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# Turkish adaptation of the student survey on writing nursing care plans: a validity and reliability study

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## Abstract

**Background** The increasing complexity of healthcare requires nursing students to acquire both theoretical knowledge and practical skills. Nursing care plans are essential for developing clinical competence and bridging the gap between theory and practice. However, many student care plans remain incomplete or lack patient-centred outcomes, highlighting the need for valid tools to assess competence. Currently, no such instrument exists in Turkey.

**Aim** This study aims to translate the 'Student Survey on Writing Nursing Care Plans', which was developed to evaluate nursing students' attitudes towards writing nursing care plans, into Turkish, and to examine the validity and reliability of the translated version.

**Method** This methodological study, conducted in April 2025, involved 362 undergraduate nursing students enrolled at Sivas Cumhuriyet University in Turkey. The majority of participants were female second-year students with a mean age of 20.9 years. The scale was evaluated through translation and back-translation, as well as apparent, content and construct validity and reliability analyses.

**Results** The item–total correlation coefficients ranged from 0.656 to 0.894. Confirmatory factor analysis showed that the model fit was acceptable ($\chi^2/df = 3.253$; RMSEA = 0.079; CFI = 0.944; TLI = 0.939; NFI = 0.921). The factor loadings of the items ranged from 0.658 to 0.906. The scale exhibited excellent internal consistency, with Cronbach's alpha equalling 0.98.

**Conclusion** The findings suggest that the Turkish version of the 'Student Survey on Writing Nursing Care Plans' is a valid and reliable measurement tool. It is recommended as a suitable instrument for evaluating the care plan development skills of nursing students within the nursing education process.

**Implications for nursing education and practice** The Turkish version of the 'Student Survey on Writing Nursing Care Plans' is a valid and reliable tool for evaluating the skills of nursing students in writing care plans. It helps to identify areas where students are particularly struggling, such as planning and evaluation, and supports the development of targeted educational strategies.

**Clinical trial number** Not applicable.

**Keywords** Nursing students, Care plan, Scale adaptation, Validity, Reliability

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## Introduction

Changes and developments in healthcare services are making the system increasingly complex. To adapt to this complexity and provide effective patient care, nursing education must equip students with a balanced combination of theoretical knowledge and practical nursing skills [1, 2]. At the core of nursing education is the understanding that everyone has unique health needs. The effectiveness of care provided in line with this understanding depends on developing and transferring clinical competence into practice. One of the most effective tools for developing clinical competence is the nursing care plan, which is based on a personalised, evidence-based and holistic approach [3, 4].

As a process based on scientific reasoning, critical thinking and problem-solving skills, the nursing care plan aims to guide patient care [5–7]. The nursing process integrates knowledge and skills to form the basis of quality care, while also supporting students' learning and enhancing their conceptual understanding. This scientific process consists of five stages: data collection; nursing diagnosis; planning; implementation; and evaluation [8, 9]. Care plans prepared in accordance with these stages significantly contribute to students' ability to perform evidence-based practices, develop critical thinking skills, form clinical judgement and gain professional autonomy [1, 2, 10, 11]. Furthermore, writing care plans is an effective learning tool that bridges the gap between theory and practice, preparing students for the complexities of real clinical environments [1, 2, 11]. Research has shown that writing care plans positively impacts student competency and that this process is influenced by learning attitudes and educational feedback [2, 12, 13].

Developing scientific and artistic proficiency in documenting the nursing process offers students significant advantages in their academic and professional careers [14]. Furthermore, drafting care plans enhances interdisciplinary communication, ensures continuity of care across shifts and facilitates the delivery of cost-effective, ethical and safe care in clinical settings [3, 15]. Deficiencies in nursing care can lead to serious consequences, such as low-quality service delivery and increased mortality rates [6]. Therefore, it is of critical importance to equip nursing students with effective care planning skills, not only for their individual educational development, but also for the broader healthcare system [2].

Nursing educators may face various challenges when it comes to teaching care plans effectively and ensuring that students are competent before they encounter real patients [12]. Furthermore, many care plans prepared by students and graduate nurses may have incomplete, vague or unoriginal outcomes [2, 12]. Can and Erol (2012) found that most nursing students randomly selected care plans from the internet or textbooks, paying little attention to the patient's specific condition. This resulted in poor nursing care management [16].

Understanding the challenges that nursing students encounter when writing care plans enables educators to devise innovative strategies that bridge the gap between nursing education and clinical practice. In this context, using internationally validated measurement tools to assess students' competence in preparing care plans is of great importance. In Turkey, nursing students begin learning about the nursing process and care planning in their first year of study, when they also start clinical practice (internships), for which they are required to prepare nursing care plans. This education includes both theoretical and practical components, which are reinforced and developed in each subsequent year in line with the vertical objectives of the nursing curriculum. Therefore, it is of critical importance to evaluate these competencies with reliable and valid measurement tools in order to monitor students' professional development. An important initiative in this field is the 'Student Survey on Writing Nursing Care Plans', developed in Saudi Arabia in 2022, which makes a valuable contribution to the literature [12]. Additionally, the scale was translated into Persian and applied to nursing students in Iran, where its usability was tested [13]. However, there is currently no such tool available in Turkey.

The Turkish version of the "Student Survey on Writing Nursing Care Plans" is expected to make significant contributions to nursing practice, clinical education, and curricula. In addition, this tool is anticipated to help students monitor their competency levels throughout the various stages of the nursing process, recognise the challenges they face, and support their professional development. Continuous evaluation and structured feedback processes will facilitate the enhancement of students' skills in formulating and implementing the nursing process more effectively. Therefore, this study aimed to adapt the "Student Survey on Writing Nursing Care Plans" into Turkish and to conduct validity and reliability analyses.

## Materials and methods

### Design

The methodological study was conducted using a cross-sectional, observational design.

### Population and sample

In cross-cultural adaptation studies of scales, it is recommended that the sample size be at least five to ten times the number of items in the scale [17, 18]. Accordingly, the sample size in this study was determined to be greater than ten times the number of items. The study population consisted of first-, second-, third-, and fourth-year nursing students. Data were collected face-to-face, and a total of 417 students were invited to participate. Of these,

362 voluntarily agreed to take part in the study and were included in the sample. Since there were no incomplete data collection forms, all 362 students were included in the analysis.

### Data collection tools and procedure

The data were collected during the spring semester of 2025 using two forms prepared by the researchers in line with the relevant literature: the "Descriptive Information Form" and the "Student Survey on Writing Nursing Care Plans". The adaptation and data collection process adhered to internationally recognised guidelines for scale adaptation, involving several systematic steps. First, three independent bilingual experts translated the original instrument into Turkish, after which a consensus version was produced by comparing the translations. This version was then back-translated into English by three independent language experts, and the final equivalence was confirmed by the original developers. Content validity was assessed by three nursing experts, and Item-Level Content Validity Index (I-CVI) and Scale-Level Content Validity Index (S-CVI) values were calculated using the Davis technique (with a value of ≥ 0.80 being considered acceptable). A pilot test was then conducted with 25 nursing students to evaluate the clarity and comprehensibility of the items. These participants were excluded from the final confirmatory factor analysis (CFA) sample to avoid bias. Minor linguistic adjustments were made following the pilot test, and no major issues were identified. Following these steps, the final Turkish version of the instrument was administered to the main study sample and psychometric testing (construct validity and reliability) was performed.

