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Clinical research article

Development of the nurses' care coordination competency scale for mechanically ventilated patients in critical care settings in Japan: Part 2 Validation of the scale

Chie Takiguchi [a,*], Yumiko Yatomi [b], Tomoko Inoue [b]

[a] Tokyo Medical and Dental University (TMDU), Japan
[b] National College of Nursing, Japan

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ABSTRACT

Objectives: To confirm the validity and reliability of the nurses' care coordination competency draft scale for mechanically ventilated patients in Japan.
Design/Method: In this cross sectional observational study, a draft scale measuring care coordination was distributed to 2189 nurses from 73 intensive care units in Japan from February–March 2016. Based on the valid 887 responses, we examined construct validity including structural validity (exploratory and confirmatory factor analysis), convergent and discriminant validity and internal consistency reliability.
Settings: 73 Intensive care units.
Results: Exploratory factor analyses yielded four factors with 22 items: 1) promoting team 2) cohesion, understanding care coordination needs, 3) aggregating and disseminating information 4) clearly articulating the care vision. The four-factor model was confirmed using a confirmatory factor analysis (confirmatory fit index = 0.942, root mean square error of approximation = 0.062). Scale scores positively correlated with team leadership and clearly identified and discriminated nurses' attributes. Cronbach's alpha coefficient for each subscale was between 0.812 and 0.890, and 0.947 for the total scale.
Conclusions: The Nurses' care coordination competency scale with four factors and 22 items had sufficient validity and reliability. The scale could make care coordination visible in nursing practice. Future research on the relationship between this scale and patient outcomes is needed.

Implications for Clinical Practice

- The nurses care co-ordination competency scale consisting of four factors and 22 items is a valid and reliable tool that measures nurses' care coordination competency for mechanically ventilated critical patients in Japan.
- This scale could make nurses' care coordination visible in nursing practice.
- This scale could be used for nurses' training and education in care coordination.

Introduction

Growing evidence suggests that multicomponent management by inter-professional teams improves outcomes of mechanically ventilated patients (Balas et al., 2014; Barr et al., 2013; Kamdar et al., 2013; Mansouri et al., 2013; Morris et al., 2011). Therefore, health care professionals are struggling to ensure the provision of these strategies in actual wards, to the right patients at the right time by the right professionals (Balas et al., 2016; Bassett et al., 2015; Kahn

* Corresponding author at: Tokyo Medical and Dental University (TMDU) 1-5-45 Yushima, Bunkyo-ku, Tokyo 113-8510, Japan.
E-mail addresses: takiguchi.cc@tmd.ac.jp (C. Takiguchi), yatomiy@adm.ncn.ac.jp (Y. Yatomi), inouet@adm.ncn.ac.jp (T. Inoue).

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et al., 2014; Needham et al., 2012). However, a gap between optimal care and actual provided care exists (Miller et al., 2015) and the gap causes delay in patient's recovery or complications (Balas et al., 2013). Nurses' care coordination in critical care is an effective strategy for filling the gap and promotes inter-professional collaboration, increased patient satisfaction, and reduction in the duration of hospitalisation (Hajewski and Shirey, 2014) and mechanical ventilation (Kahn et al., 2014).

Despite reports of the importance of developing nurses' care coordination role and acquisition of the associated competencies (Lamb et al., 2014; Schraeder and Shelton, 2014), no evaluation standards currently exist. Therefore, we have developed a draft scale that evaluates nurses' care coordination competency for managing mechanically ventilated patients in Japan (Takiguchi et al., 2017). In this paper, we report the steps taken to confirm the reliability and validity of the draft scale. A validated scale could make care coordination competency visible in nursing practice; nurses using the scale could have an increased awareness of their care coordinating positions; other health care professionals could also identify and utilise the services of nurses in this role.

To validate the nurses' care coordination competency draft scale, we hypothesised the following:

1. The nurses' care coordination competency scale would consist of six factors identified during scale development (Takiguchi et al., 2017).
2. Nurses' attributes, such as length of experience, educational backgroundand intra-organisational position, would affect their scores on this scale, because the abilities to assess comprehensively, communicate well, and work in teams are desirable when coordinating care for at-risk patients (Duva, 2014).
3. Nurses' care coordination competency would be closely related to their leadership exhibited by providing appropriate care within an inter-professional team.
4. The units scoring high on the scale would also score high on relational coordination when the unit's nursing team was evaluated by non-nursing professionals involved in mechanically ventilated patients' management, as care coordination could be interrelated with relational coordination (Van Houdt et al., 2014).

