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## Original article

# Translation, modification and validation of the Chinese version of a knowledge assessment instrument regarding pressure ulcer prevention<sup>☆</sup>

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## ABSTRACT

**Objective:** This study sought to translate, modify and validate an instrument developed by Beckman and colleagues to assess the knowledge of clinical nurses regarding pressure ulcers.

**Methods:** A methodological study design was used. The instrument was translated into Chinese and back-translated into English. A six-expert panel was invited to evaluate the content validity, and a pilot test was subsequently performed on the test-retest stability of the translated instrument. A convenience sampling method was used to recruit 240 nurses from a university teaching hospital in the Mainland of China. In total, 186 valid questionnaires were collected with a 77.5% valid return rate. The validity of the multiple-choice test items (item difficulties and discriminating indices) and internal consistency reliability were evaluated.

**Results:** The translated and modified instrument demonstrated acceptable psychometric properties, as follows: (1) the overall content validity index (CVI) was 0.91, (2) the overall test-retest reliability was 0.826, (3) the item difficulty indices were between 0.46 and 0.93, (4) the overall values for discrimination were 0.28–0.55, and (5) the Cronbach's  $\alpha$  for the internal consistency were 0.792 for the overall instrument and 0.426–0.804 for the sub-themes.

**Conclusions:** This study represents the first trial to translate and modify an existing instrument that measures the knowledge of pressure ulcers in a Chinese Mainland sample. The instrument demonstrated acceptable psychometric properties and could be applied in cross-cultural nursing practices, including nursing education, research and practice, to evaluate knowledge about pressure ulcer prevention.

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## 1. Introduction

Pressure ulcers are painful, costly, and often preventable complications that challenge many individuals in hospitals, nursing homes and home care. Pressure ulcers particularly affect those who are old, seriously ill and immobile.<sup>1</sup> Pressure ulcer patients' physical sufferings include pain, a smell, fluid leakage and immobility, and emotional stresses include changes in appearance, body image, loss of independence and control, worries about healing and social

isolation.<sup>2</sup> Patients with pressure ulcers cost 50% more than patients without this condition in acute care hospitals in the United States.<sup>3</sup> The cost attributable to pressure ulcer care in the year 2006–2007 was 9.89 million pounds in the UK.<sup>4</sup> Xue and colleagues reported that pressure ulcers elicit substantial financial burdens for patients, families and health care systems in the Mainland of China.<sup>5</sup>

Kallman and colleagues stated that “the risks to the patient for developing pressure ulcers can actually be assessed, and measures to prevent ulcers from occurring and growing can be taken.<sup>6</sup> Nevertheless, that all depends on caregivers' (knowledge, skills and attitudes).<sup>7</sup> Nurses are patients' primary caregivers and thus have the greatest responsibility for preventing the development of pressure ulcers. A European study demonstrated that no more than 10% of patients who are at risk receive adequate preventive care

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due to inadequate knowledge among nurses.<sup>8</sup> King suggested that nurses' knowledge of the wound healing process and management was limited and that nurses found it difficult to keep up to date with current advances due to poor staffing and low morale and motivation.<sup>9</sup> Similarly, a preliminary survey conducted in the Mainland of China revealed that due to the shortage of the nursing workforce, constrained resources, and inadequate knowledge about pressure ulcers, pressure ulcer prevention measures were quite inadequate.<sup>10</sup>

A valid and reliable assessment tool is crucial for determining whether clinicians have appropriate knowledge of pressure ulcer prevention. The literature revealed that Beeckman et al<sup>11</sup> developed a knowledge assessment instrument about pressure ulcer prevention that is the most updated and has been widely used in Europe. However, no Chinese version is available. Based on strong requests from our clinical colleagues, our research team decided to create a Chinese version.

The aim of this study was to translate, modify and validate the instrument developed by Beckman and colleagues for assessing pressure ulcer knowledge among clinical nurses.

## 2. Methods

### 2.1. Design

A methodological study design was applied. The study consisted of the following 3 phases: (1) translation and back-translation of the original instrument, (2) evaluation of content validity and stability of the translated version of the instrument, and (3) evaluation of the internal consistency reliability and other psychometric properties of the translated version of the instrument.

