Adaptation and validation of an instrument with SERVQUAL methodology in teaching clinics and stomatological services

Adaptación y validación de un instrumento con la metodología SERVQUAL en clínicas de docencia y servicios estomatológicos

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ABSTRACT

Objective: Adaptation and validation of an instrument designed to evaluate quality in teaching clinics and stomatological services with SERVQUAL methodology. **Material and methods:** Descriptive, cross-sectional observational and prospective study validated with alpha Cronbach coefficient. Parasuraman, Zeithaml and Berry (P, Z and B) designed an instrument with SERVQUAL methodology; it was applied to a stratified, randomized sample composed of 400 patients coming from teaching clinics and services of the Emeritum Autonomous University of Puebla (BUAP). For manufacture of said sample the following five dimensions proposed by authors were taken into account: tangibility, reliability, response capacity, security and empathy. **Results:** Instrument reported validity classifiable as excellent, according to an 0.967 alpha Cronbach value for the first part of the instrument corresponding to «expectations», the second part corresponding to «perceptions» rated 0.923. **Discussion:** Derived from validation through factorial analysis and high indexes obtained with alpha Cronbach index, both parts of the instrument remained without changes. **Conclusions:** Within the sphere of health services there is a great number of instruments validated to identify the level of satisfaction, nevertheless, each instrument must identify and locate within the dimensions of the selected model processes conducted in services to be evaluated, in order to obtain objective results. Reliability, validity and applicability of the instrument met with aforementioned expectations.

RESUMEN

Objetivo: Adaptar y validar un instrumento para evaluar la calidad, en las clínicas de docencia y servicio de estomatología con la metodología SERVQUAL. **Material y métodos:** Estudio descriptivo, transversal, observacional y prospectivo validado con una alfa de Cronbach. Se diseñó un instrumento con la metodología de SERVQUAL de Parasuraman, Zeithaml y Berry (P, Z y B) aplicándose a una muestra aleatoria estratificada constituida por 400 pacientes de las clínicas de docencia y servicio de la Benemérita Universidad Autónoma de Puebla (BUAP). Para su elaboración se tomaron en cuenta las cinco dimensiones propuestas por los autores: tangibilidad, fiabilidad, capacidad de respuesta, seguridad y empatía. **Resultados:** El instrumento reportó una validez clasificable como excelente de acuerdo (criterios de George y Mallery) con un valor alfa de Cronbach de 0.967 para la primera parte del instrumento correspondiente a «expectativas» y la segunda parte correspondiente a «percepciones» con 0.923. **Discusión:** Derivado de la validación a través del análisis factorial y los altos índices obtenidos con el índice del alfa de Cronbach ambas partes del instrumento permanecieron sin cambio. **Conclusiones:** En los servicios de salud existe un gran número de instrumentos validados para identificar el grado de satisfacción, sin embargo, cada instrumento debe identificar y ubicar en cada una de las dimensiones del modelo seleccionado los procesos realizados en los servicios a evaluar para obtener resultados objetivos. La confiablidad, validez y aplicabilidad del instrumento cumplió con esas expectativas.

INTRODUCTION

SERVQUAL methodology has been used to build service quality evaluation instruments in many countries, in private and public organizations as well as in different services, including health services.

This methodology was designed by Parasuraman, Zeithaml and Berry in 1985, with the purpose of developing a marketing construct, considering «service quality as an elusive and hard to measure subject, since it is the result of a comparison of consumer expectations or wishes versus a provider, and their

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perceptions with respect to received service».[1] Thus, the instrument is composed of two parts: one corresponding to «expectations» applied before the patient or user enters the service and the other corresponding to «perceptions» applied when service is completed. When expectations are surpassed by patients expectations during the course of treatment, service rendering is considered excellent, contrarily, when expectations are not met, service is considered deficient; when user's expectations are met service is considered satisfactory. This can be calculated with the following formula:

$$SQi = \Sigma kj = (Eij\text{-}Pij)$$

Formula **SQi** represents global perceived quality of stimulus **i**; **k** indicates the number of attributes (22 in this case); **Pij** shows perception of stimulus **i** result with respect to attribute **j** and **Eij** is the expectation for service quality of attribute **j** for stimulus **i**. In this model, perceived service quality increases as difference between **Eij** and **Pij** increases along different assessed attributes.[2]

According to studies conducted by Grönroos in 1984, it has been identified for decades that technical and functional quality weigh heavily in service providing organizations.[3]

From this perspective, technical and functional quality are identified in health service quality, technical quality is for the exclusive use of health professionals and administrators; functional quality is perceived by the user and/or patient with respect to service final result and its development. Due to the fact that frequently patients cannot accurately assess technical quality of a medical care service, functional quality is normally the main determinant factor which can be identified through patient perception.[4]

Evaluation of provision of a service, including health services, has common dimensions, nevertheless, items of the model's dimensions must be adapted to the special characteristics of this service and of the users, therefore, to be reliable, instruments must correspond to processes of each service, in addition to being statistically validated with the aim of obtaining objective results which might allow identification of opportunity areas in an organization so as to implement continuous improvement processes.

Reliability and validity are the essential characteristics of a measuring instrument in the field of social and behavioral sciences which provide «psychometric solidity» to the instrument.[5]

MATERIAL AND METHODS

With previous authorization of the Research Committee of the Stomatology Faculty, Autonomous University of Puebla, a descriptive, cross-sectional, observational and prospective study was conducted in the service and teaching clinics (STC) at undergraduate level. At the first stage, a measurement instrument was designed in accordance to the five categories of the SERVQUAL: tangible elements, reliability, response capacity, security and empathy. The original model was composed of 22 items, in the present study two additional items were included due to the fact that a teacher participates in this process, who is responsible for supervising the development of the student' s clinical skills, through treatment protocols established within normativity and ethical principles in order to provide stomatological services to patients, therefore the instrument was composed of 24 items, which were evaluated by means of a Likert scale with five response options.

