



Research Article

# Validation of a Chinese Version of Perceived Implicit Rationing of Nursing Care (CPIRNCA) Scale in Taiwan

Wei-Chuan Chen<sup>1,2,3</sup>, Chun-Jen Huang<sup>4,5,6</sup> Pei-Ling Tang<sup>7</sup>, Bih-O Lee<sup>8</sup>, Yu-Chih Lin<sup>9</sup>, Chih-Hung Chen<sup>10,11\*</sup>

- <sup>1</sup>Department of Medical Education and Research, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan.
- <sup>2</sup>School of Medicine, College of Medicine, I-Shou University, Kaohsiung, Taiwan
- <sup>3</sup>Department of Pharmacy and Master Program, Tajen University, Yanpu Township, Pingtung County, Taiwan
- <sup>4</sup>Department of psychiatry, Kaohsiung Medical University Hospital
- <sup>5</sup>Department of psychiatry, School of Post-Baccalaureate Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan
- <sup>6</sup>Department of psychiatry, School of medicine, College of medicine, Kaohsiung Medical University, Kaohsiung, Taiwan
- <sup>7</sup>School of Nursing, Fooyin University, Kaohsiung, Taiwan
- <sup>8</sup>College of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan.
- <sup>9</sup>School of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan.
- <sup>10</sup>Division of Hepato-Gastroenterology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital Kaohsiung, Kaohsiung, Taiwan.
- <sup>11</sup>Chang Gung University College of Medicine.

**\*Corresponding author:** Chih-Hung Chen, Division of Hepato-Gastroenterology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital Kaohsiung, Kaohsiung, Taiwan. [totoro@cgmh.org.tw](mailto:totoro@cgmh.org.tw).

**Citation:** Chen WC, Huang CJ, Tang PL, Lee BO, Lin YC Chen CH (2024) Validation of a Chinese Version of Perceived Implicit Rationing of Nursing Care (CPIRNCA) Scale in Taiwan. Int J Nurs Health Care Res 7: 1495. DOI: 10.29011/2688-9501.101495

**Received Date:** 10 January, 2024; **Accepted Date:** 17 January, 2024; **Published Date:** 22 January, 2024

Abstract

**Objects:** Perceived implicit rationing of nursing care (PIRNCA) was developed to measure the rationing of nursing care (RNC), which will impair the nursing quality. However, RNC still needs to be clarified in Taiwan due to the lack of the Chinese PIRNCA scale. The purpose is to test the acceptability, validity, reliability, and other psychometric properties of a Chinese translation of PIRNCA scale. **Methods:** A Chinese translation of the PIRNCA scale was assessed by 152 nurses in the medical center. Acceptability, validity, reliability and sensitivity Validity and reliability were tested. **Results:** The correlation coefficients were all greater than 0.5 (0.50 to 0.82), indicating good internal consistency. Convergent and discriminant validity (.84 vs. .93) showed good construct validity. The intraclass correlation coefficient of all dimensions was 0.86 (.66 to .96) ( $p<0.001$ ), suggesting good retest reliability and high internal consistency (Cronbach's  $\alpha=.96$ ). **Conclusions:** Pilot testing supported the acceptability, validity, and reliability of the CPIRNCA scale.

Introduction

Rationing of Nursing Care (RNC) resulted from limited time and resources available to nursing staff, which affects their ability to provide all assigned care duties [1-4]. In the Taiwan National Health Insurance (TNHI) system, medical resources were scarce due to high demands, and policies have been implemented to increase resource efficiency and prevent cost increases [5]. RNC thus was thought to exacerbate and consequently impact healthcare quality. RNC is a pressing issue that needs to be addressed in the Taiwanese healthcare system, as it is an essential mediator between nurse allocation and quality of care [6]. RNC

is a process of individual decision-making and personal behavior that can be difficult to detect and analyze [7]. It impacts the ability to meet primary care needs and even leads to discrimination issues [3,8,9]. With the development of the Basel Extent of Rationing of Nursing Care (BERNCA) scale and the Psychometric Testing of Perceived Implicit Rationing of Nursing Care (PIRNCA) scale, an international trend toward research on RNC has been initiated [1,3].

A comprehensive review has been used to explore the impact of RNC on nursing structure, process, and outcome of nursing quality [10]. RNCs can lead to decreased patient satisfaction,

increased mortality, increased adverse events, increased falls, delayed patient assessments, response to calls, and toileting assistance [6,11]. Further, nursing staff's job satisfaction and turnover intentions have been significantly affected [9,12].

