ORIGINAL ARTICLE

Clinical Decision-Making in Nursing Scale (CDMNS-PT©) in nursing students: translation and validation

Escala de Tomada de Decisão Clínica (CDMNS-PT©) em estudantes de enfermagem: tradução e validação

Escala de Toma de Decisión Clínica (CDMNS-PT©) en estudiantes de enfermería: traducción y validación

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ABSTRACT
Objectives: to validate, for the Portuguese population, the Clinical Decision-Making Nursing Scale© (CDMNS©). **Methods:** this methodological study involved 496 nursing students who filled in a questionnaire created using sociodemographic and academic data, and the scale to evaluate the making of decisions in nursing. **Results:** the confirmatory factorial analysis showed that the adjustment of the factorial structure has good quality, being made up by three factors (X2/gl = 2.056; GFI = 0.927; CFI = 0.917; RMSEA = 0.046; RMR = 0.039; SRMR = 0.050). For the scale to be reliable, it had to include only the reliability of the scale required it to be constituted by 23 items, with correlation values that varied from 0.184 and 0.610, and a global Cronbach's Alpha of 0.851, which showed its good reliability. **Conclusions:** the CDMNS-PT© is valid and reliable, showing a high potential to be used in clinical practice and investigation.
Descriptors: Education, Nursing; Students, Nursing; Validation Study; Decision Making; Translations.

RESUMO
Objetivos: validar para a população portuguesa a *Clinical Decision-Making Nursing Scale©* (CDMNS©). **Métodos:** este estudo metodológico envolveu 496 estudantes de Enfermagem que preencheram um questionário constituído por dados sociodemográficos e académicos e a escala de avaliação da tomada de decisão em Enfermagem. **Resultados:** a análise fatorial confirmatória evidenciou uma boa qualidade de ajustamento da estrutura fatorial, composta por três fatores (X²/gl = 2,056; GFI = 0,927; CFI = 0,917; RMSEA = 0,046; RMR = 0,039; SRMR = 0,050). A determinação da fidelidade da escala exigiu que ela ficasse constituída por 23 itens, com valores de correlação a variar entre 0,184 e 0,610 e um valor global de alfa de Cronbach de 0,851, demonstrando uma boa fiabilidade. **Conclusões:** a CDMNS-PT© é válida e fiável, demonstrando um elevado potencial para a sua utilização na prática clínica e na investigação.
Descritores: Educação em Enfermagem; Estudantes de Enfermagem; Estudo de Validação; Tomada de Decisão; Tradução.

RESUMEN
Objetivo: validar para la población portuguesa la *Clinical Decision-Making Nursing Scale©* (CDMNS©). **Métodos:** este estudio metodológico envolvió 496 estudiantes de Enfermería que rellenaron una encuesta constituida por datos sociodemográficos y académicos y la escala de evaluación de la toma de decisión en Enfermería. **Resultados:** el análisis factorial confirmatorio evidenció una buena calidad de ajustamiento de la estructura factorial, compuesta por tres factores (X²/gl = 2,056; GFI = 0,927; CFI = 0,917; RMSEA = 0,046; RMR = 0,039; SRMR = 0,050). La determinación de la fidelidad de la escala exigió que se quedara constituida por 23 ítems, con valores de correlación a variar entre 0,184 y 0,610 y un valor global de alfa de Cronbach de 0,851, demostrando una buena fiabilidad. **Conclusiones:** la CDMNS-PT© es válida y fiable, demostrando un elevado potencial para su utilización en la práctica clínica y en la investigación.
Descriptores: Educación en Enfermería; Estudiantes de Enfermería; Estudio de Validez; Toma de Decisión; Traducción.

INTRODUCTION

When the teaching of nursing resorts to innovative teaching methodologies, it is characterized by the interaction between the previous knowledge of the students. The knowledge acquired assumes new meaning, making it possible to train technical, working, and prioritization skills, while also promoting the organization of teamwork[1]. Furthermore, this methodology privileges reflection, encourages the critical thought of nursing students, and promotes the analysis of problems from multiple perspectives. This contributes for the improvement of clinical thinking and of the decision-making (DM) process[2-6].