### Descriptive information form

This form was developed by the researchers based on the literature. It includes questions about the sociodemographic characteristics of nursing students, such as their age, gender, year of study, grade point average, the number of hours they study outside of school each day, whether they have received prior education on care planning and which stage of the care plan they find most challenging.

### Student survey on writing nursing care plans-original scale

The original scale, developed by Salvador et al. (2022), consists of 25 items grouped into five subdimensions: data collection; problem identification; goal setting; intervention appropriateness; and outcome recognition. Each item is rated on a 5-point Likert scale (1 = poor, 5 = excellent), with a possible score range of 25 to 125; higher scores indicate greater competence in writing nursing care plans. In the development study, the content validity index (CVI) was 0.93; the pilot internal consistency was α = 0.935; the test–retest reliability was ICC = 0.915; and the inter-rater agreement ranged from 93.3% to 100%. The instrument was tested with 195 undergraduate nursing students, whose overall competency level was described as 'very good'. However, the original article did not report the KMO value or the results of structural validity analyses (EFA or CFA). Nor did it report Cronbach's α coefficients for each subdimension separately or establish a cut-off score to distinguish between adequate and inadequate care plan writing [12].

### Student survey on writing nursing care plans-Turkish scale

The 'Student Survey on Writing Nursing Care Plans' consists of 25 items, which are grouped into the following five domains: Data Collection; Problem Identification; Goal Setting; Intervention Appropriateness; and Outcome Recognition. Participants respond to the items using a 5-point Likert scale (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent), and the overall mean score is interpreted as ranging from poor to excellent. The instrument's alpha coefficient was found as 0.98.

### Translation of the original version into Turkish

The translation process adhered to internationally recognised guidelines for cross-cultural scale adaptation. First, three bilingual experts independently translated the original instrument into Turkish: two were nursing academics with advanced English proficiency, and the third was a professional language specialist. Each expert produced a separate version. These forward translations were then carefully compared, and a consensus version was created through discussion and agreement among the research team, ensuring conceptual and cultural accuracy.

#### *Assessment of content validity*

Three nursing experts evaluated the Turkish draft version of the scale for content validity. Each expert was asked to rate each item as 'appropriate', 'partially appropriate', 'needs revision' or 'not appropriate'. Based on these ratings, the Item-Level Content Validity Index (I-CVI) for each item and the Scale-Level Content Validity Index (S-CVI) for the scale as a whole were calculated. The evaluation was conducted using the Davis technique, with a value of ≥ 0.80 being considered acceptable [19] (Fig. 1).

#### *Back-translation and developer approval*

The Turkish draft scale was translated and reviewed by experts before being back-translated into English by three independent language experts. This version was then compared with the original scale to assess semantic equivalence. This version was then submitted to the original developers of the scale for confirmation of the accuracy and appropriateness of the translation (Fig. 1).

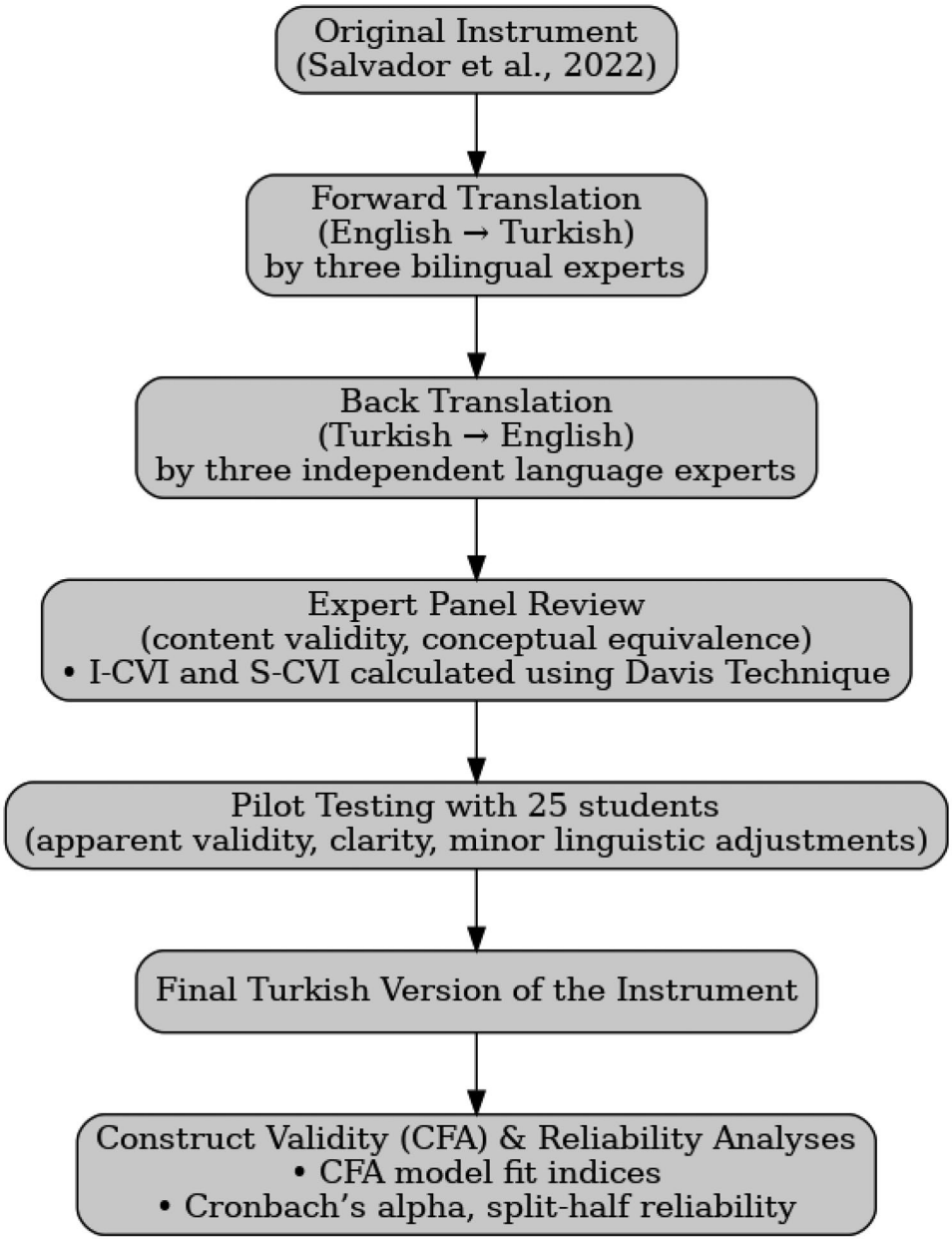



**Fig. 1** Flowchart of the Turkish adaptation process of the student survey on writing nursing care plans

#### *Content validity through expert evaluation*

To ensure both linguistic accuracy and conceptual appropriateness, the preliminary Turkish draft of the scale was reviewed in two stages. Three language experts (native English speakers or individuals with advanced academic English proficiency) and three nursing experts (academics or clinical nurses with subject-matter expertise) were involved in this process. Based on their feedback, revisions were made to the scale items, resulting in the final Turkish version (Fig. 1).