The TNHI System was established in response to the rising demand for care due to limited medical resources. Policies were being introduced to control medical insurance costs and provide more efficient and cost-effective use of medical resources. RNC has become an urgent issue for the Taiwanese health system, as it was an essential factor in ensuring quality care and has been negatively affected by the limited resources [5]. Kalisch (2012) found that RNS influences the quality of nursing care [13]. The formation of RNS was found to have a moderating influence on the negative impact of nursing staff shortage on nursing quality. Thus, it was essential to investigate the effects of RNC on nursing care outcomes, formulate preventive measures, and update relevant policies.

Given the context of RNC in medical resources shortages, RNC prevalence should exist in Taiwan's health care system. For research on RNC in Taiwan, the Chinese version of the MISSCARE survey has been used [14]. However, there was no Chinese version of the PIRNCA scale. Therefore, this study aims to compile and validate a Chinese PIRNCA(CPIRNCA) scale as a research tool to explore RNC in the structure, process, and outcome of nursing quality.

## Materials and Methods

This research project consisted of four steps. Initially, the researchers translated and collected information to create a preliminary scale. In the second step, experts were consulted to receive feedback and improve the survey questions and indicators. The third step involved conducting a two-stage test to analyze and adjust the scale based on the results obtained and to ensure its accuracy and reliability. Finally, the scale was finalized.

This study's CPIRNCA scale was translated from the English version following the guidelines. Two translators who were proficient in both English and Chinese translated the scale. Experts in nursing and English were invited to review the translations for accuracy. The Chinese scale was then translated into English to compare with the original version, and the translated scale was created. Five nurses were first asked to read through a draft to ensure it was easy to understand and answer. Finally, an expert content validity assessment was conducted to develop the predictive scale. Then, the study was adjusted based on the CVI scores and expert opinions [15]. CVI scores above 8 indicate better specialist efficacy. Within each shift of nursing care in the past week, the occurrence of RNC activities was filled out with a 4-point score ranging from 0 to 3, classified as "never," "very few," "sometimes," and "often." The higher the score, the more likely the nursing staff to encounter restrictive nursing activities.

The prevalence of RNC can be calculated in terms of activities, individuals, and total numbers and rates [7]. This study adopted the two-point endpoint method, using the percentage of individual total numbers that exceeds "never" to show the occurrence of RNC activities as the prevalence rate.

The pre-test scale was distributed to confirm the readability of the items and questions. A follow-up survey was conducted for the same nurses 14 to 22 days after the initial scale. Factor analysis technology was used to validate the CPIRNCA.

This study was conducted at a medical center in southern Taiwan from February to April 2022. The nurses will be classified into four levels according to their nursing abilities using Taiwan's Clinical Ladder system, which includes N1, N2, N3, and N4. To recruit research subjects, each scale was explained, and participants were required to give written consent before completing the scale. Participants were not rewarded for participating in this research and were asked to answer the scale anonymously.

## Statistical Analysis

1. Descriptive stochastics were used to analyze the individual characteristics, care unit, and organization. The prevalence rate was then calculated from the average percentage of RNC activities (rarely, sometimes, and often).
2. To confirm the homogeneity of all the items in the scale [16], the Critical Ratio (CR) was used to determine whether an item needed to be deleted or modified and CR more than 0.5 represented good internal consistency in the scale.
3. Factor analysis through principal component analysis and VARIMAX methods was performed. Confirmatory factor analysis (CFA) was used to assess the scale's construct and discriminant validity.
4. To evaluate the reliability and validity of the CPIRNCA, internal consistency was assessed using Cronbach's alpha.

Test-retest reliability was used to determine the consistency of the scale in repeated measurements. Confirmatory Factor Analysis was employed to evaluate the internal structure of the CPIRNCA using AMOS 22 (Analysis of Moment Structures 22). The remaining statistical procedures used IBM SPSS Statistics 26.0, and the alpha levels were set at 0.05.

## Data Source and Ethical Considerations

The hospital's ethics review board approved the study (KMUH/IRB No. 110-2511-H-037-004). Participants were informed about the study details and participated voluntarily. Nurses were assured that their participation would be confidential and that they could withdraw anytime. The study received funding from the Ministry of Science and Technology. The questionnaire used in the study was translated and adapted from its original version with permission.

Results

The CPIRNCA was completed well with good comprehension in an average of 16.3 minutes (ranging from 15-20 minutes). The scale’s overall completion and acceptance rates were 90% and 80%, respectively. Of the initial group, 134 (92.4%) completed baseline and follow-up surveys.

