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# Cross-cultural adaptation, validity and psychometric properties of the Spanish version of the dental satisfaction questionnaire

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***Introduction:*** No dental patient satisfaction questionnaires have been validated in Spain. ***Objective:*** To validate in Spain a translated version of the Dental Satisfaction Questionnaire. ***Methods:*** A consecutive sample of 217 patients attending the dental clinic of the University of Valencia was selected. The internal consistency of the questionnaire was analysed using Cronbach´s alpha and the internal structure using principal components analysis. Its reproducibility was tested both by using the test-retest method with 31 patients randomly selected from the sample and by analysis using the absolute agreement intraclass correlation coefficient. ***Results:*** Cronbach´s alpha for the questionnaire was 0.56. Seven principal components explain 60% of the variance. Test-retest obtained an intraclass correlation coefficient of 0.92 and the subscales obtained values higher than 0.7. ***Discussion:*** The internal consistency of the scale is acceptable. The internal consistency of the pain management subscale is higher than that of the others. The original structure of five subscales is partially confirmed in our version because of quality and access subscales. The reproducibility is very good. Some items of Dental Satisfaction Questionnaire that show low consistency measure expectations that would have little effect on satisfaction scores. ***Conclusions:*** The Dental Satisfaction Questionnaire in Spanish can be considered an instrument for studying patient satisfaction in Spain as it has proved viable, has acceptable internal consistency and excellent reproducibility and covers different dimensions of the concept of satisfaction, such as pain management, accessibility, quality, availability/convenience and cost.

**Key words:** *patient satisfaction, questionnaire, validation*

## Introduction

Patient satisfaction is measurable and various instruments, including patient satisfaction questionnaires, are available for this purpose. Patients typically score items closely associated with aspects of patient satisfaction and these scores can be analysed not only to quantify satisfaction but to assess the validity and reliability of the instrument. A review of the literature identified five generic dimensions of patient satisfaction with dental care: technical competence, interpersonal factors, convenience, costs and facilities (Mussard *et al*. 2008; Newsome and Wright 1999).

Many dental patient satisfaction questionnaires have been published but only two have been validated for languages other than their original language: the Dental Visit Satisfaction Scale (DVSS; Hakeberg *et al*., 2000; Stouthard *et al*., 1992) and the Dental Satisfaction Questionnaire (DSQ, Davies and Ware, 1982; Golletz *et al.*, 1995; Milgrom *et al*., 2008; Skaret *et al*., 2004). The DSQ, devised by Davies and Ware (1982), collects information on a greater number of dental satisfaction related factors than the DVSS. The DSQ has 19 items rated on a Likert-type scale with response categories: 1, agree completely; 2, agree; 3, undecided; 4, disagree; and 5, disagree completely (Table 1). Items 1, 3, 4, 5, 8, 11, 13 and 17 are reverse scored. The overall dental satisfaction index is obtained by summing the 19 items ratings and so ranges from 19 to 95. The DSQ has five subscales: quality (items 2, 6, 11, 14, 16, 17 & 18), pain management (4, 8 & 19), access (5, 13 & 15), cost (3 & 10) and availability/convenience (7 & 9).

Although some studies of oral health related quality of life have been conducted in Spain (Cortés *et al.,* 2010; Montero *et al*., 2008; 2009) and some on patient satisfaction with the dental care received (Balaguer *et al*., 2011; Escribano- Hernández *et al*., 2012; González-Lemonier *et al*., 2010; Llena *et al*., 2011; López *et al*., 2002; Peñarrocha *et al*., 2007), no study of satisfaction with dental care has been carried out with a validated questionnaire. Consequently, the aim of this study was to adapt the DSQ for use in Spain, validate the adaptation and describe its psychometric properties.

## Methods

The questionnaire was translated into Castilian Spanish in the following sequence: two translators each translated it independently and then agreed on a consensus version, which was back-translated into English by a third independent translator. The Spanish translation of the DSQ (Table 1) was trialled in a sample of 20 people to detect any difficulties in its interpretation. This trial confirmed its viability so no change was made in this qualitative phase of development.