According to SERVQUAL methodology, an instrument was designed; it was divided into two parts in order to conduct evaluation in two moments; the first corresponds to «expectations», and was used before patient attendance to STC, the second corresponds to «perceptions» and was applied at the end of the service.

Once the instrument was designed and adapted it was examined by a team of experts to assess questions' relevance and clarity. A pilot study was additionally conducted in a stratified, random sample of 100 patients in different schedules in all seven service and teaching clinics: Pediatrics Clinic, Integrated Clinic, Comprehensive Clinic 1 and Endodontics Clinic with the aim of identifying opportunity areas and be able to perform improvements in the instrument.

Its application was later conducted in a stratified randomized sample of 400 patients who attended teaching and service clinics; to this end researchers were subjected to a standardization process, it was additionally considered that they should have no relationship with the clinics, therefore, students of first courses were selected.

Statistical treatment of the instrument consisted on a Cronbach's alpha test, which measures a construct to evaluate its correlation; the closer to value 1 found in alpha Cronbach, greater will the internal consistency be,[6] as observed in *table I*.

RESULTS

Instrument's validity was assessed through a reliability analysis, conducted with alpha Cronbach

coefficient; with it both parts of the instrument were individually analyzed using factorial analysis.

For the first time, corresponding to «expectations» three common factors were obtained, which explained the 70.18% of studied phenomenon's total variability: the first factor explains 34.22%, the second factor 18.44% and the third factor explains 17.51%. Interpretation of each factor must be obtained interpreting saturations presented in *table II*.

For the second part, corresponding to «perceptions» two common factors were obtained, which explain 65.5% of total variability in the studied phenomenon:

the first factor explains 42.7% and the second factor 22.8%. Interpretation of each factor can be obtained by interpreting saturations as observed in *table III*.

Reliability determined by alpha Cronbach coefficient exhibited a value of 0.967 for the section «expectations», whereas for the second section corresponding to «perceptions» it exhibited a value of 0.935, therefore, analysis conducted eliminating each question secures instrument's pertinence.

DISCUSSION

Both parts of the questionnaire, that corresponding to «expectations» and the one corresponding to «perceptions» remain unchanged, this shows the instrument's pertinence, given the high reliability indexes calculated with the help of alpha Cronbach coefficient, the validation of the construct's content was obtained through factorial analysis method; in the «expectations» aspect, three factors were identified: first one is facultative staff care, the second would be service facilities and administrative personnel, the third would be equipment availability and suitable

Table I. George and Mallery criteria.

Alpha coefficient > 0.9	Excellent
Alpha coefficient > 0.8	Good
Alpha coefficient > 0.7	Acceptable
Alpha coefficient > 0.6	Questionable
Alpha coefficient > 0.5	Poor

Own elaboration.
Source: George and Mallery criteria.

Table II. Expectation factors.

	Factors		
	1	2	3
Expectation 1	.281	**.647**	.266
Expectation 2	.344	**.790**	.178
Expectation 3	.356	**.803**	.192
Expectation 4	.423	**.661**	.254
Expectation 5	.283	**.646**	.328
Expectation 6	.065	.274	**.694**
Expectation 7	**.541**	.514	.251
Expectation 8	**.561**	.377	.323
Expectation 9	**.476**	.392	.435
Expectation 10	**.721**	.322	.301
Expectation 11	**.698**	.383	.340
Expectation 12	**.750**	.377	.256
Expectation 13	**.721**	.243	.346
Expectation 14	**.816**	.291	.141
Expectation 15	**.740**	.280	.325
Expectation 16	**.693**	.246	.353
Expectation 17	**.803**	.329	.194
Expectation 18	**.775**	.328	.242
Expectation 19	**.798**	.274	.244
Expectation 20	**.778**	.307	.281
Expectation 21	.432	.265	**.641**
Expectation 22	.279	.143	**.794**
Expectation 23	.357	.203	**.789**
Expectation 24	.365	.235	**.720**

Source: Own elaboration.

Table III. Perceptions factors.

	Factors	
	1	2
Perception 1	.447	**.525**
Perception 2	**.743**	.339
Perception 3	**.791**	.270
Perception 4	**.758**	.299
Perception 5	**.604**	.427
Perception 6	.131	**.648**
Perception 7	**.722**	.360
Perception 8	**.611**	.470
Perception 9	.450	**.663**
Perception 10	**.768**	.333
Perception 11	**.735**	.367
Perception 12	**.797**	.279
Perception 13	**.673**	.430
Perception 14	**.778**	.261
Perception 15	**.649**	.493
Perception 16	**.712**	.316
Perception 17	**.867**	.162
Perception 18	**.818**	.291
Perception 19	**.804**	.242
Perception 20	**.833**	.224
Perception 21	.276	**.771**
Perception 22	.205	**.785**
Perception 23	.329	**.735**
Perception 24	.280	**.801**

Source: Own elaboration.

orientation, whereas in the part corresponding to «perceptions» two factors were identified: the first one was medical care provided by the clinic's personnel and the second one equipment and orientation. Results obtained corroborate validity of this instrument.

CONCLUSION

In health services there is a great number of validated instruments to identify the degree of satisfaction, nevertheless, each instrument must identify and locate each of the model's dimensions; selecting undertaken processes in the services to be evaluated in order to obtain results. Obtained results for the SERVQUAL instrument show excellent reliability and validity. Methodology of Parasuraman, Zeithaml and Berry allows undertaking adaptations according to specificity and pertinence of processes of the service to be evaluated, this allows its successful, continuous use in different countries and languages.[7-10]

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