#### *Pilot testing*

A small group of 25 individuals, not included in the main study sample, were administered the revised scale form. This pilot test aimed to evaluate the clarity of the scale items, the variability of responses to the statements and the functionality of the online data collection platform. After the test, feedback was obtained from the participants; items that were unclear, contradictory, or misinterpreted were identified and revised where necessary. To avoid bias, the 25 participants involved in the pilot test were excluded from the CFA sample, as the pilot phase was only intended to assess the clarity, comprehensibility

and feasibility of the items, not to contribute to the psychometric analyses [17], (Fig. 1).

#### *Implementation and psychometric testing process*

After the pilot test, the final version of the scale was given to a large enough sample group to be representative of the target population. The following statistical analyses were conducted based on the data obtained: confirmatory factor analysis (CFA) for construct validity;

- Cronbach's alpha for internal consistency;
- item-total correlations;
- critical ratio (CR);
- standard error (S.E.);
- item discrimination analysis. (Fig. 1).

### Statistical analysis

The data collected in the study were analysed using the Windows versions 26.0 of SPSS (Statistical Package for the Social Sciences) and 25.0 of AMOS. Descriptive statistics (frequency, percentage, mean and standard deviation) were used to summarise the data. The construct validity of the scale was assessed using Confirmatory Factor Analysis (CFA). Prior to this, the dataset's suitability for factor analysis was tested using the Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett's test of sphericity. The scale's internal consistency was evaluated using Cronbach's alpha coefficient. The concurrent validity of the scale was analysed by comparing it with relevant external criteria. Internal consistency analyses based on the split-half method considered the Spearman–Brown and Guttman split-half coefficients. As part of the analyses of convergent and discriminant validity, Average Variance Extracted (AVE) and Composite Reliability (CR) values were calculated. A significance level of $p < .05$ was accepted for all statistical tests [20, 21].

#### *Rasch measurement*

Given the unidimensional specification of the instrument, we conducted a Rasch analysis of polytomous items. Specifically, we estimated a Rating Scale Model [22], in which all items share the same five-category structure, as a robustness check of the measurement properties of individual items. Model fit was evaluated using item fit statistics (Infit and Outfit mean-square [MNSQ]), where values in the 0.70–1.30 range were considered acceptable and values in the 0.50–1.50 range were tolerated during the early stages of instrument development [23]. Item difficulty (location in logits), person reliability (separation) and item reliability were reported, and an Item-Person Map [24] was produced to examine the match between item difficulty and respondent ability distributions [25–27].

### Ethical considerations

Before starting the study, official permission to use the original scale was obtained via email from the developer. This was considered important in order to respect copyright and adhere to ethical research principles. Ethical approval to conduct the study was obtained from the Ethics Committee of Sivas Cumhuriyet University (Ethics Committee Decision No. 2025-02/71). In addition, official written permission was obtained from the institution where the study was conducted. Informed consent was obtained from all participants prior to data collection, and participation was entirely voluntary. All data obtained during the study were used solely for scientific purposes, and participant confidentiality was strictly maintained.

## Results

A total of 362 nursing students were surveyed and the data were analysed. According to Table 1, most participants were female (67.1%) and second-year students (32.6%). A large proportion of participants reported having received care planning education (89.5%). Regarding areas of difficulty, students most frequently reported facing challenges in the planning (33.7%) and evaluation (29.3%) stages of the care plan. In contrast, difficulty rates in data collection and formulating nursing diagnoses were relatively low. The mean age of participants was 20.90 years, with ages ranging from 18 to 36 years. Their grade point averages ranged from 0 to 4, with an average of 2.98. The average daily study time was found to be 1.85 h, ranging from 0 to 10 h (Table 1).

### Pilot study findings

A pilot study was conducted to evaluate the clarity and comprehensibility of the Turkish version of the instrument. Of the participants, 60% were female and 40% were male. The mean age of the participants was $20.36 \pm 1.15$ years (range = 19–24), and their mean grade point average was $2.94 \pm 0.29$. During the expert evaluation stage, the item-level content validity index (I-CVI) and scale-level content validity index (S-CVI) were both found to be within the acceptable range ($\geq 0.80$). During the pilot study, minor linguistic adjustments were made to improve the clarity of certain items, and no significant issues were reported by the participants.

The findings show that mean item scores ranged from $3.07 \pm 1.09$ (C4, C19) to $3.50 \pm 1.08$ (C10). Students reported the lowest competence in items related to data collection and evaluation, and the highest competence in items related to planning. The standard deviation (SD) values, which were approximately 1.00 across items, demonstrate an acceptable level of variability in responses (Table 2).

**Table 1** Distribution of participants' demographic characteristics and areas of difficulty ($n = 362$)

| Variable | Seçenek | *n* | % |
|---|---|---|---|
| Gender | Famele | 243 | 67.1 |
| | Male | 119 | 32.9 |
| Year of Study | 1st year | 103 | 28.5 |
| | 2nd year | 118 | 32.6 |
| | 3rd year | 70 | 19.3 |
| | 4th year | 71 | 19.6 |
| Receiving Education on Care Planning | Yes | 324 | 89.5 |
| | No | 38 | 10.5 |
| Difficulty in Data Collection | Yes | 102 | 28.2 |
| | No | 260 | 71.8 |
| Difficulty in Formulating Nursing Diagnosis | Yes | 89 | 24.6 |
| | No | 273 | 75.4 |
| Difficulty in Planning the Care Plan | Yes | 122 | 33.7 |
| | No | 240 | 66.3 |
| Difficulty in Evaluation | Yes | 106 | 29.3 |
| | No | 256 | 70.7 |
| | Min–Max | **Mean** | **Standard Deviation (SD)** |
| Age | 18.00–36.00 | 20.90 | 1.98 |
| Grade Point Average | 0.00–4.00 | 2.98 | 0.35 |
| Daily Study Hours | 0.00–10.00 | 1.85 | 1.25 |

The Wright Map provides a comparative representation of students' ability distribution and item difficulty levels on the same logit scale. The orange histogram shows that most students are concentrated in the medium-to-high range of ability, with fewer students at the lower levels. The red markers represent item difficulty parameters, indicating that items are generally easier. Overall, the Wright Map supports the unidimensional structure of the scale.

Confirmatory factor analysis demonstrated that all 25 items loaded significantly on a single factor (F1), with standardised factor loadings ranging from 0.658 to 0.906. These findings confirm that the Turkish version of the instrument retains a unidimensional structure, as shown in Tables 3 and 4; Figs. 2 and 3.

