Title: Translation and psychometric validation of the Spanish version of the Demand Control Support Questionnaire (DCSQ) for nursing professionals

Running title: Psychometric validation of the DCSQ

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CA, NE and AC were responsible for study conception and design. All authors were responsible for acquisition of data, analysis and interpretation of data. Also all authors have been involved in drafting the manuscript or revising it critically for important intellectual content and have made substantial contributions to this manuscript.

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TITLE: Translation and psychometric validation of the Spanish version of the Demand Control Support Questionnaire (DCSQ) for nursing professionals

ABSTRACT

Aim: To translate and psychometrically validate the Demand-Control-Support Questionnaire for nurses in Spain.

Background: Nurses are one of the groups most affected by work-related stress. The combination of high job demands and low control is identified as the main source of stress among nurses. The Demand-Control-Support Questionnaire is a valid and reliable tool for assessing psychosocial stress in the workplace.

Methods: A two-phase cross-sectional descriptive study. The instrument was translated according to Sousa and Rojjanasrirat guidelines, including forward and backward translations, consensus meetings, pilot testing and expert committee. Structural validity, convergent and discriminative validity, internal consistency and test-retest reliability were assessed in a sample of 247 nurses.

Results: Exploratory factor analysis verified a three-factor solution with good internal consistency (Cronbach α values ranged from 0.62 to 0.87) and test-retest reliability (Intraclass correlation coefficients ranged from 0.65 to 0.85).

Conclusions: The Spanish version of the Demand-Control-Support Questionnaire seems to be a brief, valid and reliable instrument to measure psychosocial stress in the workplace in nurses.

Implications for nursing management: The use of the Demand-Control-Support Questionnaire can be of value to inform the design and implementation of appropriate

management strategies to foster a more favorable work environment that promotes the wellbeing of professionals.

BACKGROUND

Previous studies have recognized the importance of job stress in the health professional context (Suni et al., 2017). Specifically, nurses are considered a particularly affected group, with a high prevalence of diseases and psychological disorders such as emotional exhaustion, anxiety and depression (Ghawadra et al., 2019). Moreover, the occupational stress of nurses is associated with lower job satisfaction (Shaheen et al., 2020), a higher turnover rate and a higher quitting rate (Burmeister, 2019).

Additionally, a high degree of stress is associated with a decrease in the quality of care and higher rates of safety transgressions (Sarafis et al., 2016). According to Teng et al. (2010), stress in the workplace can lead to a loss of compassion for patients and an increased incidence of errors in clinical practice; thus, it is negatively associated with the quality of care provided by nurses and, therefore, with the health outcomes of patients.

In the last 20 years, one of the most influential models for the study of the psychosocial work environment and its relationship to occupational health has been the Job-Demand-Control Model (JDC) proposed by Karasek (1979). This model states that the main sources of work stress come from two characteristics: psychological demands at work, including workload and time pressure; and control, the worker's margin of autonomy to make decisions and use his or her own capacities (Karasek, 1979). Based on the combination of both dimensions, the model hypothesizes that a work environment characterized by high control and low or moderate work demands is good for the health of the worker. By contrast, the combination of high demands and low levels of control can pose a significant risk to their health (Karasek & Theorell, 1990).

This model was expanded by Johnson and Hall (1988) to incorporated a third dimension, social support (JDCS Model). This dimension refers to the support the hierarchy provides, and can be considered a possible resource to cushion or moderate the stress generated by the combination of high demands and limited control at work. However, if social support is scarce, it is added as a new stressor to those already existing.

There are many occupational factors that have been identified as predictors of tension and stress in nursing staff. The literature describes the difficulty of nurses, in their clinical practice, to cope with pain, suffering and even death of patients as well as the lack of autonomy and ambiguity of their functions as occupational stress factors (Haslinda & Tyng, 2016). Furthermore, other relevant factors that may lead job stress are the professional's perception of poor support from their peers and supervisors (Ghanayem et al., 2020), the

work overload, associated with a high patient-to-nurse ratio and a lack of nursing personnel (Ghawadra et al., 2019).

In recent years, some instruments that evaluate work stress in nurses have been translated and adapted to the Spanish context. Among the most commonly used are the Nurse Stress Scale (NSS) and the Job Content Questionnaire (JCQ). The NSS aims to measure the frequency with which certain situations are perceived as stressful by hospital nurses (Escribà et al., 1999). The JCQ, based on the JDCS Model, evaluates psychosocial stress at work in a more comprehensive way through the variables of psychological demands and mental workload, decision latitude, social support, physical demands, and job insecurity (Escribà-Agüir, 2001). Although both questionnaires have been translated and validated in several languages, their extension makes its application impractical in many contexts.

