p-values obtained from the ANOVA. Nursing staff showed significant differences by category on three items. According to the Behavior subscale, CNAs were less likely than LPNs or RNs to agree that "Nurses effectively carry out their roles and responsibilities" (item 5). Also from the Behavior subscale, CNAs were more likely than LPNs to agree that "Certified Nursing Assistants effectively carry out their roles and responsibilities" (item 6). From the Communication subscale, LPNs were more likely than RNs to agree that "Staff use appropriate language with residents and family" (item 12). Nursing staff showed a significant difference on only one subscale. RNs scored higher on Professional Commitment than did LPNs and CNAs. Nursing staff showed no significant differences by category on the summed total score on the NCAT.

Table 3 – Spearman correlation coefficients between responses to nineteen items ($n = 318$).

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2	0.79	1.00																	
3	0.60	0.64	1.00																
4	0.75	0.73	0.59	1.00															
5	0.60	0.57	0.65	0.51	1.00														
6	0.50	0.50	0.67	0.47	0.58	1.00													
7	0.48	0.47	0.64	0.49	0.55	0.59	1.00												
8	0.54	0.54	0.61	0.51	0.51	0.67	0.78	1.00											
9	0.47	0.46	0.69	0.53	0.57	0.59	0.70	0.71	1.00										
10	0.49	0.47	0.63	0.50	0.51	0.62	0.71	0.72	0.79	1.00									
11	0.53	0.59	0.52	0.57	0.55	0.54	0.54	0.66	0.54	0.55	1.00								
12	0.53	0.52	0.50	0.52	0.48	0.47	0.52	0.54	0.41	0.45	0.67	1.00							
13	0.61	0.60	0.62	0.64	0.60	0.55	0.62	0.64	0.57	0.65	0.66	0.65	1.00						
14	0.57	0.50	0.65	0.53	0.59	0.60	0.60	0.67	0.59	0.66	0.57	0.47	0.68	1.00					
15	0.69	0.60	0.62	0.62	0.60	0.57	0.54	0.60	0.52	0.59	0.60	0.57	0.77	0.74	1.00				
16	0.33	0.31	0.23	0.34	0.27	0.18	0.22	0.22	0.21	0.28	0.24	0.36	0.38	0.26	0.39	1.00			
17	0.32	0.23	0.14	0.32	0.24	0.11	0.16	0.17	0.13	0.22	0.19	0.30	0.32	0.30	0.40	0.78	1.00		
18	0.36	0.33	0.25	0.36	0.26	0.21	0.27	0.24	0.23	0.34	0.23	0.39	0.43	0.34	0.41	0.83	0.75	1.00	
19	0.37	0.32	0.24	0.37	0.28	0.18	0.25	0.22	0.21	0.30	0.25	0.42	0.39	0.32	0.40	0.84	0.73	0.92	1.00

Note: correlation coefficient <0.5 means low correlation; correlation coefficient ≥0.5 and <0.8 means medium correlation; correlation coefficient ≥0.8 means high correlation.

Table 4 – Spearman correlation coefficients between subscales and total NCAT score ($n = 318$).

Subscale	Behavior	Expectations	Teamwork	Communication	Satisfaction	Professional commitment	NCAT total score
Behavior	1.00						
Expectations	0.45	1.00					
Teamwork	0.48	0.66	1.00				
Communication	0.12	0.63	0.63	1.00			
Satisfaction	0.43	0.66	0.65	0.61	1.00		
Professional commitment	0.16	0.29	0.25	0.30	0.30	1.00	
NCAT total score	0.46	0.84	0.84	0.82	0.80	0.50	1.00

Note: correlation coefficient <0.5 means low correlation; correlation coefficient ≥0.5 and <0.8 means medium correlation; correlation coefficient ≥0.8 means high correlation.