Examining the item–total correlation coefficients (r*), it was observed that all items fell within the range of 0.656 to 0.894. The standardised factor loadings of all items ranged from 0.658 to 0.906. The lowest factor loading was found for item c19 (0.658), which is still within acceptable limits. The highest loading value was observed for item c23 (0.906), indicating a very strong relationship between the item and the factor. Critical ratio (CR) values ranged from 13.157 to 24.503. In this context, all items had statistically significant loading values on their respective factors. The significance level for all items was found to be $p < .001$, indicating that all statements in the scale meaningfully contributed to the structural model (Table 3; Fig. 3).

Examining the model fit indices related to the confirmatory factor analysis revealed that the $\chi^2/df$ ratio was 3.253, indicating an acceptable level of model fit. The root mean square error of approximation (RMSEA) value was 0.079, which also falls within the acceptable range of 0.05–0.08. The CFI, IFI, TLI and NFI values (0.944, 0.944, 0.939 and 0.921, respectively) were all above 0.90, indicating a level of fit close to excellent. However, the GFI value of 0.823 falls below the threshold of 0.85 and is therefore considered a limited indicator of overall model fit. Overall, these results support the construct validity of the model. Although limited fit was observed in some subdimensions, the overall model demonstrates an acceptable and robust level of fit (Table 4).

The internal consistency analysis of the Student Survey on Writing Nursing Care Plans revealed a correlation of 0.931 between the two halves of the scale, while the Spearman–Brown and Guttman split-half coefficients were both calculated as 0.964. The internal consistency coefficients for the first and second halves of the scale were 0.969 and 0.864, respectively. These findings suggest that both halves of the scale are highly consistent. Furthermore, the total Cronbach's alpha coefficient was 0.98, demonstrating that the scale is a highly reliable measurement tool and that the items represent a homogeneous structure (Table 5).

Table 6 presents the Rasch item statistics. The item difficulty (location) values ranged from – 0.85 to – 0.50 logits, indicating that the items were generally easy for this group of students. The easiest item was c10, with a value of – 0.85 logits, while the most difficult was c4, with a value of – 0.50 logits. The majority of the item fit indices were within the acceptable range. Most Infit/Outfit

**Table 2** Descriptive statistics of the student survey on writing nursing care plans

| Item code | | Mean | Std. Deviation |
|---|---|---|---|
| c1 | I communicate effectively at all stages of patient assessment | 3.17 | 1.00 |
| c2 | I make the best use of my time during interactions with patients | 3.27 | 0.99 |
| c3 | Based on my assessment, I can easily identify irregularities ranging from normal to abnormal | 3.19 | 0.97 |
| c4 | I use Gordon's functional health patterns or another appropriate assessment tool to systematically collect objective data | 3.07 | 1.02 |
| c5 | I ensure that information provided by individuals is consistent | 3.29 | 0.99 |
| c6 | I determine patients' needs by evaluating them according to Maslow's hierarchy of needs | 3.19 | 1.03 |
| c7 | I categorise patients' requirements according to various types of nursing diagnosis, such as actual, risk, wellness, syndrome and possible | 3.32 | 1.02 |
| c8 | I am familiar with the various methods of developing good nursing diagnoses | 3.16 | 1.02 |
| c9 | I am familiar with the different terminologies used in developing nursing diagnoses | 3.13 | 0.97 |
| c10 | When establishing my patient's nursing diagnosis, I always consult and use NANDA resources | 3.50 | 1.09 |
| c11 | In my planning, I specify the care recipient and the reason for creating the nursing care plan | 3.33 | 1.05 |
| c12 | I consider the measurable quantities that will be used as parameters for my planning | 3.31 | 0.99 |
| c13 | I ensure that the objectives and goals I set are achievable | 3.38 | 1.04 |
| c14 | I make sure that the nursing care plan is realistic and not just aspirational | 3.46 | 1.05 |
| c15 | When creating my nursing care plan, I set a time frame for evaluation | 3.31 | 1.04 |
| c16 | Before implementing any interventions, I assess my patient in order to obtain baseline data, which I then use as parameters for ongoing assessments | 3.30 | 1.01 |
| c17 | I base independent interventions on the needs identified for the patient | 3.30 | 1.00 |
| c18 | All nursing interventions that I plan to implement for the patient are grounded in independent rationales | 3.18 | 0.98 |
| c19 | I consult the physician's recommendations, especially when planning nursing interventions related to pharmacological, medical and surgical treatment methods | 3.07 | 1.09 |
| c20 | When planning care for a patient, I collaborate with various health professionals | 3.36 | 1.07 |
| c21 | Once all nursing interventions have been implemented, I reassess the patient | 3.40 | 1.05 |
| c22 | I return to the nursing diagnosis to check whether the nursing care plan addresses the patient's health needs | 3.35 | 1.05 |
| c23 | I evaluate whether the nursing care plan, which is specific, measurable, achievable, realistic and time-framed, has been accomplished by referring back to the objectives and goals | 3.35 | 1.03 |
| c24 | I evaluate in order to check and verify the appropriateness and effectiveness of all nursing interventions provided to the individual | 3.40 | 1.03 |
| c25 | After a series of evaluations, I review the nursing care plan and decide whether to terminate, continue or modify it | 3.38 | 1.03 |

MNSQ values were between 0.94 and 1.19, which is consistent with the recommended interval of 0.70–1.30. In the early stages of scale development, a wider range of 0.50–1.50 is considered tolerable. However, c19 showed a comparatively higher Infit value of 1.27, which warrants monitoring and review, despite remaining within the tolerated range. Person reliability was 0.62 and item reliability was 0.71, suggesting moderate precision at the person level and adequate differentiation across item locations [23].

## Discussion

In scale adaptation studies, the factor structure of the original scale has already been developed and its validity tested. Therefore, Confirmatory Factor Analysis (CFA) is preferable to Exploratory Factor Analysis (EFA), the latter of which aims to rediscover the factor structure. CFA allows us to test how well the adapted scale aligns with the original structure, providing a more robust, hypothesis-driven approach to assessing construct validity [28]. Therefore, during the cross-cultural adaptation process, CFA should be conducted based on the original scale structure rather than EFA. Furthermore, CFA enhances the methodological integrity of the adaptation process by enabling the validity of the model to be evaluated using fit indices [29].

