Intensive and Critical Care Nursing xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Intensive and Critical Care Nursing

journal homepage: www.elsevier.com/iccn

Original article

Development of the Nurses' Care Coordination Competency Scale for mechanically ventilated patients in critical care settings in Japan: Part 1 Development of a measuring instrument

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ARTICLE INFO

Article history:
Accepted 5 August 2017

Keywords:
Care coordination
Intensive care unit
Mechanical ventilation
Scale development

ABSTRACT

Objectives: To develop a draft scale measuring nurses' care coordination competency for care of mechanically ventilated patients in critical care settings.
Method: The scale items and concepts were derived from semi-structured interviews with 28 professionals (14 nurses, eight physicians, three physical therapists, three clinical engineers) who are managing mechanically ventilated critical care patients. A grounded theory approach was used. After content validation by experts, two pilot tests were used to identify and correct non-discriminating items and vague items. After expert approval, the final draft scale was completed.
Setting: Intensive care units of acute care hospitals in Japan.
Findings: A scale was drafted with the following six concepts including 51 items of nurses' care coordination competency: (1) understanding care coordination needs (2) devising and clearly articulating the care vision (3) aggregating and disseminating information (4) employing resources (5) promoting team cohesion (6) engaging in situation-based negotiating. The interviewed participants argued that these competencies clearly reflect the inter-professional activities required for well-coordinated and individualised care and improved patient outcomes.
Conclusions: These findings could be utilised to educate and train nursesand establish the awareness that coordinating care is the nurses' responsibility. Future research focusing on its validity and reliability are needed.

Implications for clinical practice

- To ensure optimal care for mechanically ventilated patients, nurses must assume care coordination roles and acquire competencies in inter-professional care teams.
- The nurses' care coordination competency for managing mechanically ventilated patients includes improving patient outcome and inter-professional collaboration.
- The draft scale identifies six categories and 51 items that can be utilised to educate nurses in the care coordination competency.
- Future research focusing on the validity and reliability of the draft scale is needed.

Introduction

In critical care settings, the positive effects of multicomponent care by inter-professional teams (e.g., early mobility, maintenance of rhythmic sleep-wake cycles) on patient outcomes are becoming

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http://dx.doi.org/10.1016/j.iccn.2017.08.002
0964-3397/

clearer, especially in managing mechanically ventilated patients (Balas et al., 2014; Barr et al., 2013; Kamdar et al., 2013; Mansouri et al., 2013; Morris et al., 2011). However, a gap between optimal and actual care provided by inter-professional teams exists (Miller et al., 2015) because of factors related to patients (i.e., circulatory dynamics instability) and failure of care coordination within the inter-professional team (Balas et al., 2013; Carrothers et al., 2013; Dubb et al., 2016; Kydonaki et al., 2014; Rose et al., 2014). Despite nurses' care coordination being increasingly recognised as an effective strategy for closing the gap (Balas et al., 2012; Balas et al., 2016; Okoniewska et al., 2015; Trogrlić et al., 2015) and the importance of creating a nurse-led care coordination role in settings where patients require multifaceted care being emphasised (Lamb et al., 2015), no current evaluation standards exist to assess competency (George and Shocksnider, 2014).

Making nurses responsible for mechanically ventilated patients' care coordination is important because their activities revolve around patients', bedsides they are consistently in contact with patients and hence sensitive to the gap between ever-changing needs and the actual care received, and there fore better placed to provide care according to patients' needs (American Nurses Association, 2013). Furthermore, nurses already comprehensively manage and provide care for lightly and heavily sedated patients, including providing respiratory care, motivating patients' cognition, assisting with recovery and providing functional training. Additionally, since nurses cooperatively work alongside various professionals, this helps build relationships and promote intra-organisational contextual understanding, leading to more effective care coordination (Balas et al., 2012). A qualitative study reported that intensive care unit (ICU) nurses managing mechanically ventilated patients lead inter-professional team activities in providing a well-coordinated individual and daily care by integrating the functions of each professional (Takiguchi et al., 2013).