Characteristics of Participants

Most of the participants were 21-40 years old (75%), female (98%), experienced (12 years), and above-college level (96%). Work hours per week averaged 43 hours. The average nursing level was N2 (54%). More than half of the participants worked in the medical specialty of internal medicine and surgery (68%) and were recruited from wards (65%), with the remaining 35% recruited from the intensive care unit (ICU). Characteristics of Participants between baseline and follow-up groups did not show statistical difference (Table 1).

| Characteristics                         | Baseline group (n=145) | Follow-up group (n=134) | p-value |
|---|------------------------|-------------------------|---------|
| Age (mean±SD)                           | 34.6 ± 8.6             | 34.8 ± 8.7              | 0.99*   |
| 21-30                                   | 44.1                   | 44.0                    |         |
| 31-40                                   | 32.4                   | 31.3                    |         |
| 41-50                                   | 17.9                   | 18.7                    |         |
| 51-60                                   | 5.5                    | 6.0                     |         |
| Nursing experience (year)<br>(mean±SD)  | 11.9 ± 8.7             | 12.2 ± 8.8              | 0.84*   |
| Work hour/week<br>(mean±SD)             | 42.5 ± 5.2             | 42.7 ± 5.4              | 0.69*   |
| Gender (%)                              |                        |                         | 0.92*   |
| male                                    | 2.1                    | 2.2                     |         |
| female                                  | 97.9                   | 97.8                    |         |
| others                                  | 0.0                    | 0.0                     |         |
| Education level (%)                     |                        |                         | 0.99*   |
| College                                 | 13.8                   | 14.2                    |         |
| University                              | 82.1                   | 81.3                    |         |
| Master( and above)                      | 4.1                    | 4.5                     |         |
| Classification of ability (N level) (%) |                        |                         | 0.99*   |
| N (new hand)                            | 2.1                    | 1.5                     |         |
| N1                                      | 11.0                   | 11.2                    |         |
| N2                                      | 54.5                   | 54.5                    |         |
| N3                                      | 29.0                   | 29.1                    |         |
| N4                                      | 3.4                    | 3.7                     |         |
| Work unit (%)                           |                        |                         | 0.93*   |
| Ward                                    | 64.1                   | 64.9                    |         |
| Intensive unit                          | 25.5                   | 26.1                    |         |
| others                                  | 10.3                   | 9.0                     |         |

|                           |      |      |       |
|---------------------------|------|------|-------|
| Medical specialty (%)     |      |      | 0.99* |
| Internal medicine         | 39.3 | 40.3 |       |
| Surgery                   | 29.0 | 28.4 |       |
| Obstetrics and Gynecology | 4.1  | 4.5  |       |
| pediatrics                | 11.0 | 11.9 |       |
| others                    | 16.6 | 14.9 |       |
| *p>.05                    |      |      |       |

**Table 1:** Participant Characteristics (N=145 vs. 134).

**The psychometric Characteristics of Chinese PIRNCA**

**Item analysis**

The psychological measurement characteristics of CPIRNCA showed good internal consistency with coefficients ranging from 0.50 to 0.82, which were consistently greater than 0.5. The correlation coefficients between each item and the total scores ranged from 0.50 to 0.82 (Table 2), all above 0.5, indicating good internal consistency of the scale [17].

|   | Baseline group (n=145) |             |                                  | Follow-up group (n=134) |             |                                  |
|---|------------------------|-------------|----------------------------------|-------------------------|-------------|----------------------------------|
| Dimension/item                                  | RNC (%)                | mean (SD)   | Adjusted item-total correlation* | RNC (%)                 | mean (SD)   | Adjusted item-total correlation* |
| Assistance with physical care                   | 67.6                   | 0.93(0.61)  |                                  | 67.7                    | 0.91(0.66)  |                                  |
| 1   | 69.7                   | 1.00 (0.82) | 0.51                             | 68.7                    | 0.99 (0.82) | 0.71                             |
| 2   | 66.9                   | 0.88 (0.74) | 0.53                             | 67.2                    | 0.87 (0.72) | 0.70                             |
| 3   | 68.3                   | 0.86 (0.70) | 0.59                             | 66.4                    | 0.83 (0.70) | 0.70                             |
| 4   | 72.4                   | 1.02 (0.80) | 0.58                             | 71.6                    | 1.08 (0.85) | 0.74                             |
| 5   | 70.3                   | 1.00 (0.80) | 0.66                             | 67.2                    | 0.87 (0.76) | 0.70                             |
| 6   | 66.2                   | 0.89 (0.78) | 0.72                             | 64.9                    | 0.92 (0.83) | 0.81                             |
| 7   | 60.7                   | 0.81 (0.78) | 0.70                             | 62.7                    | 0.80 (0.76) | 0.74                             |
| 8   | 66.2                   | 0.94 (0.82) | 0.62                             | 64.9                    | 0.88 (0.79) | 0.70                             |
| Implementation of the prescribed treatment plan | 41.0                   | 0.49(0.50)  |                                  | 43.9                    | 0.49(0.47)  |                                  |
| 9   | 25.5                   | 0.32 (0.61) | 0.58                             | 35.8                    | 0.40 (0.60) | 0.59                             |
| 10  | 26.9                   | 0.33 (0.60) | 0.55                             | 33.6                    | 0.37 (0.57) | 0.61                             |
| 11  | 42.8                   | 0.50 (0.63) | 0.67                             | 45.5                    | 0.48 (0.56) | 0.70                             |
| 12  | 38.6                   | 0.45 (0.61) | 0.61                             | 45.5                    | 0.50 (0.59) | 0.63                             |
| 13  | 64.1                   | 0.77 (0.69) | 0.69                             | 56.7                    | 0.68 (0.69) | 0.70                             |
| 14  | 48.3                   | 0.57 (0.65) | 0.65                             | 46.3                    | 0.50 (0.61) | 0.66                             |
| Emotional support and teaching                  | 78.4                   | 1.22(0.71)  |                                  | 74.4                    | 1.19(0.77)  |                                  |