In 1988, Theorell et al. (1988) developed a shorter version of the JCQ, the Swedish Demand-Control-Support Questionnaire (DCSQ), which comprises the variables of psychological demands, decision latitude, and social support. Therefore, the DCSQ is much shorter and easy to use in epidemiological studies compared to JCQ (Mauss et al., 2018), being an eligible instrument to be included in this study.

Although the DCSQ has been widely translated and validated in numerous languages and has proven to be valid and reliable for measuring psychosocial stress in nurses (Griep et al., 2009; Hökerberg et al., 2014), no translated and validated Spanish version exists so far. Given the importance of having valid and reliable instruments in the Spanish context to quickly and simply measure the occupational stressors that affect nursing professionals, we set the goal of translating the DCSQ into Spanish and determining its psychometric properties in a sample of nurses.

METHODS

Study design

A two-phase cross-sectional descriptive study was carried out. Phase I involved the forward and blind backward translations, consensus meetings, pilot testing and expert committee review to ensure content and face validity. Phase II consisted of administering of the translated questionnaire to a sample of nurses to analyze the psychometric properties. The STROBE checklist was followed to enhance methodological rigor (See Supplementary File 1).

Instruments

The DCSQ

The DCSQ, developed by Theorell et al. (1988), is a self-reporting measure with three subscales related to the three dimensions of the JDCS model: psychological demands, control and social support. It consists of 17 items, scored on a 4-point Likert-type scale ranging from 1="strongly disagree" to 4="strongly agree". Item 4 "sufficient time", and item 9 "repetitive work" are scored inversely. Higher scores on the subscales indicate greater psychological demands (range 5-20), greater control (range 6-24) and greater social support at work (range 6-24).

For this study, the translation of the instrument was carried out from an English version, recently validated by Mauss et al. (2018). Psychometric testing showed that this version, validated in 411 white-collar employees in the United States, presents satisfactory internal consistency with Cronbach's alpha coefficients of 0.78, 0.78 and 0.84 for the Demands, Control and Support subscales, respectively (Mauss et al., 2018).

Job satisfaction

Nurses' job satisfaction was measured using the scale adapted by Sigudardottir et al. (2015), which was used to assess the convergent validity of the DCSQ. This tool is made up of five items: i) "In general, I am very satisfied with my present job"; ii) "I can deal with complicated situations when they arise"; iii) "I would encourage a friend to apply for a job in my unit"; iv) "I trust my supervisor"; and v) "I often think about quitting the job". These are scored using a 4-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate greater job satisfaction. Cronbach's alpha for this sample was 0.76, which indicates that the scale has good internal consistency.

Phase I: Translation of the original scale into Spanish

Written permission was obtained from the authors, both in the Swedish and English versions, for the use of the instrument. The guide proposed by Sousa and Rojjanasrirat (2011) was used for the translation and transcultural adaptation of the instrument into Spanish, coinciding with the guidelines formulated by the World Health Organization (n.d.).

Translation of the DCSQ

First, two independent translations of the English version of the DCSQ were conducted by two bilingual people whose native language was Spanish. Next, a third translator compared the two translated versions, and both with the original scale to identify discrepancies in words, phrases or meanings. Subsequently, a committee composed of seven members - the three previous translators and four of the authors of this research - analyzed and discussed the ambiguities found and originated the preliminary version of the instrument in Spanish.

Second, two new bilingual translators independently performed a back-translation into English, giving rise to two back-translated versions. Then, a multidisciplinary committee composed of all the bilingual translators and the researchers compared the back-translated versions, and these, in turn, with the original version. This process resulted in the prefinal version of the instrument in Spanish (Figure 1).

Expert committee review

A panel of seven experts, two nurses from the academic field and five from clinical practice, were asked to evaluate the clarity and relevance of each item for measuring the construct on a 4-point Likert scale (1= not relevant/unclear to 4 = very relevant/clear). For those items rated 1 or 2, the experts were asked to propose an alternative expression.

Content validity was estimated through content validity indexes at the item level (I-CVI) (reference range ≥0.78) and at the scale level (S-CVI/ave) (reference range ≥0.90) (Polit et al., 2007).

