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Rasch Analysis of a questionnaire for measuring patients' satisfaction in a Portuguese Hospital

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Introduction

Health services are complex structures with a high degree of intangibility, where it is not possible separate completely the production and consumption phases, resulting in a high interaction between users and the service provider.

This characteristic reinforces the importance of including consumers' participation in the different management processes with the assessment of users' satisfaction being a significant component of quality of care assessment.

This study aimed to evaluate psychometric properties of users' satisfaction questionnaire developed at Centro Hospitalar do Baixo Vouga (CHBV) using a Rasch model.

Method

The local Institutional Board of Direction approved the study. The first phase of the study involved a definition of a conceptual framework and generating a pool of items, which underwent pilot testing to clarify ambiguities and determining acceptability. Second phase involved a field test in a larger sample for psychometric analysis.

Instrument development

From literature review and previous experiences done at hospital level for measuring users' satisfaction, items were generated following a multidimensional model of perceived service quality [1], which included four dimensions: interpersonal and quality of care, administrative issues, facilities environment and delivery of meals. Questionnaire contained 24 items with a rating scale with four options (Strong dissatisfaction, Dissatisfaction, Satisfaction, Strong satisfaction). Two more questions were included for field-testing evaluate global satisfaction and service recommendation to others with the same condition.

Field-test

A cross-sectional study carried out using a self-administered questionnaire in paper format, available at the services of the Centro Hospitalar do Baixo Vouga (CHBV), Aveiro – Portugal, during summer of 2017. Participants' delivery the questionnaire anonymously in a closed envelope.

Participants

The sample consisted of 283 respondents (52.4% female) with a mean age of 56y1m±24y4m. The questionnaires under analysis originated from the different modalities of hospital services (internment – 54.0%, day hospital – 7.4%, consultations – 28.5% and urgency – 10.1%).

Statistical Analysis

A Rasch analysis was performed focusing the psychometric properties of the items, participants and rating scale categories. The Winsteps software [2] was used in order to get Rasch measurements from data. Rasch-based psychometric properties assessed for the instrument were:

(i) Measurement precision – through person separation index (PSI) for assess if items distinguish levels of satisfaction in the participants (the minimum accepted value for PSI is 2.00 [3]) and through item separ-

ation index (ISI) for assess if sample size is large enough to estimate item hierarchy on the satisfactory continuum scale (an ISI of more than 3.0 is required to ascertain this) [4];

(ii) Unidimensionality – through the analysis of item fit statistics, where ideal mean square standardized residuals (MNSQ) infit and outfit values should range from 0.7 to 1.3 [5]; as both fit statistics depend on sample size, a MNSQ value between 0.5 and 1.529 can also be considered [6]. Dimensionality assessment also included a principal component analysis (PCA) of the residuals.

(iii) Response scale analysis - categories should be spaced and advance step calibrations by at least 1.4 logits [7];

(iv) Targeting - differences in person and item means of up to 1.0 logit are acceptable[4].

Results

First analysis found that reliability index observed for items was 0.97 and 0.83 for persons. The separation index meted the established criteria. However, "Visiting schedule" item misfit for unidimensionality and was excluded for a second analysis.

After running the second analysis, the reliability index observed for 23-item scale was also 0.97 for items and 0.83 for persons. The separation index for items was 2.18 for persons and 5.97 for items. One item ("Identification of professionals") shows an outfit value in the limit of acceptance (bold value in Table 1). The PCA of the residuals revealed that the first factor explained 52.8% of variance and the first contrast as an eigenvalue of 2.7.

The threshold differences between categories met the difference criteria of a 1.4 logits - Table 2. The 23-item scale shows a poor targeting of the sample population (person mean 2.65±1.29, items mean 0.00±78).

Higher satisfaction items were "Nurses: explanations about interventions", "Confidentiality of clinical process information" and "Nurses: attention and availability" and lower satisfaction items referred to 'meals' (presentation, variety, quantity and quality).

Table 1 – Item fit statistics for the 23-items scale from the Rasch Analysis (n=283)

	Model		Infit MnSq	Outfit MnSq	Ptmea Corr.
	Measure	S.E			
Presentation of meals	1.42	.11	0.90	0.89	.62
Variety of meals	1.33	.12	1.04	1.01	.63
Quantity and quality of meals	1.27	.12	1.15	1.09	.62
Meal temperature	0.94	.12	0.98	0.94	.63
Convenience of facilities	0.82	.11	0.99	0.94	.58
Comfort of facilities	0.79	.11	1.08	1.07	.55
Presentation of letter of duties and rights	0.77	.11	1.20	1.31	.53
Attendance of employees (meals)	0.10	.13	1.20	1.14	.54
Other health professionals: explanations about interventions	0.01	.14	0.85	0.99	.54
Cleaning and hygiene of facilities	-0.07	.12	0.97	0.96	.54
Other health professionals: attention and availability	-0.11	.14	0.90	1.16	.50
Information about informed consent	-0.19	.13	0.91	1.05	.53
Clarifications on access and timetables	-0.29	.12	0.93	0.99	.54
Operational Assistants	-0.31	.13	1.03	0.99	.53
Doctors: attention and availability	-0.37	.12	0.89	1.03	.58
Doctors: explanations about interventions	-0.41	.13	0.95	0.95	.56
Respect for privacy	-0.43	.13	1.05	1.12	.51
Identification of professionals	-0.50	.13	1.27	**1.51**	.37
Reception at the secretariat	-0.54	.13	0.88	0.86	.53
Respect received in the service	-0.78	.13	0.90	0.79	.56
Nurses: explanations about interventions	-1.00	.14	0.99	0.85	.53
Confidentiality of clinical process information	-1.18	.15	0.88	0.87	.52
Nurses: attention and availability	-1.26	.15	0.88	0.71	.56

Table 2 – Summary of category structure (n=283)

	Category		Infit MnSq	Outfit MnSq
	Count (%)	Measure		
Strong dissatisfaction (1)	42 (1)	-3.30	1.09	1.10
Dissatisfaction (2)	404 (6)	-1.18	1.03	1.01
Satisfaction (3)	2052 (32)	1.09	1.01	1.03
Strong satisfaction (4)	3162 (48)	3.46	0.96	0.97
Missing	826 (13)			

Conclusion

23-item instrument showed acceptable measurement precision and good discrimination for the four response categories. The performed analysis also revealed the unidimensionality of the scale for measuring satisfaction with the hospital services. However further work should be done in order to add items that could improve discrimination of the scale.

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