|   |      |             |      |      |             |      |
|---|------|-------------|------|------|-------------|------|
| 15  | 79.3 | 1.26 (0.87) | 0.63 | 66.4 | 1.22 (1.08) | 0.75 |
| 16  | 69.7 | 0.93 (0.75) | 0.67 | 64.9 | 0.90 (0.77) | 0.74 |
| 17  | 86.2 | 1.47 (0.84) | 0.62 | 91.8 | 1.45 (0.73) | 0.63 |
| Surveillance/<br>vigilance                  | 65.7 | 0.83(0.52)  |      | 61.7 | 0.82(0.54)  |      |
| 18  | 52.4 | 0.62 (0.68) | 0.64 | 41.8 | 0.47 (0.62) | 0.50 |
| 19  | 71.7 | 0.92 (0.73) | 0.72 | 64.9 | 0.92 (0.81) | 0.81 |
| 20  | 42.8 | 0.50 (0.66) | 0.66 | 38.8 | 0.53 (0.75) | 0.65 |
| 21  | 63.4 | 0.74 (0.66) | 0.65 | 59.7 | 0.78 (0.75) | 0.73 |
| 22  | 73.8 | 1.04 (0.78) | 0.56 | 87.3 | 1.21 (0.67) | 0.51 |
| 23  | 71.0 | 0.88 (0.68) | 0.68 | 66.4 | 0.88 (0.75) | 0.76 |
| 24  | 84.8 | 1.11 (0.67) | 0.62 | 73.1 | 0.90 (0.67) | 0.74 |
| Coordination of care/<br>discharge planning | 71.3 | 0.93(0.69)  |      | 71.9 | 0.91(0.67)  |      |
| 25  | 72.4 | 0.97 (0.75) | 0.71 | 72.4 | 0.80 (0.70) | 0.57 |
| 26  | 72.4 | 0.94 (0.72) | 0.72 | 73.9 | 0.81 (0.67) | 0.57 |
| 27  | 69.0 | 0.89 (0.74) | 0.72 | 69.4 | 0.73 (0.63) | 0.58 |
| Documentation                               | 66.4 | 0.81(0.59)  |      | 68.5 | 0.81(0.58)  |      |
| 28  | 60.7 | 0.72 (0.68) | 0.63 | 63.4 | 0.54 (0.63) | 0.50 |
| 29  | 67.6 | 0.81 (0.67) | 0.71 | 68.7 | 0.73 (0.62) | 0.60 |
| 30  | 61.4 | 0.75 (0.70) | 0.73 | 65.7 | 0.82 (0.77) | 0.62 |
| 31  | 75.9 | 0.93 (0.66) | 0.73 | 76.1 | 0.81 (0.66) | 0.58 |
| *all significant, p<.05                     |      |             |      |      |             |      |

**Table 2:** Item-scale correlations of CPIRNCA.

### Validity analyses

As shown in Tables 3 and 4, all scale dimensions have met convergent and discriminant validity requirements [18], indicating that the quality of the scale's internal validation was good and had good construct validity.