Pilot testing

The Spanish version of the instrument was applied to a convenience sample consisting of 21 clinical nurses working at Clínica Universidad de Navarra, a hospital in the northern Spain, with the objective of evaluating comprehension of the items and the applicability of the adapted version (face validity).

First, the instrument was administered, noting the estimated time to complete it. Second, the comprehension and meaning of the items was evaluated using cognitive interview techniques. As a result, the final Spanish version of the DCSQ was obtained.

Phase II: Psychometric evaluation

Sample

The study was carried out in a convenience sample of clinical nurses working at Clínica Universidad de Navarra, Spain. The sample size was calculated following the recommendations of at least 10 cases per item, with a minimum of 200 cases for factor analysis (Polit & Yang, 2016). A target sample of 293 nurses was surveyed, anticipating a minimum response rate of approximately 60%. The inclusion criteria were i) working at the time of the study, ii) being fluent in the Spanish language, and iii) having been working in the current service for a minimum of three months, thus ensuring participants would have had a minimum time of exposure to work stressors.

Data collection

Data collection was conducted between March and May 2019. For access to the sample, meetings were held with the supervisors of each unit to explain the purpose of the

study and request their collaboration to recruit the sample. Subsequently, information sessions were organized in the different units of the hospital where potential participants were invited to participate.

In these sessions, the principal investigator explained the study and the confidential nature of the data. The printed questionnaires were distributed to participants in closed envelopes and returned to the investigator after completion. The participants individually completed the Spanish version of the DCSQ, the job satisfaction scale and a sociodemographic questionnaire.

Data analysis

Descriptive statistical analyses were performed to analyze the demographic characteristics of the nurses.

Data quality and acceptability was calculated on the basis of the proportion of computable data (limit for missing data <10%), floor and ceiling effects (both <15%), closeness of means to medians, and skewness values (from −1 to +1).

Exploratory Factor Analysis (EFA) was conducted using a Principal Component Analysis with varimax rotation to investigate the structural validity: whether the variables (items) of the Spanish version of the DCSQ were synthesizing the same factors as the original DCSQ version. The criteria for factor extraction and item retention were: i) eigenvalue >1, ii) percentage of total variance explained by the original data (>50%), and iii) factor loadings ≥0.45 (Kaiser, 1974). Further, for the internal validity study, the correlations between the three subscales were evaluated using the Pearson coefficient (criterion r =0.30-0.70).

Convergent validity was examined using Pearson coefficient between the subscales of the DCSQ and the scale of job satisfaction. The hypotheses tested were: 1) a greater control and/or social support at work is associated with greater job satisfaction; and 2) high psychological demands are associated with lees job satisfaction (Cortese et al., 2010)

For discriminative validity, ANOVA was used to determine whether there were significant differences in the subscales by differentiating the groups according to academic background and working place.

Internal consistency was estimated using Cronbach's α (criterion >0.70). Also, the corrected item-total correlation (criterion r ≥0.30) and the homogeneity coefficient (criterion >0.30) were calculated (Schmitt, 1996).

Test-retest reliability was examined by computing the weighted kappa coefficient (r >0.60) and the ICC (criterion >0.7) (Polit & Yang, 2016) to test the stability of the measure

over time. For this examination, a sample of 51 participants completed the questionnaire a second time, 10-15 days after the first administration.

SPSS Version 22.0 and STATA Version 14.0 were used to analyze the data. Listwise deletion was used for dealing with missing values leaving only complete cases.

Ethical considerations

The study was approved by the Clinical Research Ethics Committee of the University of Navarra (Reference 2018.086). The method of dissociation of the data was numerical coding, preventing persons outside the study from identifying the participant. Participants voluntarily agreed to participate and signed their written informed consent prior to the completion of the questionnaires.

RESULTS

Phase I

Content validity

The S-CVI/Ave was excellent both for relevance and clarity, with values of 0.98 and 0.96, respectively (see Table 1).

Following the experts' suggestions, modifications were made to those items with lower I-CVI for the clarity characteristic. Thus, in item 9 "I have to do the same thing over and over again" (I-CVI=0.86), the word *monotonous* was added in parentheses to improve its understanding and avoid divergent interpretations; while in item 5 "My work often involves contradictory requirements" (I-CVI= 0.71), the term *requirements* was substituted to *demands*.

Face Validity

The time to complete the questionnaire was between 5-7 minutes. Nine participants emphasized that it was a clear and concise instrument, and five participants said that it was a short, simple and easily administered questionnaire. All nurses indicated that they perfectly understood the instructions and the meaning of the items, with the exception of five who indicated difficulty with understanding item 5. All professionals agreed with the items comprising the questionnaire and did not suggest adding new items.

