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Original Article

The Quality Gaps in Education of the Iranian Physical Medicine and Rehabilitation Residents

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Keywords
Medical education; Residency; Questionnaires; Validity

Abstract

Background: The aim of this study was to assess the quality gap of education in physical medicine and rehabilitation (PM&R) residency programs after translation and validation of the Farsi (Persian) version of the SERVQUAL questionnaire. The SERVQUAL questionnaire is a global quality assessment tool designed by Parasuraman et al. and it has been used in many projects including educational programs.

Methods: The SERVQUAL questionnaire was validated before being used to determine the expectations and perceptions of all Iranian PM&R residents regarding educational systems.

Results: For the purpose of content validity measurement, the content validity index (CVI) of the whole questionnaire (0.90) and the content validity ratio (CVR) of each question (0.75 or 1) were calculated. The calculated CVI and CVR were acceptable. The Cronbach's alpha coefficient, which was used for the purpose of reliability measurement, was 0.917.

Conclusion: The Farsi (Persian) version of the SERVQUAL questionnaire is a valid and reliable tool for assessing medical education quality. The highest gap was in the empathy dimension and the lowest gap was in the tangibility dimension. Therefore, the education system must mainly focus on these aspects of quality to improve itself.

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Introduction

The quality of education has been consistently assessed. Debate and discussion about quality is complex and there are always differences of opinion on this topic. The issue of quality in

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various areas such as higher education is a challenge for universities. The quality of education is an important factor in the growth, success, and sustainability of education systems. Improvement of the quality of higher education is the most important duty of an education system. There have been significant changes, reforms, and evolutions in academic teaching in higher education.[1]

The medical education system must pay attention to the quality of education as the main tool needed to provide acceptable and academic health care in the country. Otherwise, health and education authorities will be responsible for all consequences of the maltreatments and inefficiencies of graduates.[2] Thus, the need to find ways to increase the quality of education is evident.[3]

In this context, evaluating the quality of educational services is considered as one of the basic steps in developing a quality improvement program.

In Iran, physical medicine and rehabilitation (PM&R) is a rapidly growing specialty and among the most competitive programs.[4] There are new departments teaching PM&R, as the necessity for more familiarity of general physicians and specialists with the field is felt by community and health care providers.[5] There is also a necessity of quantitative measures for the evaluation of educational quality in this field.[6] However, in databases such as PubMed, no published research exists on service quality in medical residency education programs including PM&R.

Parasuraman et al. made a multidimensional quality measure tool that measures the quality factors of a service and named it SERVQUAL (abbreviation of service quality).[7]

Although it has been used in economics, considering the flexible nature of this scale for use in different environments in which services are provided, it has also been used to evaluate the quality of medical education.[2,3,8] In this scale, service quality is the gap between customer expectations and their perceptions of the services provided by the organization. A negative gap indicates that the perceptions are lower than expectations and a positive gap shows that the perceptions are higher than expectations.[7]

The questionnaire measures the 2 domains of services, perceptions and expectations of customers, in 5 dimensions and the gap between expectations and perceptions (reality). The dimensions include reliability, tangibility, security, responsibility, and empathy. They are defined as follows:

1- Security indicates an educational system's ability to instill a sense of trust and confidence in the residents.

2- Reliability is defined as an educational system's ability to provide safe and punctual education.

3- Tangibility indicates the presence of adequate physical conditions and a good atmosphere for teaching assistants and the use of modern and useful educational facilities.

4- Empathy is the understanding of the educational system to suit the specific needs and behavior of each resident.

5- Responsibility is the residents' motivation to cooperate in the provision of education.[9]

The main purpose of writing the first SERVQUAL questionnaire was to create a standard valid questionnaire that can also be used for evaluating service quality in higher education.[10]

Numerous applications of this questionnaire in various studies have clearly demonstrated its strengths compared to others. These include the importance of the 5 dimensions of perceived service quality, ability to adapt to any service environment, reliability, and high validity.[2]

Considering the need for educational service quality assessment in the field of PM&R in Iran, the lack of research in the country on the validation of the standard Farsi (Persian) version of SERVQUAL, and the emphasis of the World Federation for Medical Education (WFME) on the role of the learning environment as an objective assessment of medical education programs (1998), the present study was conducted in the field of

PM&R and among all residents at medical universities across the country.

Methods

Adaptation and Validation of the Questionnaire: In this step, the questionnaire was translated into Farsi (Persian) in a conventional method by 8 native Iranian PM&R specialists in 2 sessions, and then, in the second step, a backward translation was performed into English by a qualified native American translator.

The Farsi (Persian) translation and the validation process were performed with the approval of Professor Parasuraman et al. (authors of the original SERVQUAL)[7] and Professor Otavio Jose De Oliveira (author of SERVQUAL adapted to higher education service).[11]

Validity and Reliability: In this step, to determine the validity of SERVQUAL, the face and content validity, and content validity ratio (CVR) of each question, as well as content validity index (CVI) of the total questionnaire were calculated. To determine its reliability (internal consistency), Cronbach's alpha was calculated, first, in the 2 domains of the questionnaire (perception and expectations), and then, in the whole questionnaire.[12]

Study Design: First, we conducted a test-retest study on 13 PM&R residents from Iran University of Medical Sciences, Tehran, Iran, and then, in a cross-sectional study, the questionnaires were distributed among all residents of the PM&R medical specialty in the period of January 2017 through March 2017. After completion, the research team analyzed the data obtained. For ethical considerations, the researchers adhered to the principles of the Declaration of Helsinki.[13]

Residents' names were not mentioned in the questionnaire and they were assured that their information and answers would remain confidential. The results of the study will be generally presented and not separately for each university.