4. Discussion

4.1. *Validity, reliability, and practice applications of the NCAT in an LTC setting*

The study extended previous work supporting the validity and reliability of the NCAT, as a simple and easy-to-use multidimensional assessment tool with promising sensitivity and specificity for identifying the occupational subculture of nursing in LTC settings. These new results support the hypothesized dimensionality of the NCAT. Correlations of items and subscales to each other and to the total score reflect an appropriate level of association, which is required to support the construct validity of the overall tool, the six first order factors, and a second order total score for the NCAT. In all instances in which the inter-item correlation for paired items was low, at least moderate correlations existed for each item when examined in relation to other items, indicating that they represent the same construct [27]. The NCAT's 19 items and six subscales discriminated between perceptions of nursing staff categories. This finding offers further evidence of the tool's ability to capture the differences in perspectives about the nursing culture that exist within differing types of nursing staff in the same type of clinical setting. Users of the tool in LTC and other settings would be encouraged to engage in total and subscale score interpretations within the respective organization's context and goals.

This study extends the findings on the original NCAT by demonstrating its use as a reliable and valid psychometric screening tool in LTC and providing results that support the NCAT's enhanced stability when used in assessing nursing staff perceptions from a sample of individuals from the same type of practice setting. Factor loadings for the six subscale dimensions and reliability coefficients for the overall subscale and total score were strengthened when testing the tool with respondents from a single type of clinical setting. A new finding was that Item 6 loaded exclusively as part of the Behavior subscale in this factor analysis, in contrast to the prior NCAT validation study [29] in which it cross-loaded onto Behavior and Teamwork subscales. Additionally, the summed scoring of the total scale (Items 1–19) and calculation of each subscale score was simplified with the elimination of any item cross-loading. It is possible that this occurred because the role behaviors for director, licensed nurses, and CNAs are more clearly differentiated in the LTC setting than in other settings.

The findings indicate that the NCAT can be used in LTC settings to identify areas in the nursing practices that could be the focus for improvement, thus permitting these practices to be targeted for intervention before implementing any substantial unit or organization-level change. Because the tool is designed to measure worker perceptions of the cultural environment, can be used by RNs, LPNs, or CNAs, and is easily scored, it is well suited for use in assessing individual and group attitudes and behaviors. Since culture is best understood when the patterns of shared experiences are considered, the NCAT can be useful in performing a baseline assessment before bringing about targeted culture change or in on-going monitoring of the impact of organizational change that can directly or indirectly affect the nursing culture. Then, for example, if the goal were to implement a new pressure ulcer prevention protocol, cultural barriers might be poor communication among nursing staff leading to breakdown of teamwork or lack of valuing prevention of pressure ulcers as an attainable priority. Once identified, specific beliefs, norms, or behaviors can be targeted for modification or strengthening, using strategies that promote sustainable implementation of the new evidence-based prevention protocol.

4.2. *Theoretical implications*

To date, when attempting to advance our knowledge regarding meaningful improvements to the provision of care delivery in LTC settings, the role of culture remains vague, with the primary focus being on contextual-level (i.e., facility) characteristics [30]. The NCAT was conceptualized as six dimensions that were proposed to capture the unique nursing ethos within each setting that drives care delivery beliefs, values, and practice norms, as presented in Fig. 1 with the definitions for each of the subscales.

The overall NCAT results and findings for subscale dimension should give insights into the core nursing culture which are important when attempting to link the practice environment to care outcomes. For example, two dimensions of the NCAT (Satisfaction and Commitment) have been identified as predictors for CNA turnover rate in LTC [17], and Teamwork and Communication have long been acknowledged as vital components of quality care delivery as it is

Table 5 – Empirical mean values and standard deviations of item, subscale, and total scale responses ($n = 211$).