Examining the findings related to item analysis revealed that the item–total correlation coefficients (r*) ranged between 0.656 and 0.894. These values suggest that all items strongly reflect the overall construct measured by the scale, indicating notably high internal consistency. The item–total correlation coefficient reflects how closely an item is related to the overall construct that it is intended to measure. Values above 0.30 are generally considered acceptable, values above 0.40 indicate good consistency and values of 0.50 or higher reflect very good internal consistency [30, 31]. In this context, the obtained values demonstrate that the items significantly contribute to the construct being measured and that the scale has a homogeneous structure. High item–total correlations also suggest that each item makes a statistically meaningful contribution to the construct, meaning that removing

**Table 3** First-order confirmatory factor analysis factor loadings and item correlation values of the student survey on writing nursing care plans

| Items code | Items | *r** | Standardised factor loadings | S.E | CR | *p* value |
|---|---|---|---|---|---|---|
| c1 | | 0.770 | 0.758 | | | 0 < 0.001 |
| c2 | | 0.782 | 0.768 | 0.041 | 24.503 | 0 < 0.001 |
| c3 | | 0.805 | 0.797 | 0.062 | 16.423 | 0 < 0.001 |
| c4 | | 0.768 | 0.761 | 0.066 | 15.543 | 0 < 0.001 |
| c5 | | 0.804 | 0.804 | 0.064 | 16.604 | 0 < 0.001 |
| c6 | | 0.796 | 0.799 | 0.066 | 16.464 | 0 < 0.001 |
| c7 | | 0.862 | 0.864 | 0.064 | 18.126 | 0 < 0.001 |
| c8 | | 0.829 | 0.828 | 0.065 | 17.206 | 0 < 0.001 |
| c9 | | 0.807 | 0.815 | 0.062 | 16.867 | 0 < 0.001 |
| c10 | | 0.832 | 0.842 | 0.069 | 17.538 | 0 < 0.001 |
| c11 | | 0.880 | 0.885 | 0.066 | 18.674 | 0 < 0.001 |
| c12 | | 0.894 | 0.900 | 0.062 | 19.052 | 0 < 0.001 |
| c13 | | 0.887 | 0.900 | 0.065 | 19.072 | 0 < 0.001 |
| c14 | | 0.870 | 0.885 | 0.066 | 18.654 | 0 < 0.001 |
| c15 | | 0.827 | 0.836 | 0.066 | 17.407 | 0 < 0.001 |
| c16 | | 0.867 | 0.879 | 0.064 | 18.509 | 0 < 0.001 |
| c17 | | 0.866 | 0.875 | 0.063 | 18.394 | 0 < 0.001 |
| c18 | | 0.794 | 0.805 | 0.063 | 16.610 | 0 < 0.001 |
| c19 | | 0.656 | 0.658 | 0.072 | 13.157 | 0 < 0.001 |
| c20 | | 0.831 | 0.883 | 0.066 | 18.605 | 0 < 0.001 |
| c21 | | 0.872 | 0.892 | 0.066 | 18.859 | 0 < 0.001 |
| c22 | | 0.881 | 0.902 | 0.064 | 19.110 | 0 < 0.001 |
| c23 | | 0.889 | 0.906 | 0.064 | 19.225 | 0 < 0.001 |
| c24 | | 0.891 | 0.882 | 0.065 | 18.589 | 0 < 0.001 |
| c25 | | 0.866 | 0.838 | 0.068 | 17.452 | 0 < 0.001 |

r* = Corrected item–total correlation coefficient;

S.E. = Standard Error; CR = Critical Ratio. $p < .001$

**Table 4** Findings related to confirmatory factor analysis and split-half reliability method

| İndex | Excellent fit criterion | Acceptable fit criterion | After modification |
|---|---|---|---|
| X^2/SD | $0 \leq \chi^2/df \leq 3$ | **$3 \leq \chi^2/df \leq 5$** | 3.253 |
| RMSEA | $0.00 \leq RMSEA \leq 0.05$ | **$0.05 \leq RMSEA \leq 0.08$** | 0.079 |
| CFI | ≥ 0.95 | **≥ 0.85** | 0.944 |
| GFI | ≥ 0.90 | ≥ 0.85 | 0.823 |
| IFI | ≥ 0.90 | **≥ 0.80** | 0.944 |
| TLI | ≥ 0.90 | **≥ 0.80** | 0.939 |
| NFI | ≥ 0.90 | **≥ 0.80** | 0.921 |

$^2$/df = Chi-square/degrees of freedom ratio

RMSEA = Root Mean Square Error of Approximation

CFI = Comparative Fit Index

GFI = Goodness of Fit Index

IFI = Incremental Fit Index

TLI = Tucker-Lewis Index; NFI = Normed Fit Index

any item could weaken the scale's reliability. In particular, item correlation values exceeding 0.80 indicate that the items have high measurement power and can discriminate sufficiently well between participants. Furthermore, these findings support the idea that the items were formulated in a consistent, cohesive and conceptually aligned manner [5, 32].

In line with the CFA, the Rasch analysis provided converging evidence for the unidimensional structure of the Turkish version, as well as an acceptable fit at item level. As item locations were skewed towards the easier end of the scale for this sample, future work should consider adding more difficult items to improve targeting and enhance measurement precision, particularly for higher-ability students.

The standardised factor loadings of all items ranged from 0.658 to 0.906. In the original development study of the 'Student Survey on Writing Nursing Care Plans' by Salvador et al. (2022), the factor loadings ranged from 0.64 to 0.89, and it was reported that all items strongly represented the construct [12]. While the factor loadings were not detailed in the scale development study by Lodi et al. (2023), it was noted that only item A1 fell below the threshold of 0.50 [33]. In the literature, factor loadings above 0.30 are considered sufficient to support construct validity, and values above 0.50 are regarded as a strong indicator of the relationship between items and factors [28, 34]. In this context, the lowest factor loading