Phase II

Sample analysis

A total of 263 nurses completed the Spanish version of the DCSQ (89.7%). However, the responses of 16 (5.4%) were excluded because the questionnaires were incomplete. Finally, responses from 247 nurses (84.3%) were included.

All participants were women, with a mean age of 40.84 years. Most of the participants (79.85%) had a permanent employment contract, and their mean duration in the current position was 12.55 years (See Table 2).

Item analysis

Descriptive statistics are reported in Table 1. Missing data was less than 5%, and no subscale presented floor or ceiling effects. The mean and median of the subscales were close, and all values remained within the accepted range of skewness, indicating that the data approached a normal distribution.

Structural validity

EFA suggested a 3-factor solution, which explained 50.52% of the total variance. All items showed factor loads >0.4, except item 9 (0.245). However, this item was retained for its theoretical value and for its importance in measuring the construct. The correlation between the subscales ranged from -0.058 (Demands with Control subscales) to 0.306 ($p<0.001$) (Control and the Support subscales) (See Table 3).

Convergent validity

The correlation of the job satisfaction scale was positive with the Control ($r=0.286$, $p<0.001$), and Support subscale ($r=0.510$, $p<0.001$). However, the correlation with the Demands subscale was low and negative (r -0.259, $p<0.001$) (See Table 3).

Discriminative validity

In relation to the academic background, the results show that nurses with Master's degree scored higher on the Control subscale ($p<0.001$). Whit respect to the work unit, nurses working in special services scored higher on the Control subscale ($p<0.001$), while nurses working in hospitalization scored higher on the Social Support subscale ($p=0.028$) (See table 4).

Reliability

In general internal consistency of the subscales was adequate, ranging the Cronbach's alpha coefficient from 0.62 to 0.87. All item-total correlations were >0.30, except for item 9 (0.168).

Regarding the test-retest reliability, the ICC for the subscales ranged from 0.65 to 0.85, indicating that the stability of the questionnaire was acceptable (See Table 5).

DISCUSSION

This study presents the translation and validation of the DCSQ to the Spanish context, providing empirical evidence of its psychometric properties after being administered to a sample of nurses in a hospital setting.

The content validity of the Spanish version of the questionnaire was excellent for the two characteristics, relevance and clarity. In addition, both the panel of experts and the pilot study confirmed the adequate feasibility of the questionnaire, considering that all the items were relevant, comprehensible and suitable for use by nurses.

Likewise, it can be affirmed that this is an acceptable and viable questionnaire, since the low proportion of missing data and the high response rate showed the suitability of the scale for the target population.

The validity of the internal structure of the items was based on principal component analysis, giving rise to a solution of three factors that represent the three dimensions of the JDCS model. Additionally, all the items showed a high factor loading (> 0.4), without cross-loading, with the exception of item 9. This item was also identified as a problematic item among nurses in a previous study validating the questionnaire (Griep et al., 2009). Those same authors indicated two possible explanations for this fact: i) erroneous reading of the item, since it is a reverse item or ii) poor fit of the item to the theoretical construction of the Control subscale given that, repetitious tasks do not necessarily mean that nurses lack control or that their skills are inadequately used. Therefore, in future studies Confirmatory Factor Analysis should be conducted to confirm the factor structure identified. Also, factorial validity should be further examined in occupations other than nursing among Spanish employees.

For internal validity, the results of Pearson's correlation test showed that the Support subscale was negative and significantly correlated with the Demands subscale and positively and moderately with the Control subscale. Furthermore, the correlation between the Demands and Control subscales was negative, although not significant. Similar results were also reported in the study carried out by van Doorn et al. (2016), who found a significant negative relationship between social support and psychological demands, indicating that higher levels of social support are associated with lower levels of psychological demands among professionals. Therefore, in order to decrease the nurse's job-stress it is important to invest in the implementation of management strategies focusing on increasing social support at work, and nurses' job control over their work and decreases the psychological demands

In relation to convergent validity, the correlation between the psychological demands and the job satisfaction scale was negative and significant, which indicates that with higher psychological demands, job satisfaction will be lower. Similar results were shown in a previous study (Ghawadra et al., 2019), corroborating the existence of an inverse relationship between job satisfaction and stress. In contrast, the satisfaction scale score correlated

positively and weakly with the Control subscale and moderately with the Support subscale; namely, greater support from superiors or peers will increase job satisfaction. In this sense, various authors consider social support as a preventive factor that can reduce the stressors in the demand-job strain relationship and therefore, diminish the burnout and dissatisfaction, and protect staff against psychological overload (Ghanayem et al., 2020; van Doorn et al., 2016).