	Nursing category			Adjusted p-value*
	Certified nursing assistant ($n = 187$)	Licensed practical nurse ($n = 77$)	Registered nurse ($n = 54$)	
Item				
1	3.3 ± 0.7	3.3 ± 0.7	3.4 ± 0.6	0.92
2	3.2 ± 0.7	3.2 ± 0.8	3.2 ± 0.6	1.00
3	3.0 ± 0.8	2.9 ± 0.8	3.0 ± 0.6	0.99
4	3.2 ± 0.8	3.1 ± 0.9	3.3 ± 0.7	1.00
5	2.9 ± 0.9[a,b]	3.0 ± 0.7[a]	3.2 ± 0.6[b]	0.03*
6	3.1 ± 0.7[c]	2.8 ± 0.7[c]	3.0 ± 0.5	0.01*
7	2.9 ± 0.8	2.9 ± 0.7	3.0 ± 0.6	1.00
8	2.8 ± 0.8	2.7 ± 0.7	2.9 ± 0.7	1.00
9	2.7 ± 0.9	2.5 ± 0.7	2.8 ± 0.6	0.74
10	2.8 ± 0.8	2.5 ± 0.8	2.9 ± 0.6	0.14
11	2.9 ± 0.9	2.8 ± 0.7	3.0 ± 0.6	1.00
12	3.3 ± 0.6[d]	3.3 ± 0.7[e]	3.2 ± 0.5[d,e]	<0.01*
13	3.1 ± 0.8	3.1 ± 0.8	3.2 ± 0.7	0.99
14	2.8 ± 0.8	2.6 ± 0.8	2.8 ± 0.7	0.99
15	3.1 ± 0.8	3.1 ± 0.9	3.2 ± 0.7	1.00
16	3.6 ± 0.6	3.6 ± 0.6	3.9 ± 0.3	1.00
17	3.4 ± 0.8	3.4 ± 0.8	3.7 ± 0.5	0.99
18	3.6 ± 0.6	3.6 ± 0.6	3.9 ± 0.3	1.00
19	3.7 ± 0.5	3.7 ± 0.5	3.9 ± 0.3	0.77
Subscale				
Expectation	9.5 ± 2.0	9.5 ± 2.0	9.6 ± 1.6	0.98
Behavior	9.2 ± 2.0	8.9 ± 1.9	9.4 ± 1.5	1.00
Teamwork	8.4 ± 2.2	8.1 ± 1.7	8.7 ± 1.7	1.00
Communication	9.0 ± 1.9	8.6 ± 1.8	9.1 ± 1.6	1.00
Satisfaction	8.9 ± 2.2	8.7 ± 2.2	9.1 ± 1.9	1.00
Professional commitment	14.3 ± 2.3[f]	14.3 ± 2.3[g]	15.4 ± 1.2[f,g]	0.01*
Overall				
Total score	59.3 ± 10.0	58.1 ± 10.0	61.3 ± 7.5	0.92

Note: Within a given row, mean values which do not share the same superscript are significantly different ($p < 0.01$).

intuitively logical that a team would fail when communication fails. Simply conducting training and creating team infrastructure does not ensure that the "team" will effectively communicate and be successful because it depends on the willingness of the group to cooperate, coordinate, and communicate for the shared purpose of achieving optimal resident outcomes [31]. Furthermore, leadership and group expectations and professional commitment are what drive outcome goals; however, it should be noted that behavior must be leveraged appropriately in order to provide support. Therefore, what the NCAT does is to bring all these dimension perceptions together for a bigger picture of the nursing culture, rather than individually measuring pieces and focusing on the context and infrastructure alone. In fact, these authors suggest that even when the leader perceives a problem in a specific area, such as teamwork, that she or he first take a look at a bigger picture of the nursing subculture using the NCAT to determine if there are other areas that may be influencing the ability of the team to work together. This additional information will help the leader [32] define the appropriate next steps to use in moving the work group toward a more synergistic work relationship.

Casper and colleagues (2013) recently found that both contextual-level characteristics and demographic individual-level characteristics wielded very little effect on staff members' perceived ability to provide individualized care to LTC residents [30]. Instead, inter-professional relationships and support predicted staff perception of their ability to provide individualized care, suggesting that interventions aimed at increasing individualized care in LTC settings should carefully consider staffs' access to resources, support, and increased control over working conditions, and ability to reform facility-level rigidity. Staff rely on these sources and other contextual factors to support their perceived ability to produce quality care outcomes. Furthermore, nursing culture is one of the key factors that impacts staff productivity and would enable staff to improve their individualization of care.