The concept of DM is defined as the final stage of the clinical rational thinking in the resolution of problems. It involves an adequate management of the difficulties found, triggering an adequate clinical judgement[7-8]. The DM is a complex mental process. It is important for the teaching of nursing and makes it possible to learn competences related to problem solving, communication, prioritization, and critical thinking[8-9].

The DM process involves knowledge in the fields of action, the ability to reason, and an adequate perception on the situation or problem that needs solving[9-10]. With regard to its stages, DM includes: the identification and definition of the problem; the development of objectives[11]; the search for data/facts[8,11-13]; the development of a data processing model[11,13]; the evaluation of the alternatives and the selection of the best action/plan of action[8,11,13]; and the implementation of the decision/plan or planning of the course of action[4,11,13].

According to Johansen and O'Brien's model, DM is made up by attributed, contextual factors, priors, and consequences. Some of its attributes are intuition and analysis, heuristic, experience, knowledge, clinical reasoning, and critical thought[9]. Priors are the events or behaviors that lead to the concept, that is, the awareness of a situation/problem[9,12,14]. Regarding the consequences of DM, they arise from the choices or responses put in action, brought forth from the initial acceptance of the choice, the reevaluation and reflection about one's own choices, culminating in a more beneficial solution[9]. The contextual factors can be classified as internal (individual) or external (environmental)[9,15]. Among the internal factors, some stand out: knowledge, experience, values, perceived self-efficiency, critical thought capacity, education, the level of commitment, flexibility, sex, and age[15-16]. Among the external factors, the following stand out: the nature and context of the practice, the complexity of the situation/problem, the level of risk involved, the characteristics of the diseased, the resources available, the intensity of the work, the sources of information, the time available, and stressing factors[15,17-18].

Some instruments that evaluate nursing DM are: Clinical Decision-Making in Nursing Scale[6]; Nursing Decision-Making Instrument[19]; Lasater Clinical Judgment Rubric[20]; Nurse Decision-Making Instrument[8]; and the Clinical Reasoning Evaluation Simulation Tool[21].

The CDMNS©[6], in turn, is an instrument validated and translated cross-culturally for many countries. In the original study, which was elaborated and validated for nursing students in the state of Virginia (n=111), in the United States, the author found a scale with 40 items, divided in 4 subscales, which were: Subscale A - Search for Alternatives or Options (items 1, 3, 6, 7, 16, 22, 27, 30, 32, and 37); Subscale B - Canvassing of Objectives and Values (items 2, 9, 10, 14, 21, 31, 33, 35, 38, and 40); Subscale C - Evaluation and Re-evaluation of Consequences (items 13, 17, 18, 23, 25, 26, 28, 29, 34, and 39); and Subscale D – Search for Information and Unbiased Assimilation of New Information (items 4, 5, 8, 11, 12, 15, 19, 20, 24, and 36). Each item is answered in an ordinal scale of frequency that varies from 1 to 5 (1-Never; 2-Rarely; 3-Occasionally; 4-Frequently; and 5-Always), filled in by participants themselves. The global score varies from 40 to 200, from 10 to 50 for each subscale. The items 2, 4, 6, 12, 13, 15, 19, 21, 22, 23, 24, 25, 30, 31, 32, 34, 39 e 40 are negative statements, and, thus, their score is reversed (1 = 5; 2 = 4; 3 = 3; 4 = 2; 5 = 1) before total and subscale scores can be added up. The other items are affirmative statements. Higher scores were interpreted as positive perceptions about DM, while lower ones were seen as indicative of less positive perceptions of DM. The mean global score of the CDMNS© in this study was 154.33; Subscale A = 38.29; Subscale B = 39.57; Subscale C = 37.30; and Subscale D = 38.97. The Cronbach's Alpha for the set of items in the instrument was 0.830, while values and correlations per item varied from 0.360 to 0.570[6].