| Dimension                                       | Item | SFL* | t-value  | Standard error | SMC** | Composite Reliability | AVE*** |
|---|------|------|----------|----------------|-------|-----------------------|--------|
| Assistance with physical care                   | 1    | 0.65 | 8.53***  | 0.28           | 0.42  | 0.91                  | 0.56   |
|   | 2    | 0.67 | 8.84***  | 0.25           | 0.45  |                       |        |
|   | 3    | 0.75 | 10.35*** | 0.23           | 0.57  |                       |        |
|   | 4    | 0.69 | 9.29***  | 0.27           | 0.48  |                       |        |
|   | 5    | 0.76 | 10.58*** | 0.26           | 0.58  |                       |        |
|   | 6    | 0.86 | 12.57*** | 0.24           | 0.73  |                       |        |
|   | 7    | 0.84 | 12.29*** | 0.24           | 0.71  |                       |        |
|   | 8    | 0.76 | 10.56*** | 0.26           | 0.58  |                       |        |
| Implementation of the prescribed treatment plan | 9    | 0.76 | 10.50*** | 0.20           | 0.58  | 0.88                  | 0.56   |
|   | 10   | 0.79 | 11.04*** | 0.19           | 0.63  |                       |        |
|   | 11   | 0.8  | 11.26*** | 0.20           | 0.64  |                       |        |
|   | 12   | 0.77 | 10.64*** | 0.20           | 0.60  |                       |        |
|   | 13   | 0.64 | 8.21***  | 0.24           | 0.41  |                       |        |
|   | 14   | 0.71 | 9.39***  | 0.22           | 0.50  |                       |        |
| Emotional support and teaching                  | 15   | 0.85 | 11.99*** | 0.27           | 0.72  | 0.84                  | 0.64   |
|   | 16   | 0.83 | 11.54*** | 0.24           | 0.69  |                       |        |
|   | 17   | 0.72 | 9.47***  | 0.29           | 0.52  |                       |        |
| surveillance/<br>vigilance                      | 18   | 0.72 | 9.80***  | 0.22           | 0.52  | 0.87                  | 0.51   |
|   | 19   | 0.77 | 10.61*** | 0.23           | 0.59  |                       |        |
|   | 20   | 0.76 | 10.41*** | 0.21           | 0.57  |                       |        |
|   | 21   | 0.75 | 10.32*** | 0.22           | 0.56  |                       |        |
|   | 22   | 0.57 | 7.15***  | 0.28           | 0.32  |                       |        |
|   | 23   | 0.71 | 9.59***  | 0.22           | 0.51  |                       |        |
|   | 24   | 0.62 | 7.95***  | 0.23           | 0.38  |                       |        |
| Coordination of care/discharge planning         | 25   | 0.91 | 14.11*** | 0.22           | 0.83  | 0.93                  | 0.82   |
|   | 26   | 0.95 | 15.02*** | 0.20           | 0.90  |                       |        |
|   | 27   | 0.85 | 12.56*** | 0.22           | 0.72  |                       |        |

|  |    |      |          |      |      |      |      |
|--|----|------|----------|------|------|------|------|
| Documentation  | 28 | 0.75 | 10.36*** | 0.22 | 0.57 | 0.90 | 0.68 |
|  | 29 | 0.86 | 12.69*** | 0.20 | 0.74 |      |      |
|  | 30 | 0.84 | 12.27*** | 0.22 | 0.71 |      |      |
|  | 31 | 0.85 | 12.37*** | 0.20 | 0.72 |      |      |
| *p<.05, **p<.01, ***p<.001, SFL: Standardized factor loading, SMC: Squared Multiple Correlation, AVE: Average Variance Extracted |    |      |          |      |      |      |      |

**Table 3:** Confirmatory factor analysis results for variables (N=145).

**Reliability analyses**

The internal consistency test showed that the intraclass correlation coefficient (ICC) of the overall scale was 0.86; the ICCs of each dimension ranged from 0.66 to 0.96, all reaching a significant level (p<0.001). This result indicated that the Chinese scale is reliable in the pre and post-test groups (Table 4).

|  | Baseline group (n=145) |              | Follow-up group (n=134) |              | Paired t-test (p-value)* | ICC* |
|--|------------------------|--------------|-------------------------|--------------|--------------------------|------|
|  | mean (SD)              | Cronbach’s α | mean (SD)               | Cronbach’s α |                          |      |
| Assistance with physical care  | 0.93(0.62)             | 0.91         | 0.91(0.66)              | 0.94         | 0.38                     | 0.89 |
| Implementation of the prescribed treatment plan  | 0.48 (0.49)            | 0.88         | 0.49 (0.47)             | 0.87         | 0.56                     | 0.78 |
| Emotional support and teaching   | 1.22 (0.72)            | 0.83         | 1.19 (0.77)             | 0.86         | 0.44                     | 0.69 |
| surveillance/ vigilance  | 0.83 (0.52)            | 0.87         | 0.82 (0.54)             | 0.87         | 0.82                     | 0.66 |
| Coordination of care/discharge planning  | 0.94 (0.69)            | 0.93         | 0.91 (0.67)             | 0.93         | 0.11                     | 0.96 |
| Documentation  | 0.81 (0.59)            | 0.90         | 0.81 (0.58)             | 0.91         | 0.80                     | 0.96 |
| total score  | 0.83 (0.48)            | 0.96         | 0.82 (0.50)             | 0.96         | 0.64                     | 0.86 |
| *Only 134 participants enrolled for the test-retest analysis; **Intraclass correlation coefficient |                        |              |                         |              |                          |      |