The NCAT expands but differs from the range of existing instruments for measuring the influence of cultures on the healthcare workplace. For example, Patient Safety Culture Assessment Tools – designed for hospital, medical office, and nursing home use – assess safety-focused behaviors and expectations but do not assess the culture of occupational groups [33]. Also, tools that assess nurse perceptions of the work environment, e.g., the popular Nursing Work Index-R [34], ask respondents to rate the importance of work environment characteristics that support their practice [35] but do not capture the commonly shared beliefs, values, norms, and rituals that guide group behaviors.

4.3. *Limitations*

A limitation of this study is that users cannot use the NCAT to compare one organization's results to another since the tool's scoring has not been standardized using a norm-referenced scoring approach. Currently, the NCAT can be used to examine and compare the perceptions of individuals and groups to each other within an organization by calculating individual subscale scores or a total NCAT score. The next step in research on the NCAT is to conduct a large multi-site study that addresses standardization of the tool's scoring in order to enable more reliable and consistent comparisons of raw scores across groups, especially those that come from very different settings and contexts.

Another limitation of this study is that demographic characteristics were only available for a subset of the sample. However, this did not influence the ability to test the tool for its overall psychometric properties.

5. Conclusions

This study extended previous findings on the NCAT by providing results that support the NCAT's enhanced stability when used in assessing nursing staff perceptions in LTC settings and demonstrating its use as a reliable and valid psychometric screening tool for nursing culture. When LTC administration is considering any type of quality improvement implementation or change project, use of the NCAT to assess nursing's organizational subculture would reflect an awareness that forces beyond the environmental influences on workflow are relevant; in fact, we propose that the occupational subculture of nursing should be fully considered because it can potentially impact outcomes and determine project success.

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REFERENCES

[1] Jones AL, Dwyer LL, Bercovitz AR, Strahan GW. The national nursing home survey: 2004 overview. National Center for Health Statistics. Vital Health Stat. 2009;13(167).

[2] Castle NG, Ferguson JC. What is nursing home quality and how is it measured? Gerontologist Aug 2010;50(4):426–42.

[3] Kennerly SM, Yap TL, Hemmings A, Beckett G, Schafer JC, Borchers A. Development and psychometric testing of the nursing culture assessment tool. Clin Nurs Res Nov 2012;21(4):467–85.

[4] Peters DH, Adam T, Alonge O, Agyepong IA, Tran N. Implementation research: what it is and how to do it. BMJ 2013:347. 2013-11-20 11:48:42.

[5] Estabrooks CA, Thompson DS, Lovely JJ, Hofmeyer A. A guide to knowledge translation theory. J Contin Educ Health Prof Winter 2006;26(1):25–36.

[6] Greenhalgh T, Robert G, Bate P, Macfarlane F, Kyriakidou O. Diffusion of innovations in health service organisations: a systematic literature review. Malden, MA: Blackwell Publishing, Inc; 2005.

[7] Perry L, Bellchambers H, Howie A, Moxey A, Parkinson L, Capra S, et al. Examination of the utility of the promoting action on research implementation in health services framework for implementation of evidence based practice in residential aged care settings. J Adv Nurs Oct 2011;67(10):2139–50.

[8] Glasgow RE, Klesges LM, Dzewaltowski DA, Bull SS, Estabrooks P. The future of health behavior change research: what is needed to improve translation of research into health promotion practice? Ann Behav Med Feb 2004;27(1):3–12.

[9] Glasgow RE, McKay HG, Piette JD, Reynolds KD. The RE-AIM framework for evaluating interventions: what can it tell us about approaches to chronic illness management? Patient Educ Couns Aug 2001;44(2):119–27.

[10] Rogers EM. Diffusion of innovations. 5th ed. New York, NY: Free Press; 2003.

[11] Scott T, Mannion R, Davies H, Marshall M. The quantitative measurement of organizational culture in health care: a review of the available instruments. Health Serv Res Jun 2003;38(3):923–45.

[12] Nieboer AP, Strating MM. Innovative culture in long-term care settings: the influence of organizational characteristics. Health Care Manage Rev Apr-Jun 2012;37(2):165–74.