Regarding discriminative validity, statistically significant differences were found based on academic background, with nurses with Master's degrees obtaining the highest score on the Control subscale. This outcome could be explained by the fact that nurses who have completed a Master's degree have acquired a set of competencies that give them a sense of greater control and decision-making capacity in their clinical practice, as well as greater use of their skills. In this sense, several studies indicate that nurses with higher educational levels have better work abilities than their colleagues with lower educational levels (Skela-Savič et al. 2020; Svavarsdottir et al., 2018; van Doorn et al., 2016). Similarly, the theoretical foundations of the JDCS model indicate that control over the work process can be facilitated through greater learning (Karasek & Theorell, 1990).

The type of unit in which the professional works was also associated with control and social support at work. On the one hand, nurses who work in hospitalization service perceived greater social support from their peers and supervisors than nurses from other departments. This perception could be because nurses who work in hospitalization services generally spend more time with their colleagues and maintain greater communication when making decisions than those who work in departments such as emergency departments or intensive care units (Amarneh et al., 2010). On the other hand, nurses who work in emergency departments or intensive care units perceive greater control at work; namely, they have greater skill discretion and decision authority. This finding is consistent with the study conducted by Adriaenssens et al. (2011), which showed that nurses working in emergency services perceived greater skill discretion, indicating that emergency departments are not only stressful work environments but also challenging and certainly require more advanced skills and nursing knowledge. Therefore, future research should take into consideration the characteristics of different health contexts in the design of interventions focused to reduce the predisposing factors of job-stress among nurses.

Reliability was adequate in relation to internal consistency. The highest value of the Cronbach's alpha was obtained in the Support subscale, whereas the Control subscale obtained the lowest. It is possible that the internal consistency of this subscale was affected

by item 9, which was also identified in the EFA as a problematic item and had an item-total correlation coefficient below the 0.3 limit (Schmitt, 1996). However, the values of Cronbach's alpha found in the Spanish version were similar to those described for the original scale (Mauss et al., 2018). Hence, translation of the questionnaire into Spanish itself did not contribute to lower internal consistency. These results are in agreement with those of Sanne et al. (2005), who argued that the Control subscale is made up of the combination of two theoretically distinct constructs: "skill discretion" and "authority decision". Therefore, this subscale varies much more between the different occupational groups than the Demands and Support subscales, which to a greater extent reflect the local working conditions and individual perception. This variability can result in a low internal consistency for this factor in the analysis of different occupational groups (Sanne et al., 2005).

Finally, the analysis of test-retest reliability indicated adequate temporal stability, such that the Spanish version of the DCSQ has the capacity to produce a similar score when administered under the same conditions to the same participants at different times. This result provides evidence on the potential of the instrument to study the effectiveness of interventions aimed at reducing stressful psychosocial factors and promoting more favorable work environments.

LIMITATIONS

There is the possibility of selection bias, since participation was voluntary and the sampling protocol was non-probabilistic, which could limit data generalization. However, the high participation rate and the use of explicit eligibility criteria allow adequate identification and description of the sample and reproducibility of the results.

Additionally, the use of a self-assessment questionnaire could generate a social desirability response bias. Nevertheless, we believe that the data obtained are close to the real data, with an adequate distribution of responses and a high number of participants, which reinforces the value of the findings and provides more stable results.

CONCLUSIONS

This study has demonstrated that the Spanish version of the DCSQ is a valid and reliable instrument with satisfactory properties to measure psychosocial stress in the workplace in nurses. Having this questionnaire in the Spanish context can be key to measuring occupational stressors in a brief and easy way and implement interventions aimed at promoting the well-being of nurses. Future studies that assess the psychometric properties of the instrument in other populations and contexts to expand its use and make comparisons between the different occupational groups are necessary.

IMPLICATIONS FOR NURSING MANAGEMENT

This study provides Spanish nurse managers with a new questionnaire to assess occupational stressors in the nursing context. Specifically, the DCSQ can be useful to assess the work-related stressors of different health settings and inform the design and implementation of management strategies adapted to the needs of each context. In addition, this study reinforces the importance of invest in the implementation of management strategies focusing on increasing social support at work and job control of the nurses in order to decrease psychological demands and foster more favorable work environments that promotes professionals' well-being.