The study was then conducted with a sample of consecutive patients attending for the initial visits service at the Dental Clinic of the University of Valencia's Faculty of Medicine and Dentistry during the 2009/10 and 2010/11 academic years. Patients aged over 14 years

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**Table 1.** Spanish and English versions of the Dental Satisfaction Questionnaire's items

| *Item* | *Wording in* English *and (Spanish)* |
|---|---|
| 1 | There are things about the dental care I receive that could be better<br>*(Hay aspectos del tratamiento dental que recibo que podrían mejorarse)* |
| 2 | Dentists are very careful to check everything when examining their patients<br>*(Los dentistas muestran un cuidado especial cuando examinan a sus pacientes)* |
| 3 | The fees dentists charge are too high<br>*(Los dentistas cobran precios demasiado elevados)* |
| 4 | Sometimes I avoid going to the dentist because it is so painful<br>*(Algunas veces evito ir al dentista porque hacen mucho daño)* |
| 5 | People are usually kept waiting a long time when they are at dentist´s office<br>*(Normalmente los pacientes tienen que esperar mucho tiempo en la clínica dental)* |
| 6 | Dentists always treat their patients with respect<br>*(Los dentistas siempre tratan a sus pacientes con respeto)* |
| 7 | There are enough dentists around here<br>*(Hay suficientes dentistas en mi zona)* |
| 8 | Dentist should do more to reduce pain<br>*(Los dentistas deberían hacer más para reducir el dolor)* |
| 9 | Places where you can get dental care are very conveniently located<br>*(Las consultas de los dentistas están en lugares a los que es muy fácil llegar)* |
| 10 | Dentist always avoid unnecessary patient expenses<br>*(Los dentistas siempre evitan a sus pacientes gastos innecesarios)* |
| 11 | Dentists aren´t as thorough as they should be<br>*(Los dentistas no son tan exhaustivos a la hora de examinar a sus pacientes como deberían)* |
| 12 | I see the same dentist just about every time I go for dental care<br>*(Me atiende el mismo dentista casi siempre que necesito tratamiento dental)* |
| 13 | It´s hard to get a dental appointment for dental care right away<br>*(Es difícil conseguir una consulta con el dentista de forma inmediata)* |
| 14 | Dentists are able to relieve or cure most dental problems that people have<br>*(Los dentistas son capaces de aliviar o curar la mayoría de problemas dentales que los pacientes le puedan presentar)* |
| 15 | Office hours when you can get dental care are good for most people<br>*(El horario de atención de los dentistas es conveniente para la mayoría de la gente)* |
| 16 | Dentists usually explain what they are going to do and how much it will cost before they begin treatment<br>*(Los dentistas suelen explicar en qué consistirá el tratamiento y su coste antes de iniciarlo)* |
| 17 | Dentists should do more to keep people from having problems with their teeth<br>*(Los dentistas deberían hacer más para evitar que las personas tengan problemas dentales)* |
| 18 | Dentists' offices are very modern and up to date<br>*(Las consultas de los dentistas son muy modernas y disponen de las últimas tecnologías)* |
| 19 | I am not concerned about feeling pain when I go for dental care<br>(*No tengo miedo a sentir dolor cuando voy al dentista)* |

Note: The five response categories are: 1, agree completely (completamente de acuerdo); 2, agree (algo de acuerdo); 3, undecided (dudoso); 4, disagree (algo en desacuerdo); and, 5, disagree completely (completamente en desacuerdo). Items 1, 3, 4, 5, 8, 11, 13 and 17 are reverse scored.

were included in the study following the same criteria as Davies and Ware (1982); those who were being treated or had previously been treated at this clinic were excluded. Also excluded as incomplete were questionnaires where fewer than 75% of the questions had been answered. The study was approved by the University of Valencia's Ethics Committee and there were no financial incentives to participate.

In the waiting room, patients signed an informed consent form that explained the study's objectives. They next self-completed the Spanish version of the DSQ and were then examined by a dentist who recorded their oral health status as defined by the DMFT, the care index %F/DMFT and the Community Periodontal Index, the last determined by examining six specified index teeth (Cutress *et al*., 1988). Socio-demographic data were also gathered: age, gender, residence (semi-urban/urban), living arrangements (living alone / with a partner / with others), education (no schooling / primary / secondary / vocational training / university) and frequency of dental visits (none / fewer than once a year / once a year / more than once a year).