### 2.2. Sample

The population consisted of 240 registered nurses who were working in hospital units that included surgical, medical, geriatric, oncologic, and gynecologic wards and the intensive care unit. The inclusion criteria were being a full-time registered nurse, the abilities to read and write Chinese, and the willingness to participate in the study. In total, 186 valid questionnaires were collected from 240 samples for a 77.5% valid return rate.

### 2.3. Ethical considerations

Before beginning the research project, the permission to use the questionnaire and ethical approval were obtained from the corresponding author Dr. Dimitri Beeckman and the Macao Polytechnic Institute, respectively. All participants were informed about the purposes and the methods of the study and assured that their participation in the study was voluntary and that they could withdraw from the study at any time. Written consent was obtained from each participant.

### 2.4. Instruments

The instrument consisted of two parts, i.e., the Demographic Data Form and the Questionnaire of Knowledge Assessment Instrument for Pressure Ulcer Prevention. The instrument consisted of 6 themes with 26 items that included the following: i. etiology and development (6 items), ii. classification and observation (5 items), iii. risk assessment (2 items), iv. nutrition (1 item), v. reduction in the amount of pressure/shear (7 items), and vi. reduction in the duration of the pressure/shear (5 items). The content validity was 0.78–1.00. The item difficulty indices of the questions ranged from 0.27 to 0.87, and the item discrimination

values ranged from 0.29 to 0.65. The overall internal consistency reliability (Cronbach's  $\alpha$ ) was 0.77.<sup>11</sup>

### 2.5. Procedure

In the first phase, the original version of the instrument was translated into the Chinese language and a back-translation was created. A six-expert panel was invited to evaluate the content validity using a 4-point Likert scale (ranging from 1 = not relevant to 4 = very relevant). Additionally, the expert panel was instructed to comment on each item regarding the accuracy, clarity and cultural relevance of the translation and to provide suggestions about the addition or deletion of any item. In the first round, 3 of the 6 experts suggested the addition of item(s) to themes iii (*risk assessment*) and iv (*nutrition*). Based on an extensive literature review and the experts' opinions, single new items were added to themes iii and iv, which resulted in an instrument composed of 28 items (*Appendix*). A second round involving the evaluation of the content validity was conducted, and the content validity indices each item (CVI = 0.79–0.97) and the overall score were calculated (CVI = 0.91). The items were modified to yield a final Chinese version of the Instrument of Assessing Knowledge of Pressure Ulcer Prevention, which was abbreviated as IAKPUP.

In the second phase, the test-retest reliability of the IAKPUP was evaluated. A convenience sampling method was used to recruit 20 nurses over a 20-week interval. Pearson's  $r$  was used to estimate the stability of the instrument.

In the third phase, a cluster sampling method was used to recruit 240 participants from a university teaching hospital. Cronbach's alpha was used to estimate the internal consistency reliability of the IAKPUP, and the item difficulties and discriminating indices were applied to evaluate the validities of the multiple-choice test items of the IAKPUP.

### 2.6. Data analysis

The data were analyzed using SPSS 19.0. The answers to the questions were re-coded as dichotomous variables (i.e., correct and incorrect). Descriptive analysis was employed to describe the demographic characteristics of the participants. The item difficulties and discriminating indices were applied to evaluate the validities of the multiple-choice test items of the IAKPUP. The internal consistency of the IAKPUP was determined using Cronbach's alpha.

## 3. Results

### 3.1. Demographic characteristics of the participants

The majority of participants were female (96.2%), the mean age was 35.3 years (SD = 10.9), and the majority of the participants held associate degrees (44.1%) followed by bachelor degrees (34.4%).

### 3.2. Test-retest reliability

The overall intraclass correlation coefficient was 0.826, and these values were 0.671–0.892 for the sub-themes (*Table 1*).

### 3.3. Validity of the multiple-choice test items

The item difficulty indices of the IAKPUP items varied between 0.46 (or 45.6%) and 0.93 (or 92.5%). The overall discrimination values (D-values) were between 0.28 and 0.55. None of the items had a negative discriminating value (*Table 2*).

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