In the 1990s, CDMNS© started to be used again, this time in England, with a sample of nurses (n = 50), showing internal consistency, as analyzed by Cronbach's Alpha, of 0.780[22]. Even in the 21st century, the measuring instrument CDMNS© was used in the United States, in the State of Pennsylvania, in a sample of nursing students (n = 123), to a Cronbach's Alpha of 0.810[23]. In 2010, also in the United States, the CDMNS© showed a Cronbach's Alpha of 0.680 when applied to nursing students (n = 185)[24]. In 2015, the same measuring tool was applied to nursing students in Turkey (n = 210), and it was possible to find an index of item content validation of 0.810 and an index of scale content validation of 0.830. The Cronbach's Alpha of the scale was 0.780, with a Kaiser-Meyer-Olkin (KMO) of 0.730 and Bartlett's test was – X2 = 2039.161 with a p < 0.001. This instrument is made up by seven factors that explain 60.8% of the total variance. The correlation of each item with the total scale varied from 0.13 to 0.56[25]. In 2020, in Croatia, a new transcultural validation showed a Cronbach's Alpha of 0.850[26].

As can be observed, there were many cross-cultural translations and variations of the CDMNS©. However, the psychometric properties of none of them were evaluated with Portuguese nursing students.

OBJECTIVES

To validate the measuring instrument Clinical Decision-Making in Nursing Scale©[6] for the evaluation of the DM of the Portuguese nursing students.

METHODS

Ethical aspects

For the development of this investigative research, an authorization request was elaborated to carry out the translation. It was followed by an adaption of the CDMNS© instrument to Portuguese[6]. This request was elaborated through an e-mail, which was responded by the family of the author, since she was deceased. The family gave permission to carry out the translation and the cultural validation of the instrument.

The project received a positive opinion from the Ethics Committee of the Unit of Investigation in Health Sciences, from the *Escola Superior de Enfermagem de Coimbra*, Portugal, and its application was approved by the directing bodies of two schools from the central region of Portugal.

After the study and its objectives were presented, the participants signed the Free and Informed Consent Form. The main principles of the Declaration of Helsinki were respected, namely, the confidentiality and anonymity of the data.

Design, period, and place of study

This is an observational methodological study, following the STROBE directives. It was carried out in February 2020 in two schools (one nursing school and one health school) in the Center Region of Portugal.

Population and sample

The participants were nursing students from two schools in the Center Region of the country. The inclusion criteria for the 496-participant sample allowed for nursing students with or without clinical simulation practices, including those who had clinical practices prior to the start of their licensing in nursing, with or without certified formation in Basic Life Support (BLS), regardless of experience with BLS in real situations.

Concerning sociodemographic and academic variables, the following were analyzed: age, sex, year of nursing licensing, clinical teaching practical experience, and practical experience considering health care before starting the nursing licensing course.

Study protocol

For the cultural validation of the CDMNS©, the international guidelines were respected[27-29]. To execute the first stage of this validation process, an authorization was requested to apply the CDMNS©[6], receiving a positive response from the family of the author. Later, the instrument had to be translated, which happened using the method of translation followed by retranslation[27-29], in three steps: at first, two bilingual people were selected to translate the scale into Portuguese; later, two others retranslated the Portuguese version into the original language of the scale; finally, the review commission, formed by five experts in the field of DM, compared the original version of the scale with the retranslated version in the second stage. In the submission of the scale to the revision committee, terminological doubts were clarified by the bilingual experts.

Before the submission of the document to the participants of the investigation, it was applied to a similar sample of the accessible population that included 15 nursing students who did not participate in the study. This aimed to evaluate whether the document provoked any linguistic or terminological doubts, and to analyze

the construction of the sentences. This stage was overcome successfully, without barriers to the interpretation of the items of the scale.

Analysis of results and statistics

The software Statistical Package for the Social Sciences (SPSS), version 26.0, was used for the treatment and analysis of the results found. Descriptive statistical measures were used to characterize sociodemographic and academic data. The validation of the Clinical Decision-Making Nursing Scale – Portuguese Version© (CDMNS-PT©) was based on a psychometric characterization, and it was necessary to test its fidelity and validity[30]. Therefore, to analyze the reliability of the CDMNS-PT©, the following premises were considered: Cronbach's Alpha of all items of each instrument and of the scale as a whole, after the exclusion of each item individually; through Cronbach's Alpha, it was possible to evaluate the internal consistency of the instrument, which can vary from 0 to 1, with higher values indicating a better internal consistency. A Cronbach's Alpha above 0.800 shows a good internal consistency, but values above 0.600 are acceptable, when there are scales with a low number of items[31].