In this study *agree completely* responses were rated high, 5, and *disagree completely*, low, 1, with these ratings being 1 and 5 for reverse scored items. This gave an overall dental satisfaction index with higher scores

indicating greater satisfaction. The internal consistency of the questionnaire was assessed by Cronbach´s alpha and corrected item-total correlations. The internal structure was assessed by Principal Components Analysis with varimax rotation solution. The reproducibility of the scale was assessed by test-retest reliability, measured in 31 of the 217 patients selected at random for repeat application of the questionnaire by telephone two days after they had first completed the questionnaire but before their first treatment session, to avoid treatment in the clinic changing their perception of satisfaction. Reliability was analysed by intraclass correlations coefficient for absolute agreement. The criterion validity of the instrument was analysed using responses disagree or strongly disagree for item 1 (There are things about the dental care I receive that could be better) as the gold standard of satisfaction as suggested by Davies and Ware (1982). Statistical analyses were performed using SPSS v19.0 software.

## Results

Of 250 patients asked, 14 refused to participate and following the exclusion of 19 incomplete questionnaires, 217 were available for psychometric analysis, from 87% of the 250 patients approached. The mean age of the sample was 48.3 years (range 18-84) with women being slightly older than the men (mean 49.1 vs 46.3 years). There were twice as many women as men (67% vs 33%). Socio-demographic data are presented in Table 2. The mean overall dental satisfaction index was 62.8 (mode 65, median 63, range 43-82) (Figure 1). No statistical differences were found among the socio-demographic categories with respect to the DSQ scores. The mean of the DMFT index was 10.7 (sd 7.2), the %F/DMFT was 44% (sd 7%) and Community Periodontal Index mean was 2.1 (sd 1.2).

**Table 2.** Distribution of the socioeconomic variables and its relation with the Spanish version of Dental Satisfaction Questionnaire (DSQ) scores (n=217)

| | | *n* | *DSQ score Mean (95%CI)* | *Statistical test, p-value* |
|---|---|---|---|---|
| Age | < 50 year-old | 120 | 62.5 (61.4-63.6) | Student's t, 0.42 |
| | ≥ 50 year-old | 97 | 63.3 (61.7-64.8) | |
| Gender | Male | 71 | 63.1 (61.4-64.8) | Student's t, 0.69 |
| | Female | 146 | 62.7 (61.6-63.8) | |
| Residence | Semi-urban | 34 | 62.7 (60.2-65.2) | Student's t, 0.72 |
| | Urban | 183 | 62.7 (61.6-63.8) | |
| Living arrangements | Living alone | 24 | 62.8 (60.4-65.3) | ANOVA, 0.29 |
| | With a partner | 131 | 63.4 (62.2-64.6) | |
| | With others | 62 | 62.0 (59.7-63.6) | |
| Education | No schooling | 14 | 65.9 (62.0-69.7) | ANOVA, 0.06 |
| | Primary | 79 | 64.1 (62.5-65.8) | |
| | Secondary | 39 | 61.3 (59.5-63.1) | |
| | Vocational training | 37 | 61.4 (59.1-63.6) | |
| | University | 48 | 62.3 (60.2-64.3) | |
| Frequency of dental visits | None | 7 | 63.9 (59.0-68.7) | ANOVA, 0.28 |
| | Less than once a year | 99 | 62.1 (60.7-63.5) | |
| | Once a year | 74 | 64.1 (62.3-65.8) | |
| | More than once a year | 37 | 62.2 (60.3-64.1) | |