Research methods

In this cross-sectional study with 73 ICUs in Japan, structural validation by factor analysis was conducted on the draft scale and hypotheses were tested using the finalised Nurses' Care Coordination Competency Scale (NCCCS) (Fig. 1).

Data collection

Participants were nurses and non-nursing professionals who were involved in the management of mechanically ventilated patients. For validation, we recruited nurses with a wide range of experience, from novices to experts and non-nursing professionals with diverse job roles. We selected 118 ICUs all having critical care certified nurse specialists (CNS) all over Japan and 269 ICUs with at least 400 hospital beds and having intensive care certified nurse (CN) listed on the website of the Japanese Nursing Association. Requests for cooperation were sent to the 387 ICUs, and 73 ICUs consented to participation. We asked the unit representatives to inform us about the number of nurses and non-nursing professionals who were involved in the management of mechanically ventilated patients in their units. Between February and March 2016, the nurses' care coordination competency draft scale and Performance Maintenance Survey (PMS) (Misumi, 1986) were distributed to 2189 ICU nurses of the 73 ICUs. The Japanese version of the Relational Coordination Scale (J-RCS) (Naruse et al., 2014) was also distributed to 1030 non-nursing professionals (i.e., physicians, physical therapists, clinical engineers, nutritionists, dentists, and social workers). Each ICU was sent the anonymous self-administered questionnaires and an explanation of the study, as well as return envelopes to be distributed by the unit representatives. We requested participants to respond by returning the questionnaire directly to the researchers, via the mail, or through a designated website.

Construct validation: structural validation

The following process were undertaken for structural validation: (1) invalid responses, items with high-ratio minimal or maximum values (more than 30%) were removed due to ceiling

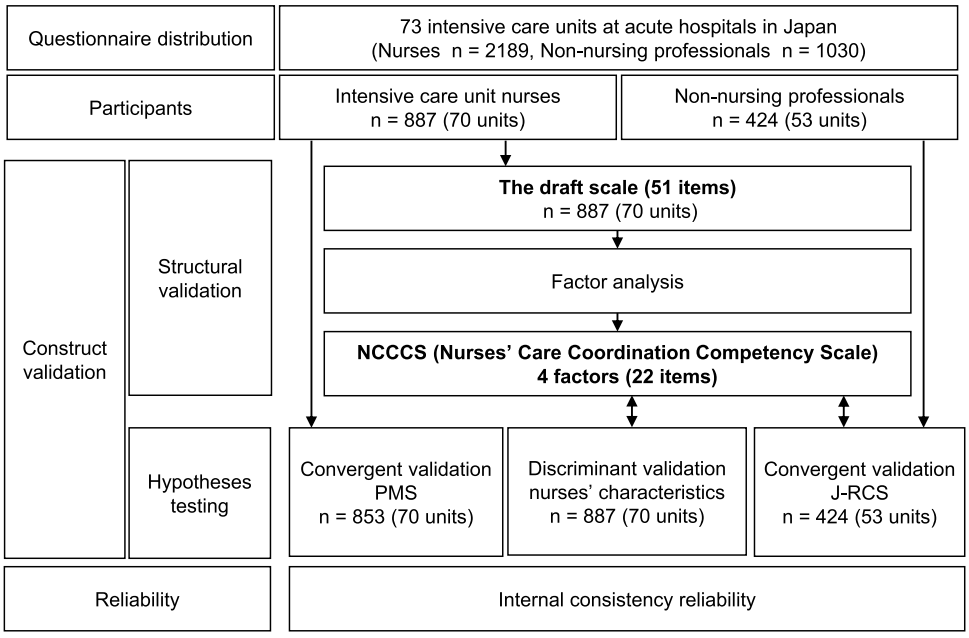

Fig. 1. Process of validation of the draft scale.

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