To analyze the validity of the CDMNS-PT©, a confirmatory and exploratory factorial analysis was carried out. For the confirmatory factorial analysis, several indexes of global fitness of the factorial model were considered, which were: the ration of chi-squared (X2) and degrees of freedom (df), presented by the expression X2/df; the Goodness of Fit Index (GFI); Comparative Fit Index (CFI); the Root Mean Square Error of Approximation (RMSEA) index; the Root Mean Square Residual (RMR) index; and the Standardized Root Mean Square Residual (SRMR) index. The factorial model was found to have a good global fitness when: X2/df was below 3; GFI and CFI were above 0.900; and RMSEA, RMR, and SRMR are below 0.050, with values up to 0.100 considered to be acceptable[32]. The composite reliability (CR) and the mean variance extracted (MVE) were also analyzed as indicators of converging validity. The discriminating validity of the factors was analyzed according to the comparison between the MVEs and the square of their correlations. The multinormality of the variables was evaluated using the analysis of Asymmetry Coefficient, Kurtosis, and Mardia's Multivariate Coefficient[32].

RESULTS

This study counted on the participation of 496 nursing students: 428 were female, representing 86.3%; 387 students were in the 2nd year of their nursing course; and 287 had not yet carried out any practices in their clinical studies (Table 1). The nursing students were from 19 to 49 years old, with a mean age of 21 years old (20.89±3.79). The data shows that 64 participants had provided care before they started their licensing course (12.9%), due to their profession as firefighters or operational assistants.

Table 1 – Academic characterization of nursing students

Responses	Year of licensing			Clinical teaching		Health care practices	
	2nd year	3rd year	4th year	Yes	No	Yes	No
Number of students (n)	387	68	41	209	287	64	432
Percentage of students (%)	78	13.7	8.3	42.1	57.9	12.9	87.1

Psychometric characteristics of Clinical Decision-Making Nursing Scale – Portuguese Version©

The instrument CDMNS-PT©, similarly to the original document, at the moment it was applied to the nursing students, was made up by 40 items, each answered in an ordinal frequency scale that varied from 1 to 5 (1-Never; 2-Rarely; 3-Occasionally; 4-Frequently; and 5-Always).

Before its application, the CDMNS© was translated by two bilingual people into Portuguese, and then re-translated into the original language by two other translators. The few emerging doubts about the terminology were clarified with the aid of a third person, who specializes in DM. The revision committee, formed by experts in the same field, approved the Portuguese version, with terminology adjustments in the items 1, 6, 17, and 33 of the original instrument, which led to the replacement, respectively, of the following terms: "clinical judgment" was replaced by "clinical decision"; "alternative approach" by "aleatory approach"; "outcomes" by "consequences"; and "contexts" by "setting". The level of agreement of the committee regarding the final instrument was 90%. The submission of the instrument to the sample, which was similar to the accessible population, showed that there are no linguistic or terminology doubts about the items in the scale.

A psychometric study started with the determination of the statistics of each of the 40 items. To evaluate the fidelity of this scale, the Cronbach's Alpha of all items in the instrument was calculated, in addition to that of the scale as a whole, after the exclusion of each item, one by one. After many analyses, 17 items were excluded (items 1, 2, 4, 5, 6, 7, 12, 13, 15, 22, 23, 24, 28, 33, 36, 37 and 40), due to one or two reasons: Cronbach's Alpha above the global alpha, or Pearson's correlation below 0.200, indicating no statistical significance. The decisions were made based on the references provided by many authors[27,31]. The items of the original instrument were renumbered to form the Portuguese version, changing the CDMNS© into the CDMNS-PT© as follows (3-1; 8-2; 9-3; 10-4; 11-5; 14-6; 16-7; 17-8; 18-9; 19-10; 20-11;21-12; 25-13; 26-14;27-15; 29-16; 30-17; 31-18: 32-19; 34-20; 35-21; 38-22; 39-23).

Regarding the correlation coefficients, it was found that all the 23 items in the scale presented correlations above 0.200, with the exception of the item 23 (0.184), which has a slightly lower but still statistically significant value, considering the size of the sample.