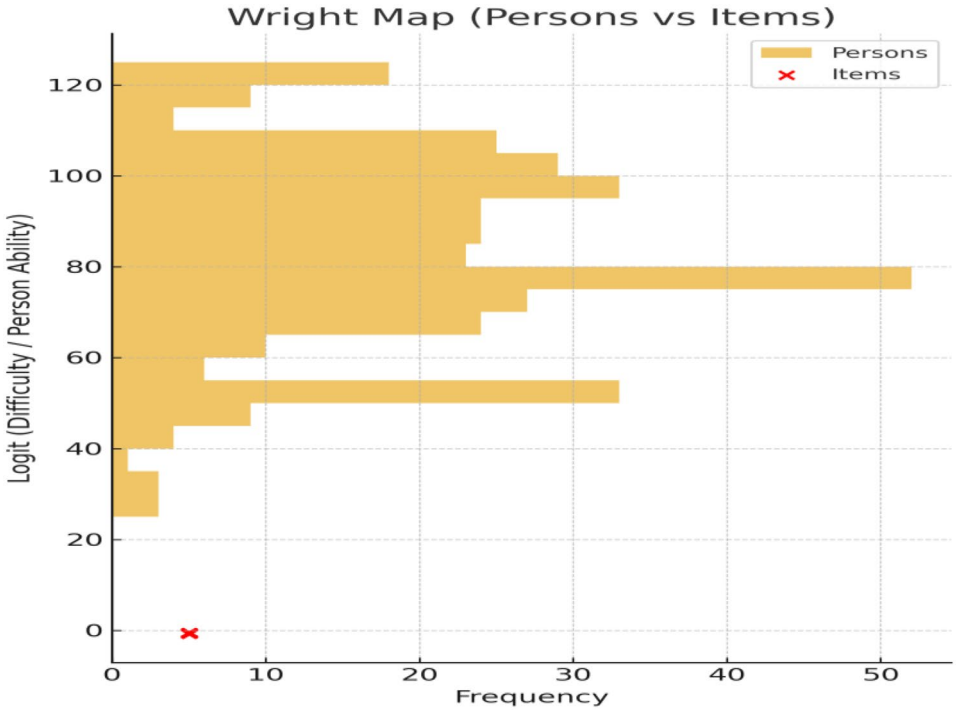



**Fig. 2** The wright map of persons and items

in the present study was observed for item c19 (0.658), which still falls within the acceptable range. The highest factor loading was observed for item c23 (0.906), indicating a very strong representation of the factor. Factor loadings above 0.70 are particularly indicative of strong construct representation and item discrimination [35]. Additionally, the critical ratio (CR) values for the items ranged from 13.157 to 24.503. According to the literature on confirmatory factor analysis (CFA), CR values greater than 1.96 indicate statistically significant factor loadings [36]. In this study, all items demonstrated statistical significance at the $p < .001$ level, indicating that the scale items contribute to construct validity and are meaningfully represented in the confirmatory model. Overall, these findings suggest that the scale has strong structural characteristics and that the developed model is statistically robust.

Although the model fit indices were acceptable, they were not excellent. This limitation should be acknowledged when interpreting the results regarding structural validity. Examining the model fit indices related to the confirmatory factor analysis revealed a $\chi^2/df$ ratio of 3.253. As values between 3 and 5 indicate an acceptable fit, this suggests that the model demonstrates an acceptable level of fit [36, 37]. The RMSEA value was 0.079 and, as this falls within the range of 0.05 to 0.08, it indicates that the model's approximate error level is within acceptable limits [28]. The CFI (0.944), IFI (0.944), TLI (0.939), and NFI (0.921) values were all above 0.90, which is generally considered an indicator of "good fit" in the literature [38]. These values support that the model has strong construct validity. However, the GFI value was 0.823, falling below the 0.85 threshold, which suggests that there may be certain limitations in the model, particularly in terms of overall fit indices. In the literature, a GFI value above 0.90 is considered excellent, while a value above 0.85 is regarded as acceptable [39]. Previous studies involving scale development and adaptation in the field of nursing have generally reported acceptable and strong levels of structural validity based on confirmatory factor analysis (CFA) results. In the study by Salvador et al. (2022), in which the "Student Survey on Writing Nursing Care Plans" was developed, the construct validity of a two-factor model was confirmed, with RMSEA = 0.071, CFI = 0.931, GFI = 0.906, and NFI = 0.892. These values indicate an acceptable level of model fit. Similarly, in the study by van den Broek et al. (2024) on the "Nursing Shared Decision Making Attitude Scale," CFA results for the two-factor structure yielded RMSEA = 0.063, CFI = 0.942, TLI = 0.926, and $\chi^2/df = 2.84$. These values reflect good model fit [40].

Based on the obtained fit indices, it can be concluded that the model's construct validity is adequately established, that the model represents the data in a theoretically consistent manner, and that the confirmatory factor analysis presents a valid structural model.

In analysing the scale's internal consistency, we found that the correlation between the two halves was 0.931.

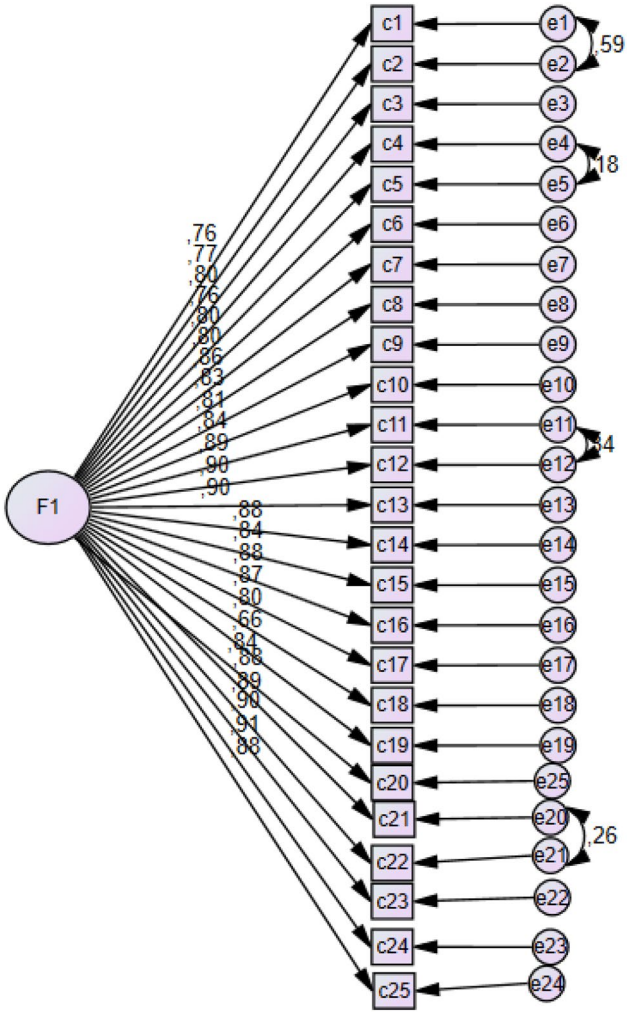



**Fig. 3** Standardized first-order confirmatory factor analysis model of the student survey on writing nursing care plans

**Table 5** Data on split-half reliability and cronbach's alpha

| Statistic | Value |
|---|---|
| The items are: c1, c2, c3, c4, c5, c6, c7, c8, c9, c10, c11, c12, c13. | 0.969 |
| The items are: c13, c14, c15, c16, c17, c18, c19, c20, c21, c22, c23, c24, c25. | 0.864 |
| Correlation Between Two Halves | 0.931 |
| Spearman-Brown Katsayısı Coefficient | 0.964 |
| Guttman Split-Half Katsayısı Coefficient | 0.964 |
| *** Total Scale Cronbach's Alpha | 0.98 |

Meanwhile, both the Spearman–Brown and Guttman split-half coefficients were calculated as 0.964. According to the literature, split-half reliability coefficients of 0.80 and above indicate high internal consistency and suggest that the scale has a homogeneous structure [30, 31]. Specifically, the Spearman–Brown correction generalises the correlation between the two halves to the entire test, while the Guttman split-half coefficient accounts for the reliability of both halves of the test [41]. The correlation