McDonald et al. (2007) demonstrated components of care coordination and mechanisms for achieving it. However, these are not the nurses' specific care coordination functions. Literature has mostly focused on care coordination in primary care settings, outside a critical care setting. (McDonald et al., 2007; Schultz et al., 2013). Moreover, most care coordination measurements are outcome rather than process measures (McDonald et al., 2014). Two previous studies that have examined competency of care coordination focused on providing home paediatric care (Council on Children with Disabilities and Medical Home Implementation Project Advisory Committee, 2014) and patient centred care in outpatient, and community settings (Haas et al., 2013). These cannot be appropriately applied directly to critical care settings, because care coordination needs vary by task (Van Houdt et al., 2013) and patient characteristics (Van Houdt et al., 2014).

As the first step in creating a care coordination role for ICU nurses, we must make care coordination competency visible in nursing practices (Lamb et al., 2014). For this purpose, we have to identify the nurses' care coordination competencies from actual critical care settings and develop a validated scale that evaluates nurses' care coordination competency in caring for mechanically ventilated patients in critical care settings. In this paper, we report the steps taken to generate a draft scale. The process of establishing construct validity and reliability of the draft scale is reported in part 2 (Takiguchi et al., 2017).

Methods

The draft scale was developed through a structured process that consisted of defining the concept to be measured, item generation and scaling, content validation, and pilot testing (Fig. 1).

Defining the concept to be measured

The concept to be measured was defined based on semi-structured interviews. We recruited participants who met the following criteria through snowball sampling.

1 Nurses and other professionals involved in the management of mechanically ventilated patients in acute care hospital ICUs in Japan.
2 Those with an experience of at least three years of management of acute mechanically ventilated patients.
3 Those consenting to participate.

A range of professionals were recruited to clarify nurses' care coordination competency needs based on the perspectives both of nurses and other professionals involved in managing mechanically ventilated patients. Interviews were conducted during January–September 2015. The interviewees comprised of 28 professionals (14 nurses; eight physicians; three physical therapists; three clinical engineers) in four acute care hospital ICUs. In Japan, a physical therapist is a professional responsible for the preservation, enhancement, or restoration of movement and physical function that is impaired or threatened by disease, injury or disability. A clinical engineer is a professional in biomedical engineering responsible primarily for applying and implementing medical technology to optimise health care delivery.

Each interview was conducted at a mutually convenient time in a private room. We asked participants to recall successful experiences of management of mechanically ventilated patients from their professional perspectives and to identify and extract *nurses' contributing factors* leading to care coordination successes. In doing so, we requested participants to indicate *nurses' specific actions*. Interviews lasted between 20 and 105 minutes. The interviews were digitally recorded and transcribed.

Data were analysed using constant comparative analysis based on a grounded theory approach (Corbin and Strauss, 2008). The codes and categories derived from interview data were also compared with care coordination categories found in prior research (American Nurses Association, 2013; Council on Children with Disabilities and Medical Home Implementation Project Advisory Committee, 2014; McDonald et al., 2014; National Quality Forum, 2014; Takiguchi et al., 2013; Van Houdt et al., 2013). Interviews and analysis were conducted in parallel and data collection was continued until we reached data saturation (Corbin and Strauss, 2008).

Item generation and scaling

The codes and categories identified via data analysis were adapted as items and concepts of the draft scale. Then we used a 5-point Likert scale to assess the *frequency of the action* that each item expressed. Therefore, this draft scale is useful as it can measure not the potential ability but the substantial ability which can be reflected in their actions. Higher scores meant higher care coordination competency.

Content validity

To ensure that the degree to which the content of the scale adequately represents the construct to be measured, we sought opinions from current professional experts (from different institutions) via panel discussions. These included three certified critical care nurses; advanced practice nurses authorised by Japanese Nursing Association, seven doctoral students in the critical care field, and three nursing science faculty members. We asked them whether each scale item comprehensively represented nurses' care coordi-

Please cite this article in press as: Takiguchi, C., et al., Development of the Nurses' Care Coordination Competency Scale for mechanically ventilated patients in critical care settings in Japan: Part 1 Development of a measuring instrument. Intensive Crit Care Nurs (2017), http://dx.doi.org/10.1016/j.iccn.2017.08.002