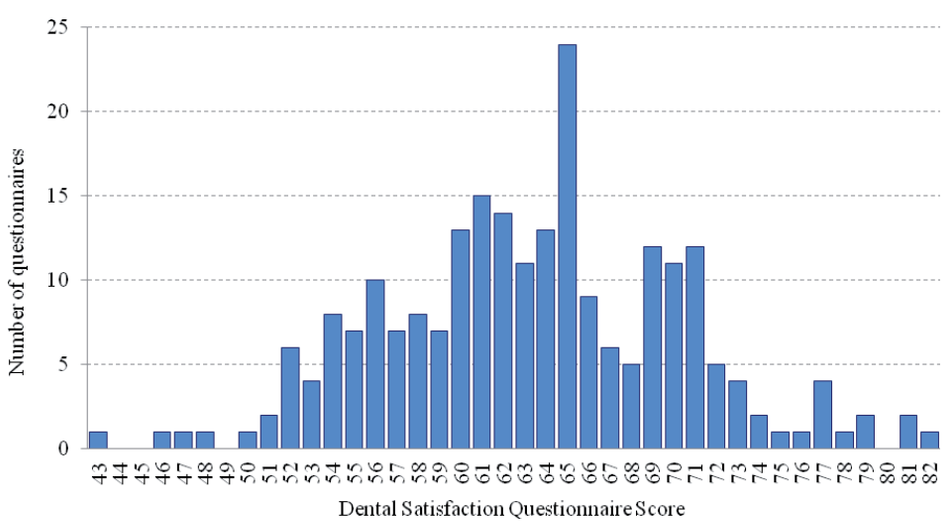



**Figure 1.** *Histogram of Spanish version of Dental Satisfaction Questionnaire (DSQ) scores (n=217)*

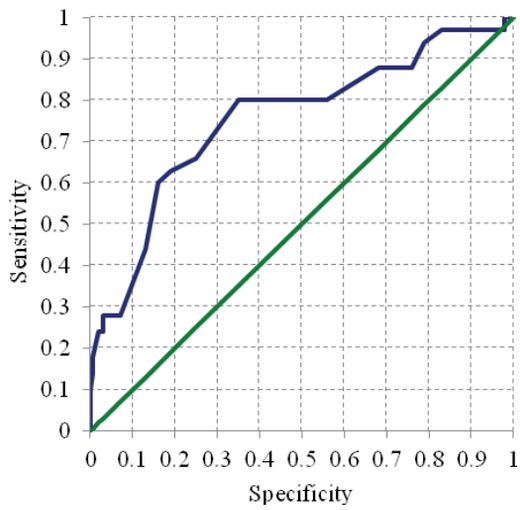
Turning to the scale's consistency, Cronbach´s alpha for the questionnaire's subscales were: quality 0.30, pain management 0.65, access 0.33, availability/convenience 0.42 and cost 0.41. The overall dental satisfaction index obtained a Cronbach's alpha of 0.56. Items 7, 11, 13 and 17 presented the lowest correlations and their removal led to a higher Cronbach's alpha statistic (Table 3). Items 4, 8 and 19 showed the highest corrected item-total correlations. These same items, which refer to pain management, also presented discrimination index values greater than 1.

Regarding internal structure of the scale, Bartlett's test of sphericity rejected the hypothesis that the correlations matrix was an identity matrix and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy gave a value of 0.63. Principal Component Analysis identified seven

**Table 3.** Internal consistency and discrimination index values of the 19 items in the Spanish version of the Dental Satisfaction Questionnaire (n=217)

| *Item* | *Corrected item-total correlation* | *Cronbach's alpha if item removed* | *Discrimination index value* |
|---|---|---|---|
| 1 | 0.16 | 0.55 | 0.45 |
| 2 | 0.29 | 0.53 | 0.79 |
| 3 | 0.15 | 0.55 | 0.77 |
| 4 | 0.36 | 0.51 | 1.56 |
| 5 | 0.25 | 0.54 | 0.94 |
| 6 | 0.10 | 0.56 | 0.30 |
| 7 | 0.08 | 0.56 | 0.49 |
| 8 | 0.36 | 0.52 | 1.01 |
| 9 | 0.21 | 0.54 | 0.79 |
| 10 | 0.12 | 0.56 | 0.74 |
| 11 | 0.05 | 0.57 | 0.55 |
| 12 | 0.23 | 0.54 | 0.89 |
| 13 | -0.03 | 0.59 | 0.48 |
| 14 | 0.23 | 0.54 | 0.66 |
| 15 | 0.36 | 0.52 | 1.13 |
| 16 | 0.33 | 0.52 | 1.02 |
| 17 | -0.19 | 0.61 | -0.12 |
| 18 | 0.22 | 0.54 | 0.55 |
| 19 | 0.34 | 0.51 | 1.52 |

Whole scale Cronbach´s alpha = 0.56




Area Under Curve (AUC)=0.76, (95%CI 0.66,0.89). Gold-standard of satisfaction was score 4 and 5 for item 1. The cut-off score set at 65, with sensitivity of 80% and specificity of 66%.