With the analysis of the data presented in Table 2, the Cronbach's Alpha of the CDMNS-PT© was found to be 0.851, showing that the scale has a good internal consistency[31]. Analyzing the same data, it stands out that the CDMNS-PT©, after the exclusion of each item sequentially, has a Cronbach's Alpha that varies from 0.838 to 0.859, also showing that the instrument has good internal consistency. Some items with a Cronbach's Alpha above the global internal consistency were maintained due to the theoretical possibilities of interpreting these items.

Then, an exploratory factor analysis of the instrument was implemented, in order to analyze its validity. The adequacy of the factor analysis was performed using the KMO test (with reference values between 0.5 and 1), thus measuring the quality of the correlations between the variables and enabling the decision regarding the continuity of the analysis. In this work, the KMO result was 0.901, defined as adequate. Bartlett's test of sphericity was applied, testing the hypothesis that there is no correlation between the variables ($X2 = 3053.256$; $p = 0.000$) allowing the inference that the matrix of correlations is not an identity matrix. Thus, it is possible to affirm that there are some relationships between the variables that are expected to be included in the analysis. Then, with the 23 items, an exploratory factor analysis was developed, using the principal components method, with Varimax orthogonal rotation and latent roots greater than 1. Thus, three factors emerged (Table 3), which explained 42.096% of the total variability.

Table 2 – Descriptive statistics, Pearson's Correlation, and Cronbach's Alpha per item of the Clinical Decision-Making Nursing Scale – Portuguese Version©

Item description	M	SD	r Corrected	Cronbach's Alpha
1 The situational factors at the time of a clinical decision (...)	4.05	0.749	0.358	0.847
2 I go out of my way to get as much information as (...)	4.41	0.664	0.516	0.842
3 I assist patients/ clients in excising their rights to make (...)	4.50	0.679	0.565	0.841
4 When my values conflict with those (...)	3.88	0.895	0.376	0.846
5 I listen or consider expert advice or (...)	4.34	0.707	0.522	0.842
6 I consider the future welfare of the family of the (...)	4.23	0.795	0.488	0.842
7 I make a mental list of options before making (...)	3.97	0.834	0.421	0.845
8 When examining consequences of options I might (...)	4.18	0.716	0.567	0.840
9 I consider consequence before making a choice (...)	3.75	0.925	0.435	0.844
10 Consensus or agreement among my peer group is (...)	4.31	0.726	0.547	0.841
11 I include patients/ clients as sources of information.	4.38	0.745	0.559	0.840
12 I consider what my peers will say when (...)	4.04	0.775	0.433	0.844
13 My past experiences have little to do with (...)	3.94	1.073	0.245	0.853
14 When examining consequences of options I might (...)	4.21	0.704	0.570	0.841
15 I select options that I have used successfully in (...)	3.88	0.711	0.370	0.846
16 I write out a list of positive and negative consequences (...)	3.37	1.130	0.325	0.850
17 I do not ask my peers to suggest options for my (...)	4.10	0.974	0.330	0.848
18 My professional values are inconsistent with (...)	3.96	1.057	0.254	0.852
19 My finding of alternatives to help with my decision (...)	4.39	0.839	0.475	0.843
20 The risks of and benefits for the patient/ client, are the (...)	4.33	0.986	0.406	0.845
21 When I have a clinical decision to make (...)	3.93	0.857	0.453	0.843
22 Finding out about the patient/ client's objectives is a (...)	4.19	0.786	0.610	0.838
23 I examine the risks and benefits only for consequences (...)	3.78	1.283	0.184	0.859
CDMNS-PT©				0.851

M - mean; SD - standard deviation; r - corrected total item correlation; CDMNS-PT© – Clinical Decision-Making Nursing Scale - Portuguese Version©.

Table 3 – Exploratory factorial analysis of the Clinical Decision-Making Nursing Scale – Portuguese Version©

