

Psychometric Evaluation of the Hospital Culture of Transitions Survey

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Background: Ineffective or inefficient transitions threaten patient safety, hinder communication, and worsen patient outcomes. The Hospital Culture of Transitions (H-CulT) survey was designed to assess a hospital's organizational culture related to within-hospital transitions in care involving patient movement. In this article, psychometric properties of the H-CulT survey were examined to assess and refine the hospital culture of transitions.

Methods: A cross-sectional, multicenter, multidisciplinary correlational design and survey methods were used to examine the psychometric properties of the H-CulT survey. Exploratory factor analysis was used to quantify the accuracy of the previously identified structure. Specifically, the analysis involved the principal axis factor method with an oblique rotation, based on a polychoric correlation matrix.

Results: A sample of 492 respondents from 13 diverse hospitals participated. Cronbach's alpha for the instrument was 0.88, indicating strong internal consistency. Seven subscales emerged and were labeled: Hospital Leadership, Unit Leadership, My Unit's Culture, Other Units' Culture, Busy Workload, Priority of Patient Care, and Use of Data. Correlations between subscales ranged from 0.07 to 0.52, providing evidence that the subscales did not measure the same construct. Subscale correlations with the total score were near or above 0.50 ($p < 0.001$). Use of a factor-loading cutoff of 0.40 resulted in the elimination of 12 items because of weak associations with the topic.

Conclusion: The H-CulT is a psychometrically sound and practical survey for assessing hospital culture related to patient flow during transitions in care. Survey results may prompt quality improvement interventions that enhance in-hospital transitions and improve staff satisfaction and patient satisfaction with care.

In hospitals, patient flow is characterized by a series of transitions in care involving patient movement between and within units. Ineffective or inefficient transitions threaten patient safety, hinder communication, and worsen patient outcomes.¹⁻³ Key health care agencies have identified the need for efficient hospital patient flow as a measure of quality; for example, The Joint Commission restructured Leadership (LD) Standard LD.04.03.11 to address patient flow,^{4,5} and the Centers for Medicare & Medicaid Services included multiple measures of emergency department (ED) throughput in its quality reporting program.⁶

Hospital culture is a set of assumptions formed by a hospital group to resolve internal and external pressures, which are taught to new members as the preferred way to think and feel in relation to pressures.⁷ There are several levels of hospital culture. At the surface are artifacts: tangible and visible manifestations of culture, such as mode of dress or public staff behavior. Below the surface are the hospital's espoused beliefs and values, reflected in policies and procedures that most hospitals have in codified form. The third level includes the collective assumptions shared by members of a particular work unit (for example, the ED) that create the

mental models that drive behavior and directly produce patient care outcomes.⁷

Understanding organizational culture is important to improving transitions in care. Hospital culture impacts staff attitudes, beliefs, customs, values, and shared practices mediating transitions in care between units and the efficiency of those transitions (patient flow). Through an understanding of organizational culture, teams can identify potentially remediable issues, prioritize improvement efforts, and assess the impact of improvements aimed at changing the culture. In this project, the care transition of high interest was patient movement between the ED and hospital inpatient units.

Surveys can be useful to assess organizational culture. For example, the Agency for Healthcare Research and Quality (AHRQ) developed and validated the Hospital Survey on Patient Safety Culture to assess safety culture within an organization.⁸ Subsequently, AHRQ's survey was associated with actual patient safety events.⁹ In previous work, our group developed a survey to assess the culture of patient flow surrounding care transitions called the Hospital Culture of Transitions in Care (H-CulT) through a rigorous process that involved stakeholder input to develop domains, items, and survey structure.¹⁰ In this article, psychometric properties of the H-CulT survey were examined to assess and refine hospital culture of transitions in care in patient flow. Because efficient and effective transitions affect quality of care, it is

vitaly important to assess hospital organizational culture of transitions in care to determine modifiable gaps and disparities.

METHODS

A cross-sectional, multicenter, multidisciplinary correlational design and survey methods were used to examine the psychometric properties of the H-CulT survey. Approval was obtained from the Institutional Review Board (IRB) of the principal investigator's [M.M.] hospital and the IRB of each of the participating hospitals.