**Table 4:** Distribution and reliability of baseline and follow-up CPIRNCA scores.

**Comparison between Chinese and English PIRNCA**

A comparison of CPIRNCA scores with English PIRNCA found that the response rates were lower for the domestic participants than for the Western countries. The distribution of scores was similar in each dimension. “Emotional Support and Teaching” had the highest score, and “Implementation of the prescribed treatment plan” had the lowest score (Table 5).

**Citation:** Chen WC, Huang CJ, Tang PL, Lee BO, Lin YC Chen CH (2024) Validation of a Chinese Version of Perceived Implicit Rationing of Nursing Care (CPIRNCA) Scale in Taiwan. Int J Nurs Health Care Res 7: 1495. DOI: 10.29011/2688-9501.101495

|   | Taiwan (N=145) | Western country (N=375) | t value  |
|---|----------------|-------------------------|----------|
| Prevalence (%)  | 65.0           | 87.6                    |          |
| Questionnaire Response Rate (%)                                 | 94.2           | 73.1                    |          |
| Reliability   | 0.96           | 0.96                    |          |
| Validity<br>Composite reliability<br>Average variance extracted | >.6<br>>.5     | N/A                     |          |
| Dimension/item  |                |                         |          |
| Assistance with physical care                                   | 67.6           | 85.2                    | 24.96*** |
| 1   | 69.7           | 85.2                    |          |
| 2   | 66.9           | 83.7                    |          |
| 3   | 68.3           | 86.4                    |          |
| 4   | 72.4           | 92.4                    |          |
| 5   | 70.3           | 87.9                    |          |
| 6   | 66.2           | 81.9                    |          |
| 7   | 60.7           | 81.7                    |          |
| 8   | 66.2           | 82.5                    |          |
| Implementation of the prescribed treatment plan                 | 41.0           | 66.1                    | 6.16**   |
| 9   | 25.5           | 56.8                    |          |
| 10  | 26.9           | 63.4                    |          |
| 11  | 42.8           | 70.4                    |          |
| 12  | 38.6           | 67.3                    |          |
| 13  | 64.1           | 80.4                    |          |
| 14  | 48.3           | 58.2                    |          |
| Emotional support and teaching                                  | 78.4           | 87                      | 4.14     |
| 15  | 79.3           | 91.1                    |          |
| 16  | 69.7           | 79.0                    |          |
| 17  | 86.2           | 90.9                    |          |



|   |      |      |        |
|---|------|------|--------|
| Surveillance/<br>vigilance                      | 65.7 | 80.9 | 4.67** |
| 18  | 52.4 | 62.8 |        |
| 19  | 71.7 | 83.9 |        |
| 20  | 42.8 | 74.1 |        |
| 21  | 63.4 | 80.2 |        |
| 22  | 73.8 | 86.8 |        |
| 23  | 71.0 | 89.7 |        |
| 24  | 84.8 | 88.5 |        |
| Coordination of care/discharge planning         | 71.3 | 84.8 | 6.58*  |
| 25  | 72.4 | 89.9 |        |
| 26  | 72.4 | 83.1 |        |
| 27  | 69.0 | 81.3 |        |
| Documentation                                   | 66.4 | 80.2 | 4.40*  |
| 28  | 60.7 | 80.0 |        |
| 29  | 67.6 | 76.8 |        |
| 30  | 61.4 | 80.5 |        |
| 31  | 75.9 | 83.5 |        |
| *p<.05, **p<.01, ***p <.001; N/A: not available |      |      |        |

**Table 5:** Comparison between Chinese and English PIRNCA.

Discussion

Rationing of Nursing Care (RNC) is an issue that occurs when nursing staff has limited time and resources, affecting their ability to provide all assigned care duties [1]. To assess RNC, the Basel Extent of Rationing of Nursing Care (BERNCA) scale and Psychometric Testing of Perceived Implicit Rationing of Nursing Care (PIRNCA) scale have been developed in an attempt to address the issue [3]. Policies have been implemented to increase resource efficiency and prevent cost increases. However, there was an urgent need to address RNC in the Taiwanese healthcare system to ensure the quality of care. This study aims to compile and validate a Chinese version of the PIRNCA scale as a research instrument to study RNC in Taiwan’s nursing care context. CPIRNCA will further help us understand RNC in the structure, process, and outcomes of nursing quality.