	Item description	Factor 1	Factor 2	Factor 3
1	The situational factors at the time of a clinical decision (...)	0.521		
3	I assist patients/clients in excising their rights to make (...)	0.547		
4	When my values conflict with those (...)	0.539		
5	I listen or consider expert advice or (...)	0.695		
6	I consider the future welfare of the family of the (...)	0.341		
10	Consensus or agreement among my peer group is (...)	0.614		
11	I include patients/ clients as sources of information.	0.539		
12	I consider what my peers will say when (...)	0.676		
14	When examining consequences of options I might (...)	0.442		
15	I select options that I have used successfully in (...)	0.522		
21	When I have a clinical decision to make (...)	0.400		
22	Finding out about the patient/ client's objectives is a (...)	0.456		
2	I go out of my way to get as much information as (...)		0.477	
7	I make a mental list of options before making (...)		0.690	
8	When examining consequences of options I might (...)		0.729	
9	I consider consequence before making a choice (...)		0.706	
16	I write out a list of positive and negative consequences (...)		0.639	
13	My past experiences have little to do with (...)			0.555
17	I do not ask my peers to suggest options for my (...)			0.516
18	My professional values are inconsistent with (...)			0.587
19	My finding of alternatives to help with my decision (...)			0.622
20	The risks of and benefits for the patient/ client, are the (...)			0.693
23	I examine the risks and benefits only for consequences (...)			0.636

Factor 1 was named Definition of the Problem and Development of the Objectives; it is made up by 12 items (CDMNS-PT© items 1, 3, 4, 5, 6, 10, 11, 12, 14, 15, 21, and 22), which explain 16.663%. Factor 2 is made up by five items (CDMNS-PT© items 2, 7, 8, 9, and 16), and was named Search and Data Processing. It explained 14.775%. Factor 3 is made up by 6 items (CDMNS-PT© items 13, 17, 18, 19, and 20), which explain 10.658%. It is called Evaluation of Alternatives, Planning, and Implementation of Action.

This factorial solution was equally tested using the confirmatory factorial analysis, and the initial model was refined according to the modification indexes proposed by the AMOS, correlating some mistakes. Through this procedure, the global adjustment became fit for global fitness indexes (Figure 1).

Using data found from the different global fitness indexes (Table 4), it can be shown that, among the index from the initial model, only the GFI and the CFI were problematic, with values that, despite being below 0.900, were acceptable. In this same initial model, the other modification indexes were found to be fit. Regarding the indexes of the second-round model, they are equal to those of the model with modification indexes.

The composite reliability (CR) is presented as adequate, with values above 0.700, except for Factor 3. The stratified CR was very high, at 0.911 (Table 5).

No discriminant validity was found between Factors 1 and 2, although it was found between Factors 1 and 3, and between Factors 2 and 3.
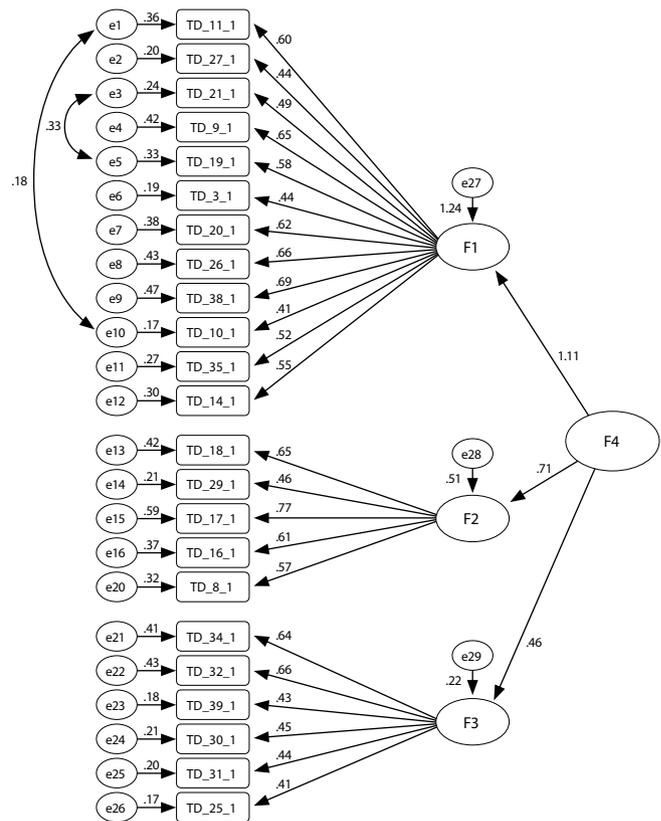

Figure 1 – Second-round model

Table 4 – Global fitness index

Model	X²/gl	GFI	CFI	RMSEA	RMR	SRMR
Initial model	2.403	0.895	0.858	0.053	0.046	0.057
Model with modification indexes	2.056	0.927	0.917	0.046	0.039	0.050
Final model	2.056	0.927	0.917	0.046	0.039	0.050

X^2/gl - chi-squared ratio per degrees of freedom; GFI – Goodness Fit Index; CFI – Comparative Fit Index; RMSEA – Root Mean Square Error of Approximation; RMR – Root Mean Square Residual; SRMR –Standardized Root Mean Square Residual.