**Table 6** Rasch analysis results for the Turkish version of the student survey on writing nursing care plans

| Item | Difficulty (logit) | Infit MNSQ | Outfit MNSQ |
|---|---|---|---|
| c1 | -0.55 | 1.04 | 1.0 |
| c2 | -0.64 | 0.99 | 0.99 |
| c3 | -0.57 | 0.97 | 0.94 |
| c4 | -0.50 | 1.08 | 1.03 |
| c5 | -0.66 | 0.97 | 0.99 |
| c6 | -0.56 | 1.09 | 1.07 |
| c7 | -0.68 | 1.03 | 1.05 |
| c8 | -0.54 | 1.05 | 1.04 |
| c9 | -0.51 | 0.94 | 0.95 |
| c10 | -0.85 | 1.13 | 1.19 |
| c11 | -0.69 | 1.07 | 1.1 |
| c12 | -0.67 | 0.97 | 0.99 |
| c13 | -0.73 | 1.06 | 1.09 |
| c14 | -0.80 | 1.05 | 1.11 |
| c15 | -0.67 | 1.06 | 1.09 |
| c16 | -0.66 | 1.0 | 1.03 |
| c17 | -0.66 | 0.98 | 1.0 |
| c18 | -0.56 | 0.98 | 0.97 |
| c19 | -0.50 | 1.27 | 1.19 |
| c20 | -0.72 | 1.1 | 1.14 |
| c21 | -0.75 | 1.07 | 1.11 |
| c22 | -0.71 | 1.09 | 1.11 |
| c23 | -0.71 | 1.01 | 1.05 |
| c24 | -0.76 | 1.0 | 1.06 |
| c25 | -0.74 | 1.01 | 1.06 |

obtained in this study (0.931), together with the Spearman–Brown and Guttman coefficients (0.964), indicates that the scale provides highly consistent and stable measurements. Furthermore, they support a strong coherence among the items in relation to the construct being measured.

Furthermore, the total Cronbach's alpha coefficient was found to be 0.98, indicating a very high level of internal consistency for the scale. The relevant literature shows that scales developed and adapted within the field of nursing generally demonstrate high levels of internal consistency. In the study by Salvador et al. (2022), which developed the 'Student Survey on Writing Nursing Care Plans', the Cronbach's alpha coefficient was reported as 0.91, reflecting a notably high level of internal consistency [12].

In their study of the 'Nursing Shared Decision Making Attitude Scale', van den Broek et al. (2024) reported adequate alpha coefficients for two subdimensions: 0.84 for empathetic communication and 0.78 for mastery learning [40]. In Yılmaz et al. (2025) study, titled 'Attitude Scale towards the Use of Artificial Intelligence Technologies in Nursing', the total internal consistency coefficient of the scale was found to be 0.910. High alpha values were obtained for the subdimensions: 0.933 for the positive attitude sub-dimension, and 0.917 for the negative

attitude sub-dimension [42]. In a study by Lodi et al. (2023) which aimed to measure the knowledge, attitudes and practices of professional nurses related to care plan writing, Cronbach's alpha values of 0.75, 0.74 and 0.77 were reported for the knowledge, attitude and practice subdimensions, respectively [33]. Cronbach's alpha coefficients of 0.70 and above are generally considered adequate, values above 0.80 are regarded as good and values exceeding 0.90 indicate a high level of reliability [5, 31]. In this context, a coefficient of 0.98 indicates that the items are highly consistent with the construct being measured and reflect similar characteristics. However, some researchers caution that values above 0.95 may indicate excessive similarity between items, suggesting that the scale has become overly homogeneous [41]. Nevertheless, the alpha value obtained in this study shows that the scale has a strong internal structure and can be used as a reliable measurement tool.

### Strengths of the study

One of this study's main strengths is that the scale adaptation process was conducted in accordance with international validity and reliability standards. During the language validity phase, the translation and back-translation processes were carried out in collaboration with multilingual experts and subject-matter specialists, which strengthened the cultural adaptation of the measurement tool. Additionally, the sample size was more than ten times larger than the number of items, providing sufficient data for statistical analysis. The high factor loadings obtained in the confirmatory factor analysis, along with the acceptable level of fit indices, supported the construct validity of the scale. The very high internal consistency reliability coefficients (Cronbach's Alpha = 0.98) demonstrate that the measurement tool provides a stable and reliable structure. This increases the applicability of the scale in both academic research and educational practices.

### Limitations of the study

This study has some limitations. Firstly, the data were collected exclusively from nursing students, meaning the scale was only tested on students. Therefore, the results may not be generalisable to other groups, such as nursing graduates or professional nurses working in clinical settings. Additionally, since the data were collected online based on self-reports, the responses may have been influenced by factors such as social desirability or distractions. Another limitation is that a small proportion of students reported that they had not received education on nursing care plan writing. In Turkey, care planning is integrated into different courses rather than taught as a separate module, which may have led to a misperception among some students. This misperception could have influenced their responses and should be considered when interpreting the findings. Since the study employed a cross-sectional design, it is not possible to draw causal inferences. Finally, the absence of a test–retest analysis limits our ability to assess the scale's stability over time. Future studies should therefore consider conducting assessments at different time points.

## Conclusion

The aim of this study was to adapt the *Student Survey on Writing Nursing Care Plans* into Turkish and to evaluate its psychometric properties. The adaptation process was conducted through a rigorous methodological procedure, including translation, back-translation, expert content validity assessment, pilot testing, and confirmatory factor analysis. The findings demonstrated that the Turkish version of the scale retained a unidimensional structure, had strong item–total correlations ($r = .656–0.894$), provided acceptable fit indices ($\chi^2/df = 3.253$; RMSEA = 0.079; CFI = 0.944; TLI = 0.939; NFI = 0.921), and showed excellent internal consistency (Cronbach's $\alpha = 0.98$). In addition, Rasch analysis supported the measurement strength of the scale at the item level.

Based on these findings, the Turkish version of the scale can be considered a valid and reliable instrument for assessing nursing students' competence in writing nursing care plans. Its use in nursing education will facilitate the identification of students' strengths and weaknesses across different stages of the care planning process, support targeted educational interventions, and contribute to the advancement of evidence-based practice and professional autonomy. Furthermore, applying the scale in diverse samples and educational settings will enhance its external validity and broaden its applicability within nursing curricula and clinical training.

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#### Author contributions

KAA, HHT, EY: Conceptualization, Data curation, Formal analysis, Writing - original draft. KAA, HHT, EY: Conceptualization, Investigation, Writing - original draft. KAA, HHT: Investigation, Data curation, Writing - original draft. KAA, HHT: Investigation, Formal analysis, Writing - original draft. KAA, HHT: Supervision, Writing - review & editing. All authors approved the final manuscript for submission.

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#### Data availability

Not applicable.

## Declarations

#### Ethics approval and consent to participate

Ethical principles were meticulously followed throughout the research process. Prior to the commencement of the study, written ethical approval

was obtained from the Ethics Committee of Sivas Cumhuriyet University (Ethics Committee Approval No: 2025-02/71). Additionally, official permission was obtained from the institution where the study was conducted, and the implementation process was planned accordingly. Participants were clearly informed about the aim, scope, and voluntary nature of the study. Informed consent was obtained from all participants, and the confidentiality of personal data was guaranteed. Participants were informed of their right to withdraw from the study at any time, and this was explicitly stated during the data collection process. All collected data were used solely for scientific purposes and were not shared with third parties. This study has been prepared in accordance with the Declaration of Helsinki.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare no competing interests.