Strategies and practices for responding to rationing of nursing care have been explored [19-21]. Increasing the nursing staff available to provide care was an initial step towards reducing

the RNC. Creating a culture of collaboration between nurses, physicians, and other healthcare personnel can help to ensure that patient safety and outcomes are prioritized, e.g., by developing a collective efficacy, which creates a sense of responsibility and mutual trust among nursing teams, nurses can have a positive influence on decision-making and rationing of nursing care. Informative technology can also help to facilitate care delivery, allowing nurses to spend more time with patients. Furthermore, nurturing an ethical climate and ensuring that nurses are part of management decisions can go a long way in avoiding the rationing of nursing care and promoting a positive ethical climate [22,23]. However, developing a validated instrument remained the cornerstone of researching RNC.

The Chinese RNCs score highest in emotional support and teaching, suggesting that although holistic nursing care was the current trend, physical care was still prioritized in nursing care, followed by mental, spiritual, and social care. This finding implies that therapeutic prescription implementation may have less of a focus in this population.

RNC was a potential healthcare administration and nursing management issue that can undermine the quality of holistic healthcare and lead to unsustainable healthcare policies. To remedy this situation, the TNHI needed to recognize the problem and establish the reason model predicting the formation of RNV to ensure quality care and sustainable policies. Administrators and nursing managers must recognize and identify the underlying causes and tailor their solutions accordingly instead of recruiting extra staff. Our findings indicated that CPIRNCA was linguistically and semantically equivalent to the original English PIRNCA and demonstrates good internal construct validity in measuring the core concepts of nursing care. It has a high correlation between the items, the total score, and the total score and primary factors. Overall, the results measured by CPIRNCA showed a similar distribution to those found in Western countries (Table 5). However, due to the implicit characteristics of RNC, qualitative research involving different cultural groups was required to explore the implications of RNC scale scores and understand their validity in different cultural contexts.

Interestingly, healthcare expenditure was significantly higher in the US and Australia than in Taiwan [24,25]. It was supposed that the incidence of RNC in Taiwan should be higher than in these countries. However, our results paradoxically showed a lower rate (65.0%). A possible explanation was that Taiwan's relative distribution of resources or personnel shortage was better than in Western countries. Moreover, unlike the skill-mixed nursing care system in foreign countries, Taiwan's accompaniment culture due to assistance from family members or nursing assistants may be the reason. The lower prevalence of RNC in Taiwan may be because the obedience of nursing staff in organizational climate supposedly plays a role, even if the nursing work overtime was serious in Taiwan [26]. Yet, more research was needed to verify these speculations.

## Conclusion

The validation of CPIRNCA was the first study to translate PIRNCA into Chinese in Taiwan. Our preliminary results indicated that the translation and validation process of PIRNCA into Chinese was successful, with similar psychometric characteristics distribution compared to those of the Western countries (Table 5). CPIRNCA is now a valuable instrument for assessing RNC in Taiwan. As all Chinese share the same written language, we hope it can be applied to other Chinese populations worldwide. Furthermore, CPIRNCA content could also be used as a reference to solve the RNC problem, e.g., the transformation of nurses' care beliefs, the shaping of the external ethical climate, and the formulation of guiding principles [27]. Due to the limited sample size and research environment, the validity and reliability of CPIRNCA must still be confirmed.

## Acknowledgments

The authors sincerely thank Ms. Huang Fan-Jan for her data collection and analysis assistance.

## Ethical Considerations

Our study was approved by the hospital's ethics review (approval no. KMHIRB-E(I)-20200401)

## Conflict of Interest

There is no conflict of interest in this study.

## Author Contributions

Study conception and design: WC C, CH C

Data collection: PL T, BO L, CJ H

Data analysis and interpretation: PL T, BO L, WC C

Drafting of the article: WC C

Critical revision: CH C, YC L

## Funding

Ministry of Science and Technology program (No. 110-2511-H-037-004).

## Availability of data and materials

Data used to support the findings of this study are available from the corresponding author upon request.