**Figure 2.** *Receiver Operating Characteristic (ROC) Curve of the Spanish version of Dental Satisfaction Questionnaire (DSQ)*

**Table 4.** Principal Components Analysis with varimax rotated solution showing the seven components or domains with eigenvalues greater than 1 that together explain 60% of the variance.

| *Item number and domain* | *Principal Components* | | | | | | |
|---|---|---|---|---|---|---|---|
| | *Pain management* | *Quality* | *Overall Satisfaction* | *Availability/ Convenience* | *Access* | *Quality* | *Cost* |
| 1 Item not in a subscale | 0.269 | -0.092 | **0.655** | 0.012 | -0.069 | -0.001 | 0.132 |
| 2 Quality | 0.137 | 0.204 | -0.078 | -0.036 | 0.005 | **0.716** | 0.049 |
| 3 Cost | -0.156 | 0.169 | 0.205 | -0.186 | 0.250 | 0.208 | **0.555** |
| 4 Pain Management | **0.782** | -0.022 | 0.127 | 0.028 | 0.098 | 0.097 | -0.017 |
| 5 Access | 0.429 | 0.065 | 0.203 | -0.025 | **0.556** | -0.104 | 0.191 |
| 6 Quality | -0.116 | 0.061 | -0.032 | 0.318 | -0.282 | **0.484** | 0.093 |
| 7 Availability/Convenience | -0.085 | 0.006 | 0.072 | **0.850** | 0.003 | 0.050 | -0.029 |
| 8 Pain Management | **0.698** | 0.127 | 0.311 | 0.094 | 0.031 | -0.012 | -0.066 |
| 9 Availability/Convenience | 0.199 | 0.302 | 0.141 | **0.484** | -0.230 | -0.199 | -0.054 |
| 10 Cost | 0.046 | 0.079 | -0.041 | 0.090 | -0.175 | -0.061 | **0.872** |
| 11 Quality | 0.180 | -0.218 | 0.417 | -0.157 | 0.085 | **0.563** | -0.260 |
| 12 Item not in a subscale | 0.125 | 0.049 | -0.361 | **0.470** | 0.246 | 0.404 | 0.227 |
| 13 Access | -0.075 | -0.013 | 0.044 | -0.036 | **0.804** | -0.001 | -0.117 |
| 14 Quality | -0.067 | **0.551** | 0.335 | -0.138 | -0.249 | **0.276** | 0.064 |
| 15 Access | 0.146 | 0.758 | -0.015 | 0.192 | 0.107 | -0.069 | -0.114 |
| 16 Quality | 0.092 | **0.631** | 0.069 | 0.074 | 0.102 | 0.087 | 0.132 |
| 17 Quality | 0.008 | -0.103 | -0.687 | -0.114 | -0.260 | 0.040 | 0.022 |
| 18 Quality | 0.048 | **0.603** | -0.238 | -0.052 | -0.111 | 0.084 | 0.194 |
| 19 Pain Management | **0.715** | 0.201 | -0.210 | -0.111 | -0.124 | 0.102 | -0.001 |

Values in **bold** are the authors' interpretation of the domains identified in each component of the principal components analysis. Two principal components identified the Quality domain

components with individual eigenvalues greater than 1 which together explained 60% of the variance. The correlation matrix obtained with the varimax rotation method is shown in Table 4. The subscales that were completely defined were pain management, cost and availability/convenience, while those that were partly defined were access and quality. The communalities presented values in excess of 0.5.