Setting and Sample

A convenience sample of staff with responsibility for patient flow was recruited in June through October 2014 from 13 acute care hospitals in three states throughout the South and Midwest of the United States. The hospitals chosen were of varying size and location in an effort to increase diversity of the sample. Participants were nurses in multiple roles, including nurse practitioners and managers, physicians, physician assistants, administrators, therapists, unit clerks, and technicians. We estimated that a minimum sample size of 10 respondents per item would provide adequate power for factor analysis.¹¹ Therefore, our minimum sample size goal was 350 completed surveys. There were no exclusions to participate after respondents self-determined their role in transitions in care regarding patient flow.

Survey Measurement

The original H-CulT was a 35-item survey designed through a rigorous process to provide information about staff attitudes, values, beliefs, and shared practices related to transitions in care at the hospital and unit levels. Of the 35 items, 32 used a Likert response format (from 1 ["strongly disagree"] to 5 ["strongly agree"],¹² and 1 used a response format indicating frequency (from 1 ["never"] to 5 ["always"]); 1 item asked for a "yes/no/I don't know" response, and 1 item asked respondents to give their hospital a grade (A–F) for transitions in care. The survey also included five demographic questions about respondents' unit/department type, their position, and their tenure on the unit, at the hospital, and in their roles. The final item was open-ended to allow for additional comments.

Data Collection

REDCap software (Research Electronic Data Capture version 5.8.2 [2015], Vanderbilt University) was used to administer the survey. Contact people at each hospital distributed a cover letter and link via electronic mail. Survey completion was anonymous, and completion indicated a subject's consent to participate. Contact persons did not report the number of staff to whom the survey was sent, making it impossible to directly calculate a response rate.

Data Analysis

In the original survey development process in 2013, which was based on literature and expert consensus, the team posited that there were eight themes contributing to the culture of transitions.¹⁰ For this project, we used exploratory factor analysis to quantify the accuracy of the previously identified structure. Specifically, the analysis involved the principal axis factor method with an oblique rotation, based on a polychoric correlation matrix, which was chosen to appropriately model the latent data structure present in responses. Factors (domains) were identified using parallel analysis. Parallel analysis is a statistical technique that analyzes item response variation to provide guidance for identifying the number of latent constructs underlying the phenomenon of interest. These methods have been commonly used in the social sciences to reveal groupings of items, called *factors*, by analyzing patterns and variation in ways survey respondents answered items.¹¹ Factors represent unique, underlying dimensions within the broader phenomenon of interest. Using multiple iterations, called *rotations*, we identified items that belonged together and items that did not align with, or only weakly contributed to understanding the phenomenon of interest. Analyses were performed using R software (version 3.1; Vienna) and the scree plot was fit using the nFactors package.^{13,14} Factor loadings were calculated to evaluate the latent structure of survey item responses. When factor loadings were below 0.40, the items were eliminated from the survey. In addition, several items were associated with multiple factors, and when the difference between the loadings on multiple factors was less than 0.1, that item was also discarded. The Kaiser-Meyer-Olkin correlation¹⁵ and Bartlett's test of sphericity¹⁶ were used to measure adequacy of the sample for factor analysis. Internal consistency of the survey was assessed using Cronbach's alpha. Surveys were deemed incomplete if respondents skipped more than six items. For surveys with missing items that were below the cutoff, responses were imputed using the mice package in R.

RESULTS

Participants and Hospitals

A total of 757 staff initiated the online survey, and 492 returns were complete and usable for analysis, resulting in a subject to item ratio of approximately 14:1. The only significant difference found between completers and noncompleters was years worked in the department. Specifically, staff who completed the survey had less time on the unit compared to those with missing responses (Pearson's chi-square test $p = 0.01$). Typical respondents were nurses working on medical/surgical units for one to five years in large hospitals. The participant characteristics are shown in [Table 1](#).

The 13 participating hospitals were located in Ohio, Louisiana, and Virginia. Four small hospitals (<150 staffed beds) contributed 9% of the responses, 4 medium-size hospitals

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