Table 5 – Composite3 reliability and convergent/discriminant validity

Factors	CR	MEV	DISCRIMINANT VALIDITY		
			F1 vs. F2	F1 vs. F3	F2 vs. F3
Factor 1 – Definition of the Problem and Development of the Objectives	0.841	0.312	0.640		
Factor 2 – Search and Data Processing	0.751	0.383		0.270	
Factor 3 – Evaluation of Alternatives, Planning, and Implementation of Action	0.600	0.238			0.108
Global factor – CDMNS-PT©	0.911	0.315			

CR - composite reliability; MEV – mean extracted variance; F1 – Factor 1; F2 – Factor 2; F3 – Factor 3; CDMNS-PT© – Clinical Decision-Making Nursing Scale - Portuguese Version©.

The Cronbach's Alpha for each of the three CDMNS-PT© factors was 0.842, 0.722, and 0.666, respectively, for Factor 1, Factor 2, and Factor 3.

The mean DM value was no different in the nursing students who, up to the moment of the study, had not gone through any of the disciplines that included clinical teaching to be had (t = -0.727; p = 0.468).

After the validity of the instrument was determined, the CDMNS-PT© still had 23 items, with a score that could vary from 23 to 115, with a higher score indicating higher DM perception. The mean value of nursing students for DM is 94.13±9.64, that is, approximately 21 points from the highest possible CDMNS-PT© score (115), showing a good perception about DM.

In global terms, with regard to the three CDMNS-PT factors, Factor 1 - Definition of the Problem and Development of the Objectives had a weighted mean of 3.77±0.34; Factor 2 - Search and Data Processing, had a weighted mean of 3.94±0.59; and Factor 3 - Evaluation of Alternatives, Planning, and Implementation of Action, showed a weighted mean of 4.08±0.64. The CDMNS-PT© as a whole showed a weighted mean of 3.89±0.36.

DISCUSSION

As can be verified, in this study, which involved the participation of 496 nursing students, most (86.3%) were female. This number is in accordance with the reality of the nursing courses in Portugal, where 81.8% of students are women[33], also corroborating the data from the *Ordem dos Enfermeiros de Portugal* (the Portuguese Order of Nurses), which mentions 60,757 female nurses (82.2%)[34].

Regarding their age, nursing students were, on average, 21 years old, most of whom were in the 2nd year of the licensing course in nursing, being in the middle of their academic path. This proves the data found in Portugal, where 22 years old is the mean age of higher education students[35].

Regarding the clinical experience that resorts to clinical teaching, there was a heterogeneity in the sample, with percentages varying from 42.1% to 57.9% of nursing students who had or not clinical teaching, respectively. This data shows an asymmetry in the clinical experience and can be considered a limitation of this study.

Psychometric characteristics of Clinical Decision-Making Nursing Scale – Portuguese Version©

Considering the results displayed above, regarding the CDMNS-PT©, 17 items were eliminated from the original instrument, since they presented *r* values below 0.200, and Cronbach's Alpha values higher than those of the CDMNS-PT©, which would prejudice the internal consistency of the instrument[31].

According to the data obtained, the Cronbach's Alpha of the CDMNS-PT© was 0.851, showing that the instrument has good internal consistency and no items that prejudice this value[31]. Considering the analysis of the CDMNS©, the result from this study is slightly superior, but very close to the original 0.830 value, although the aforementioned items were eliminated[6]. Therefore, these two instruments are shown to have good internal consistency[31]. In the same vein, there are results from other studies that also attempted to validate this instrument across cultures, showing internal consistency values that varied from 0.780 to 0.850[22-23,25-26]. In this study, the scale had a lower number of items. It should be mentioned that, in the studies mentioned, the sample varied from 50 to 210 participants, while this work has a larger sample, with 496 nursing students[22,25].