Criterion validity was studied using an analysis of sensitivity and specificity using as a gold-standard of satisfaction score 4 and 5 of item 1. The cut-off of Dental Satisfaction Questionnaire was located at the score 65, with a sensitivity of 80% and a specificity of 66% in the DSQ. The area under the curve (AUC) was 0.76 with a 95%CI from 0.658 to 0.868 (Figure 2).

On the test-retest analysis, the Spanish version of the DSQ (19 items) presented an overall intraclass correlation for absolute agreement value of 0.92. The values for the subscales were pain management 0.95, access 0.93, availability/convenience 0.93, cost 0.74 and quality 0.72.

Significant correlations were found ($p<0.05$) between DMFT index and both the quality subscale (Pearson's $r=0.17$) and with overall dental satisfaction index ($r=0.17$), and between % F/DMFT and the pain management subscale ($r=0.15$).

## Discussion

The Castilian Spanish version of the Dental Satisfaction Questionnaire proved viable, has internal consistency, excellent reproducibility and covers the different dimensions of satisfaction: pain management, accessibility, quality, availability/convenience and cost.

The representativeness of the convenience sample used for this study could be a limitation when generalising the results, though using patients before treatment at the university clinic should have reduced possible bias from this cause and self-completion, ensuring patient anonymity and surveying patients away from earlier dental experiences should have reduced other types of bias. In addition, socio-demographic differences not affecting questionnaire scores may indicate that it may be a homogeneous sample. A KMO value (0.63) indicates an appropriate sample size.

We believe that the questionnaire could be used across the whole of Spain because there are no significant differences in care delivery between the different autonomous communities or regions. Public benefits in oral health in the adult population are limited to oral surgery with other services being provided by the private sector.

The Cronbach´s alpha statistics for the overall dental satisfaction index and the subscales in this study, although acceptable, were lower than those obtained in DSQ validations in other populations (Golletz *et al*. 1995, Skaret *et al*. 2004). The pain management subscale presented the highest alpha value.

The reflection of the internal structure of the questionnaire was good and very similar to the original. The subscales completely defined were pain management, cost and availability/convenience, while those that were partly defined were access and quality with the last divided into two components. Davies and Ware (1982) identified in the instrument's original development that responses to item 1 represent overall satisfaction. Components analysis shows this item to be a domain independent of the others, supporting its choice as the gold standard of satisfaction. Also, in the study of criterion validity it had acceptable sensitivity, 80% but only moderate specificity, 66%.

The pain management subscale presented a higher Cronbach's alpha statistic than that of the original instrument (Davies and Ware, 1982), as in other later validations, so this scale presents fairly acceptable internal consistency. This subscales items (4, 8 and 19) presented the greatest convergent validity with the whole scale.

There may be various reasons for the lower consistency of items, 7, 11, 13 and 17. Items 11 and 13 are reverse-scored, which might make them more difficult to understand, although this problem was not detected in the qualitative analysis stage of the pilot trial. The DSQ's originators proposed a reformulation of item 13 for the 14-item short version of the DSQ. Items 7 and 17 ask about the patient's satisfaction with the number of dentists and their preventive care. The excessive number of dentists per inhabitant in Spain and the gradual reduction of their workload over the past decade (Bravo-Perez, 2004) could result in patients' expectations in respect of item 7 being almost universally met leading to it having little effect on satisfaction. Successive Spanish population surveys over the past decade have found patients' expectations of dentists to be rehabilitative rather than preventive. The percentage visiting dentists for a check-up is still low and so is the level of preventive action carried out in dental clinics. The dental health programs funded by the regional governments are doing important preventive work, but only among children and pregnant women. The patients in our sample, with an average age of 48.3 years, could therefore have low expectations in this area (item 17) as unexpected, so its not being met would have little effect on their satisfaction.

The significant correlation between %F/DMFT and the pain management subscale could be because the fear of suffering pain during dental treatment might be lower once the patient has received dental treatment, increasing satisfaction with this aspect.

The Spanish version of the Dental Satisfaction Questionnaire can be considered an instrument for studying patient satisfaction in Spain as it has proved viable, has acceptable internal consistency and excellent reproducibility. Its subscales cover the five dimensions of the concept of satisfaction: pain management, accessibility, quality, availability/convenience and cost.

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