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**References**

1. Ballantyne H. Using nursing care plans to support effective working. Pract. 2020;42:177–80.
2. Wong FMF. Care plan writing in nursing education: challenges, competence, and clinical preparedness. Nurs Rep. 2025;15:134. https://www.mdpi.com/2039-4403/15/4/134.
3. Hooks R. Developing nursing care plans. Nurs Stand. 2016;30(26):51–7. https://doi.org/10.7748/ns.30.26.51.s48.
4. Lucas P, Jesus É, Almeida S, Araújo B. Relationship of the nursing practice environment with the quality of care and patients' safety in primary health care. BMC Nurs. 2023;22:413.
5. Seçer S, Karaca A. Evaluation of nurses' perceptions of nursing diagnoses and their opinions regarding the application of nursing process. Florence Nightingale J Nurs. 2021;29(2):229–38.
6. Mutshatsh TE, Mothiba TM, Mamogobo PM. Exploring professional nurses' use of the nursing process at selected public hospitals in Limpopo, South Africa. Afr J Nurs Midwifery. 2020;22(2):14. https://hdl.handle.net/10520/ejc-ajnm-v22-n2-a23.
7. Zeleke S, Kefale D, Necho W. Barriers to implementation of nursing process in South Gondar zone governmental hospitals. Ethiopia Heliyon. 2021;7(3).
8. Aseratie M, Murugan R, Molla M. Assessment of factors affecting implementation of nursing process among nurses in selected governmental hospitals, addis Ababa, ethiopia: a cross-sectional study. J Nurs Care. 2014;3:170. https://doi.org/10.4172/2167-1168.1000170.
9. Herdman TH, Kamitsuru S. NANDA international nursing diagnoses: definitions and Classification, 2015–2017. Oxford: Wiley Blackwell; 2014.
10. Aldridge J, Eshun A, Meurier C. Nursing assessment and care planning. Nursing practice: knowledge and care. Hoboken, NJ: Wiley; 2016. pp. 23–45.
11. Doenges M, Moorhouse M, Murr A. Nursing care plans: guidelines for individualizing client care across the life span. 10th ed. Philadelphia, PA: F.A. Davis Company; 2019.
12. Salvador JT, Alqahtani FM, Sauce BRJ, Alvarez MOC, Rosario AB, Reyes LD, et al. Development of student survey on writing nursing care plan: an exploratory sequential mixed-methods study. J Nurs Manag. 2022;30(5):23–36. https://doi.org/10.1111/jonm.12996.
13. Ramazanzadeh N, Ghahramanian A, Zamanzadeh V, Onyeka TC, Valizadeh L, Ghafarifar S. Translation, cross-cultural adaptation and evaluation of the Iranian Persian version of student survey on writing nursing care plan. Nurs Open. 2023;10(8):5476–84.
14. Kumar R. Concept mapping in nursing education. IJNS Adv. 2021;4:305–10.
15. Patalagsa J. Nursing care plan: an evidence-based tool for learning and providing high quality care. Saarbrücken, Germany: Scholar's Press; 2013. ISBN: 978-3-639-51284-7.
16. Can G, Erol O. Nursing students' perceptions about nursing care plans: A Turkish perspective. Int J Nurs Pract. 2012;18(1):12–9. https://doi.org/10.1111/j.1440-172X.2011.01985.x.
17. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Front Public Health. 2018;6:149. https://doi.org/10.3389/fpubh.2018.00149.
18. Comrey AL, Lee HB. A first course in factor analysis. New York: Psychology; 2013.
19. Davis LL. Instrument review: getting the most from a panel of experts. Appl Nurs Res. 1992;5(4):194–7. https://doi.org/10.1016/S0897-1897(05)80008-4.
20. Kaiser HF. An index of factorial simplicity. Psychometrika. 1974;39(1):31–6.
21. Seçer İ. Psychological test development and adaptation process: SPSS and LISREL applications. Ankara: Anı Publishing; 2021.
22. Andrich D. A rating formulation for ordered response categories. Psychometrika. 1978;43(4):561–73.
23. Linacre JM. What do infit and outfit, mean-square and standardized mean? Rasch Meas Trans. 2002;16(2):878. Available from: https://www.rasch.org/rmt/rmt162f.htm
24. Wright BD, Masters GN. Rating scale analysis. Chicago: MESA; 1982.
25. Tennant A, Conaghan PG. The Rasch measurement model in rheumatology: what is it and why use it? Arthritis Rheum. 2007;57(8):1358–62.
26. Bond TG, Fox CM. Applying the Rasch model: fundamental measurement in the human sciences. 3rd ed. New York: Routledge; 2015.
27. Boone WJ, Staver JR, Yale MS. Rasch analysis in the human sciences. New York: Springer; 2014.
28. Brown TA. Confirmatory factor analysis for applied research. New York: Guilford; 2015.
29. Cokluk Ö, Şekercioğlu G, Büyüköztürk Ş. Multivariate statistics for the social sciences: SPSS and LISREL applications. 2nd ed. Ankara: Pegem Academy; 2012.
30. Büyüköztürk Ş. Handbook of data analysis for the social sciences. Ankara: Pegem Academy; 2018. pp. 1–214.
31. Tavşancıl E. Measurement of attitudes and data analysis with SPSS. 2nd ed. Ankara: Nobel Publishing; 2005.
32. DeVellis RF, Thorpe CT. Scale development: theory and applications. 5th ed. Thousand Oaks, CA: Sage; 2021.
33. Lodi LM, Randa MB, Ntuli ST, Matlala SF. Assessment of reliability and validity of a nursing tool used to examine knowledge, attitude, and practices of professional nurses in writing nursing care plans at a teaching hospital in Gauteng Province, South Africa. Open Nurs J. 2023;17(1).
34. Tabachnick BG, Fidell LS. Using multivariate statistics. 6th ed. Ankara: Nobel Publishing; 2015.
35. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. Harlow: Pearson Education Limited; 2013. https://books.google.com.tr/books?id=VvXZnQEACAAJ.
36. Kline P. Test construction: factor analytic and item analytic methods. Handbook of psychological testing. 2nd ed. London, New York: Routledge; 2000. pp. 161–81.
37. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. Methods Psychol Res Online. 2003;8(2):23–74.
38. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model. 1999;6(1):1–55. https://doi.org/10.1080/10705519909540118.
39. Hooper D, Coughlan J, Mullen MR. Structural equation modelling: guidelines for determining model fit. Electron J Bus Res Methods. 2008;6:53–60.
40. van den Broek S, Halvorsen F, Raap-van Sleuwen B, de Vos R. The nursing shared decision making attitude scale: A translation and psychometric evaluation study. PEC Innov. 2024;5:100361.
41. Field A. Discovering statistics using SPSS. 3rd ed. New York: Sage; 2009.
42. Yılmaz D, Uzelli D, Dikmen Y. Psychometrics of the attitude scale towards the use of artificial intelligence technologies in nursing. BMC Nurs. 2025;24(1):151.

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