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Table 1. *Acceptability data of the Spanish version of the DCSQ*

Items	Missing %	Range (min-max)	Mean (SD)	Median	% floor	% ceilling	Skewness
Psychological demands	**4.6**	**5-20**	**13.69 (2.5)**	**14.00**	**0.4**	**1.2**	**-0.058**
1. work fast	1.5	1-4	2.82 (0.8)	3.00	5.4	17.0	-0.382
2. work intensively	1.5	1-4	2.97 (0.7)	3.00	2.3	19.3	-0.417
3. work effort	2.7	1-4	2.51 (0.7)	2.00	5.1	6.3	0.079
4. overtime work	1.5	1-4	2.79 (0.7)	3.00	1.5	11.2	-0.097
5. conflicting demands	3.4	1-4	2.65 (0.7)	3.00	3.9	7.5	-0.196
Control -Decision latitude	**2.7**	**7-24**	**18.65 (2.1)**	**19.00**	**1.2**	**1.2**	**-0.061**
6. learning new things	1.5	1-4	3.58 (0.57)	4.00	0.4	60.6	-0.981
7. skill level	2.3	2-4	3.32 (0.6)	3.00	4.3	36.2	-0.020
8. being creative	2.3	1-4	3.13 (0.7)	3.00	0.8	28.0	-0.310
9. repetitive work	1.5	1-4	3.04 (0.7)	3.00	2.3	20.8	-0.546
10. how to do the work	1.5	1-4	2.95 (0.6)	3.00	0.8	13.1	-0.250
11. what to do at work	1.5	1-4	2.63 (0.7)	3.00	3.1	6.9	-0.079
Social support at work	**3.0**	**8-24**	**19.63 (2.8)**	**19.00**	**0.4**	**12.9**	**-0.042**
12. pleasant atmosphere	1.9	1-4	3.02 (0.6)	3.00	1.9	20.2	-0.455
13. spirit of unity	1.9	1-4	3.12 (0.7)	3.00	1.2	28.7	-0.378
14. colleagues support	2.3	1-4	3.35 (0.6)	3.00	0.4	41.2	-0.450
15. helpful colleagues	2.3	1-4	3.22 (0.6)	3.00	0.8	30.0	-0.322
16. relationship with superiors	1.9	2-4	3.41 (0.6)	3.00	3.5	44.2	-0.233
17. relationship with colleagues	1.5	2-4	3.49 (0.5)	3.00	1.2	49.8	-0.191

Note. SD = standard deviation

Table 2. *Participants' demographic characteristics (N=247)*

Characteristics	Respondents
Age, *m* (SD)	40.48 (10.8)
Gender	
Female, *n* (%)	247 (100.0)
Highest qualification	
Diplomate, *n* (%)	127 (51.4)
Graduate, *n* (%)	85 (34.4)
Master program, *n* (%)	35 (14.2)
Job Training	
Specialization, *n* (%)	223 (90.3)
Expert, *n* (%)	51 (20.6)
Specialization and Expert, *n* (%)	47 (19.0)
Workplace	
Hospitalization plant, *n* (%)	96 (38.9)
Consultation room, *n* (%)	53 (21.5)
Other, *n* (%)	98 (39.7)
Years since graduation as RN, *m* (SD)	18.47 (10.8)
Working department	
Medical department, *n* (%)	112 (45.3)
Critical care, *n* (%)	67 (27.1)
Other, *n* (%)	68 (27.5)
Years of employment in the current service, *m* (SD)	12.55 (10.7)
Employment status	
Temporary staff, *n* (%)	46 (18.6)
Permanent staff, *n* (%)	194 (78.5)
Other, *n* (%)	7 (2.8)

Note. *m* = mean; SD = standard deviation; RN = registered nurse

Table 3. *Construct validity by exploratory factor analysis of the Spanish version of the DCSQ and correlations between factors*