[13] Kiely C. Cultural transformation in pressure ulcer prevention and care. J Wound Ostomy Cont Nurs Jul-Aug 2012;39(4):443–6.

[14] Scott T, Mannion R, Davies HT, Marshall MN. Implementing culture change in health care: theory and practice. Int J Qual Health Care Apr 2003;15(2):111–8.

[15] Kontos PC, Miller KL, Mitchell GJ. Neglecting the importance of the decision making and care regimes of personal support workers: a critique of standardization of care planning through the RAI/MDS. Gerontologist Jun 2010;50(3):352–62.

[16] Castle NG, Engberg J. Staff turnover and quality of care in nursing homes. Med Care Jun 2005;43(6):616–26.

[17] Squillace MR, Bercovitz A, Rosenoff E, Remsburg RE. An exploratory study of certified nursing assistants' intent to leave. 2008. Washington, D.C.

[18] American Association of Critical Care Nurses. AACN standards for establishing and sustaining healthy work environments. Aliso Viejo, CA: American Association of Critical-Care Nurses; 2005.

[19] Gibson DE, Barsade SG. Managing organizational culture change: the case of long-term care. J Soc Work Long Term Care 2003;2(1–2):11–34.

[20] Kennerly SM, Yap TL, Hemmings A, Beckett G, Schafer JC, Borchers A. Development and psychometric testing of the nursing culture assessment tool. Clin Nurs Res Apr 19 2012.

[21] Yap TL, Kennerly SM, Simmons MR, Buncher CR, Miller E, Kim J, et al. Multidimensional team-based intervention using musical cues to reduce odds of facility-acquired pressure ulcers in long-term care: a paired randomized intervention study. J Am Geriatr Soc Sep 2013;61(9):1552–9.

[22] George G, Mallery P. SPSS for windows step by step: a simple guide and reference 11.0 update. 4th ed. Boston: Allyn & Bacon; 2003.
[23] Muthén LK, Muthén BO. Mplus User's guide. 6th ed. Los Angeles, CA: Muthén & Muthén; 1998–2010.
[24] Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model 1999;6(1):1–55.
[25] Weston R, Gore P. A brief guide to structural equation modeling. Couns Psychol 2006;34(5):719–51.
[26] Suhr D. Reliability, exploratory, & confirmatory factor analysis for the scale of athletic priorities. Paper presented at: 28th annual meeting of SAS users group international 2003; Cary, NC.
[27] Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. New York, NY: McGraw-Hill, Inc.; 1994.
[28] Plichta S, Kelvin E. Munro's statistical methods for health care research. Philadelphia, PA: Lippincott Williams & Wilkins; 2013.
[29] Borchers A, Kennerly S, Yap T, Hemmings A, Beckett G, Schafer J. Workplace culture: psychometric evaluation of the Nursing Culture Assessment Tool. Funded grant T42/OH008432-05, National Institute of Occupational Health and Safety Sponsored Education Research Center's Pilot Research Program, University of Cincinnati, Cincinnati, OH. 2010.
[30] Caspar S, Cooke HA, O'Rourke N, MacDonald SW. Influence of individual and contextual characteristics on the provision of individualized care in long-term care facilities. Gerontologist Oct 2013;53(5):790–800.
[31] King HB, Battles J, Baker DP, Alonso A, Salas E, Webster J, et al. TeamSTEPPS: team strategies and tools to enhance performance and patient safety. Advances in patient safety: new directions and alternative approaches (Vol. 3: Performance and tools). Rockville MD. 2008.
[32] Yap TL, Kennerly SM. A nurse-led approach to preventing pressure ulcers. Rehabil Nurs May-Jun 2011;36(3):106–10.
[33] Agency for Healthcare Research and Quality (AHRQ). Surveys on. Patient Saf Cult 2011 [Accessed September 20, 2011], http://www.ahrq.gov/qual/patientsafetyculture/.
[34] Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the revised nursing work index. Nurs Res May-Jun 2000;49(3):146–53.
[35] Flynn L, Dickson G, Moles DJ. Enhancing the nursing workplace. Provider Nov 2007;33(11):35–6. 39.