## References

1. Jones TL (2014) Validation of the perceived implicit rationing of nursing care (PIRNCA) instrument. *Nurs Forum* 49: 77-87.
2. Kalisch BJ (2006) Missed nursing care: a qualitative study. *J Nurs Care Qual* 21: 306-313.
3. Schubert M, Glass TR, Clarke SP, Schaffert-Witvliet B, De Geest S (2007) Validation of the Basel extent of rationing of nursing care instrument. *Nurse Res* 56: 416-424.
4. Uchmanowicz I, Koltuniuk A, Mlynarska A, Łagoda K, Witczak I, et al. (2020) Polish adaptation and validation of the Perceived Implicit Rationing of Nursing Care (PIRNCA) questionnaire: a cross-sectional validation study. *BMJ Open* 10: e031994.
5. Lee YH, Huang YT, Huang KH, Yeh, LL, Chen PH (2014) The Review and Prospect of the National Health Insurance Payment System Reform. *Formosan Journal of Medicine* 18: 53-66.
6. Kalisch BJ, Tschannen D, Lee KH (2012) Missed nursing care, staffing, and patient falls. *J Nurs Care Qual* 27: 6-12.
7. Kalánková D, Suhonen R, Stolt M, Kurucová R, Katajisto J, et al. (2020) Psychometric testing of perceived implicit rationing of nursing care (PIRNCA). *J Adv Nurs* 76: 1469-1482.
8. Balevre PS (2002) Rational nursing: A concept analysis for practical application. *J Nurses Staff Dev* 18: 146-150.

9. Papastavrou E, Charalambous A, Vryonides S, Eleftheriou C, Merkouris A (2016) To what extent are patients' needs met on oncology units? The phenomenon of care rationing. *Eur J Oncol Nurs* 21: 48-56.
10. Mandal L, Seethalakshmi A, Rajendrababu A (2020) Rationing of nursing care, a deviation from holistic nursing: A systematic review. *Nurs Philos* 21: e12257.
11. Kalisch BJ, Williams RA (2009) Development and psychometric testing of a tool to measure missed nursing care. *J Nurs Adm* 39: 211-219.
12. Jones TL, Hamilton P, Murry N (2015) Unfinished nursing care, missed care, and implicitly rationed care: State of the science review. *Int J Nurs Stud* 52: 1121-1137.
13. Kalisch BJ, McLaughlin M, Dabney BW (2012) Patient perceptions of missed nursing care. *Jt Comm J Qual Patient Saf* 38: 161-167.
14. Pan SP, Lin CF (2021) The relationship between organizational communication and missed nursing care in oncology wards in Taiwan. *Nurs Open* 9: 2750-2760.
15. Waltz CF, Strickland OL, Lenz ER (2010) *Measurement in nursing and health research*: Springer Publishing Company.
16. McCrae RR, Kurtz JE, Yamagata S, Terracciano A (2011) Internal consistency, retest reliability, and their implications for personality scale validity. *Pers Soc Psychol Rev* 15: 28-50.
17. Adamson KA, Prion S (2013) Reliability: measuring internal consistency using Cronbach's  $\alpha$ . *Clin Simul Nurs* 9: e179-e180.
18. Hair Jr. JF, Black WC, Babin BJ, Anderson RE (2009) *Multivariate Data Analysis*. (7<sup>th</sup> Edition, Prentice Hall, Upper Saddle River): 761.
19. Moradi T, Adib-Hajbaghery M, Dianati M, Moradi F (2023) Rationing of nursing care: A concept analysis. *Heliyon* 9: e15861.
20. Li HQ, Xie P, Huang X, Luo SX (2023) The experience of nurses to reduce implicit rationing of nursing care: a phenomenological study. *BMC Nurs* 22: 1-10.
21. Zhu X, Zheng J, Liu K, You L (2019) Rationing of nursing care and its relationship with nurse staffing and patient outcomes: the mediation effect tested by structural equation modeling. *Int J Environ Res Public Health* 16: 1672.
22. Smith JG, Morin KH, Wallace LE, Lake ET (2018) Association of the nurse work environment, collective efficacy, and missed care. *West J Nurs Res* 40: 779-798.
23. Wang SL, Hsu HY, Lin SS, Hwang GJ (2014) The role of group interaction in collective efficacy and CSCL performance. *Multicultural Education & Technology Journal* 17: 242-254.
24. Hegney DG, Rees CS, Osseiran-Moisson R, Breen L, Eley R, et al. (2019) Perceptions of nursing workloads and contributing factors, and their impact on implicit care rationing: a Queensland, Australia study. *J Nurs Manag* 27: 371-380.
25. Kalisch BJ, Landstrom GL, Hinshaw AS (2009) Missed nursing care: a concept analysis. *J Adv Nurs* 65: 1509-1517.
26. Ke Y, Wang H, Hsu S (2016) Improving the issue of nurses' delay of off-duty from work through organizational transformation. *Leadership Nurs* 17: 58-70.
27. Vryonides S, Papastavrou E, Charalambous A, Andreou P, Merkouris A (2015) The ethical dimension of nursing care rationing: A thematic synthesis of qualitative studies. *Nurs Ethics* 22: 881-900.