	Factors		
Items	1	2	3
Psychological demands			
1. I have to work very fast (work fast)	-0.031	**0.795**	0.040
2. I have to work very intensively (work intensively)	-0.009	**0.814**	0.131
3. My work requires too much effort (work effort)	-0.065	**0.744**	-0.013
4. I have enough time to do everything (overtime work)	-0.047	**0.664**	-0.111
5. My work often involves conflicting demands (conflicting demands)	-0.176	**0.460**	-0.182
Control -Decision latitude			
Skill discretion			
6. I have the possibility of learning new things through my work (learning new things)	0.066	0.016	**0.571**
7. My work requires a high level of skill or expertise (skill level)	0.110	0.168	**0.642**
8. My work requires ingenuity and creativity (being creative)	0.167	0.180	**0.601**
9. I have to do the same thing over and over again (repetitive work)	0.083	-0.102	0.245
Decision authority			
10. I have a choice in deciding how I do my work (how to do the work)	0.078	-0.142	**0.720**
11. I have a choice in deciding what I do at work (what to do at work)	0.005	-0.184	**0.597**
Social support at work			
12. There is a calm and pleasant atmosphere where I work (pleasant atmosphere)	**0.718**	-0.306	-0.023
13. There is a good spirit of unity (spirit of unit)	**0.802**	-0.181	0.068
14. My colleagues are there for me (support me) (colleagues support)	**0.826**	-0.029	0.140
15. People understand that I can have a bad day (helpful colleagues)	**0.755**	0.019	0.033
16. I get on well with my superiors (relationship with superiors)	**0.724**	-0.001	0.266
17. I get on well with my colleagues (relationship with colleagues)	**0.746**	0.014	0.232
Eigenvalues	4.186	2.622	1.780
% of variance explained (total = 50.52%)	24.62	15.43	10.47
2	-0.200*		
3	0.306*	-0.059	
Job satisfaction	0.510*	-0.259*	0.286*

Note. Factor loadings with an absolute value >0.400 are displayed in bold; KMO = 0.769; Bartlett's test = 1411.250; p<0.001.

* p< 0.001

Table 4. *Contrasted group comparisons by academic training and working department*

		n	Mean (SD)	p
Academic Training				
Psychological demands	Diplomate	127	13.57 (2.620)	0.679
	Graduate	85	13.78 (2.201)	
	Master program	35	13.94 (2.634)	
Control	Diplomate	127	18.31 (2.100)	<0.001
	Graduate	85	18.82 (1.995)	
	Master program	35	19.74 (2.105)	
Social support	Diplomate	127	19.53 (2.897)	0.771
	Graduate	85	19.59 (2.804)	
	Master program	35	19.91 (2.513)	
Working department				
Psychological demands	Medical department	112	13.59 (2.440)	0.590
	Critical care	67	13.60 (1.915)	
	Other	68	13.96 (3.000)	
Control	Medical department	112	18.86 (1.963)	<0.001
	Critical care	67	19.19 (2.002)	
	Other	68	17.93 (2.275)	
Social support	Medical department	112	20.13 (2.589)	0.028
	Critical care	67	19.19 (2.888)	
	Other	68	19.15 (2.959)	

Note. SD = standard deviation

Table 5. *Reliability analysis of the Spanish version of the DCSQ for nursing professionals*

Item number	Item-total correlation	Cronbach's α if item deleted	Cronbach's α	Homogeneity index	Agreement (%)	kappaW	ICC
Psychological demands			0.76	0.38			0.65
1. work fast	0.613	0.676			95.69	0.66	
2. work intensively	0.650	0.666			95.46	0.53	
3. work effort	0.578	0.692			93.75	0.33	
4. overtime work	0.484	0.725			95.01	0.49	
5. conflicting demands	0.308	0.783			95.78	0.55	
Control -Decision latitude			0.62	0.22			0.69
6. learning new things	0.347	0.577			94.50	0.59	
7. skill level	0.446	0.541			94.50	0.57	
8. being creative	0.402	0.553			93.00	0.56	
9. repetitive work	0.168	0.649			94.50	0.70	
10. how to do the work	0.467	0.530			93.00	0.53	
11. what to do at work	0.318	0.590			96.89	0.67	
Social support at work			0.87	0.52			0.85
12. pleasant atmosphere	0.628	0.853			96.37	0.63	
13. spirit of unity	0.720	0.836			96.22	0.64	
14. colleagues support	0.746	0.831			96.50	0.80	
15. helpful colleagues	0.622	0.853			98.00	0.72	
16. relationship with superiors	0.639	0.850			97.00	0.80	
17. relationship with colleagues	0.651	0.849			95.50	0.71	

Note. ICC = Intraclass Correlation Coefficient

Stage 1: Forward translation English -> Spanish

Step 1:
Forward-translated version 1(TL1)
Forward-translated version 2 (TL2)

Step 2:
A third translator reviews translations TL1 and TL2 and summarizes differences

Step 3:
Comparison TL1 and TL2 by experts committee and originate the preliminary initial translated version (Synthesis I)