Regarding the correlations carried out between the many items in the CDMNS-PT©, the minimal correlation value found was 0.184 (p > 0.05) in item 23, while the maximum value was 0.610, between the item 22 and the instrument as a whole, thus making it possible to state that the CDMNS-PT© has a good validity indicator[31]. These data are in accordance with those found by the original instrument, in which the values oscillated between 0.360 and 0.570[6]. In another study, there were values below those found here, with correlations varying from 0.130 to 0.560; however, its authors, considering possibilities of interpretation, the culture, and the values of the profession, decided to maintain such items in the instrument[25].

The use of the exploratory factorial analysis led to an instrument made up by three factors that, globally, explains 42.096% of the variance. This analysis is conditioned when compared to the CDMNS©, since , in this work, there was a confirmatory and exploratory factorial analysis, while the original study grouped items according to the criteria of the author, which were seen as subscales of the instrument[6].

The names of the CDMNS-PT© were Factor 1 - Definition of the Problem and Development of the Objectives; Factor 2 - Search and Data Processing; and Factor 3 - Evaluation of Alternatives, Planning, and Implementation of Action, and were chosen based on the stages of DM, as described by many authors. Namely: the identification and definition of the problem; the development of objectives[11]; the search for data/facts[8,11-13]; the development of a data processing model[11,13]; the evaluation of the alternatives and the selection of the best one/plan of action[8,11,13]; and the implementation of the decision/plan or planning of the course of action[4,11,13].

Regarding the indexes of the second-round model, they are equal to those of the model with modification indexes, showing values that are found to be acceptable and close to those described by other studies (X2/gl = 2.056; GFI = 0.927; CFI = 0.917; RMSEA = 0.046; RMR = 0.039; SRMR = 0.050)[25,32].

Considering the data found through the application of the CDMNS-PT©, nursing studies were found, globally, to have a good

perception of DM, with a mean score of 94 from a maximum of 115, which, despite being higher percentagewise, was very close to the results of the original scale, of 154 points in a maximum of 200[6]. This is true even if one considers that the number of items that make up the scales is different, and the fact that the weighted mean value for each CDMNS-PT© factor and for the global results were very close (between 3.77 and 4.08 for a total of 5).

Study limitations

One of the limitations of this study is in the non-probabilistic technique of sampling by convenience, which was implemented for data collection[3]. A second limitation is related to the selection of nursing students from only two higher education schools. In future studies, a different sample is suggested, made up by numerous schools that are located in different geographic areas of the country, and with a larger number of nursing students from the last year of the course, since these are the ones who finished most clinical teaching disciplines. In spite of the number of students involved in the study, another limitation is the asymmetry of clinical experience among nursing students. It has been found that a high percentage of participants had no classes with practical experience.

Contributions to the Field of Nursing

The cross-cultural validation of the CDMNS-PT© for Portuguese opens the door to investigate and create the process of DM in Portuguese nursing students, and to define strategies to improve it.

CONCLUSIONS

This study, whose main objective was to translate and validate the CDMNS© instrument[6] for Portuguese nursing students — CDMNS-PT© —, counted on the participation of 496 students, most of whom were female, with a mean age of 21 years old, and in the 2nd year of the course.

The cross-cultural validation of the CDMNS-PT© involved a process of translation and retranslation carried out by independent bilingual translators, nursing students that were not in the sample of the study, and experts in the field of DM.

The CDMNS-PT© was made up by 23 items and presented a Cronbach's Alpha of 0.851, indicating good internal consistency. It was made up by three factors: Factor 1 - Definition of the Problem and Development of the Objectives; Factor 2 - Search and Data Processing; and Factor 3 - Evaluation of Alternatives, Planning, and Implementation of Action. The names of the factors were chosen according to the stages of the DM process.

It could be shown that the CDMNS-PT© had an adequate validity and fidelity for the evaluation of the DM of Portuguese nursing students.

Suggestions for future studies include the use of this instrument (CDMNS-PT©) for the analysis, discussion, and implementation of new measures regarding the improvement of DM processes in Portuguese nursing students. Furthermore, this theme should be experimented upon, to diagnose the DM of Portuguese nursing students and refine it towards the development of better non-technical competences for the provision of nursing care.

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