Stage 2: Blind Back-translation Spanish (Synthesis I)-> English

Step 1:
Back-translated version 1(B-TL1)
Back-translated version 2 (B-TL2)

Step 2:
Comparison of B-TL1 and B-TL2 by a multidisciplinary committee to originate the second translated version in Spanish (Synthesis II)

Expert panel

Pilot testing: 21 nursing professionals

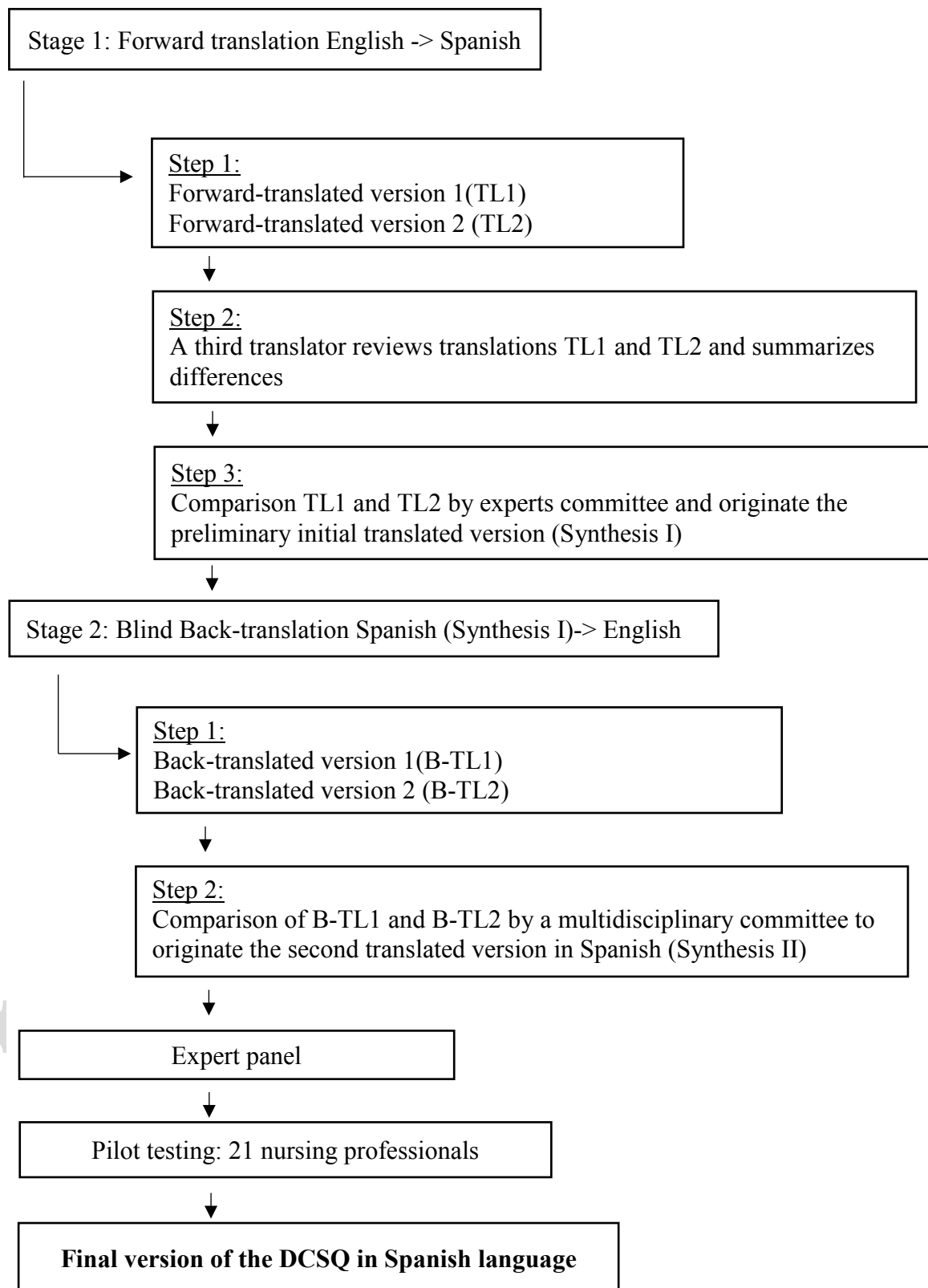**Final version of the DCSQ in Spanish language**

Figure 1. *The linguistic and cultural adaptation process of the Spanish version of the Demand-Control-Support Questionnaire (DCSQ)*