Statistical Analysis: For statistical analysis, SPSS software (version 17, SPSS Inc., Chicago, IL, USA) was used. To describe qualitative and continuous variables, mean [standard deviation (SD)], and frequency (percentage) were used. Spearman's correlation coefficient was used for test-retest, and paired samples t-test for normally distributed variables in the final data analysis.

Results

Demographic Characteristics: The questionnaires were distributed among all PM&R residents in Iran University of Medical Sciences, Shahid Beheshti University, Army University of Medical Sciences, Baqiyatallah University of Medical Sciences, Tabriz University of Medical Sciences, and Shiraz University of Medical Sciences, Iran. A total of 83 questionnaires were distributed and 65 completed questionnaires were returned (78.31%). Twenty out of 20 residents of Iran University of Medical Sciences (100%), 8 out of 17 residents of Shahid Beheshti University of Medical Sciences (47%), 11 out of 12 residents of Baqiyatallah University of Medical Sciences (91.66%), 6 out of 7 residents of the Army University of Medical Sciences (85.71%), 10 out of 15 residents of Tabriz University of Medical Sciences (66.66%), and 10 out of 15 residents of Shiraz University of Medical Sciences (66.66%) completed and returned their questionnaires. Other demographic information are provided in table 1.

Construct Validity: In this study, construct validity was measured using face validity and content validity. The face validity of the SERVQUAL was checked by 8 Iranian PM&R specialists; their opinion was obtained on how logical, attractive, understandable, and appropriate the questions are for what they measure. According to the specialists' opinion, some of the questions needed to be changed. After these changes, and in the content validity measurement, the operationalization against the relevant content domain for the construct was checked. In this approach, it is assumed that there is a good detailed description of the content domain.

Table 1. Demographic characteristics of 65 physical medicine and rehabilitation (PM&R) residents

Variable	n (%)
Sex	
Female	32 (49.2)
Male	33 (50.8)
Marital status	
Married	48 (73.8)
Single	17 (26.2)
Residency year	
1	21 (32.30)
2	19 (29.23)
3	25 (38.46)
University	
Iran University of Medical Sciences	20 (30.76)
Shahid Beheshti University	8 (12.30)
Army University of Medical Sciences	6 (9.23)
Baqiyatallah University of Medical Sciences	11 (16.92)
Tabriz University of Medical Sciences	10 (15.38)
Shiraz University of Medical Sciences	10 (15.38)
Variable	**Mean (SD)**
Age (year)	32.34 (4.71)

SD: Standard deviation

Content Validity Ratio: For the purpose of CVR, first, 8 Iranian PM&R specialists were contacted through e-mail, and then, 2 face-to-face meetings were held with them (reviewers).

CVR was measured using Lawshe's method; Lawshe has proposed a method wherein experts rate each item of the questionnaire on a 3-point scale ranging from 0 to 2, 0 = no agreement with that question, not necessary for the questionnaire, 1 = useful question, but not essential for the questionnaire, and 2 = perfect agreement, essential question for the questionnaire.[12]

A table of minimum CVR scores for item inclusion was developed based on a one-tailed test at the 0.05 level of significance and the acceptable range depended on the number of reviewers (for 8 reviewers the minimum of 0.75 is acceptable).

$$CVR = \frac{n\,e - N/2}{N/2}$$

In the CVR formula, n e is the number of experts who rated an item as "essential" and N is the total number of experts.

In this study, the CVR of all questions was either 0.75 or 1, which is acceptable.

Content Validity Index: The CVI of the entire questionnaire can be calculated by determining the mean CVR for all of the retained items.[12]

$$CVI = \frac{\sum CVR}{retaind\ number\ of\ quesitons}$$

In this study, CVI was 0.90 which is satisfactory and acceptable.

Reliability: To evaluate the test-retest reliability, 13 PM&R residents from Iran University of Medical Sciences were included in the study. The retest was conducted 10 days after the initial test. Spearman's correlation coefficient (Tables 2 and 3) was calculated for each question of the questionnaire, and then, question no. 2, which had a low coefficient, was changed and edited by the PM&R specialists.

To evaluate the internal consistency reliability of the Farsi (Persian) version of SERVQUAL, Cronbach's alpha was used.

Table 2. Spearman's correlation coefficient for questions of the expectations domain

Question No.	Spearman's correlation coefficient	P
1	0.603	0.290
2	0.361	0.226
3	0.561	0.460
4	0.520	0.690
5	0.552	0.510
6	0.471	0.104
7	0.481	0.960
8	0.557	0.480
9	0.561	0.460
10	0.433	0.139
11	0.595	0.320
12	0.567	0.430
13	0.600	0.845
14	0.679	0.110
15	0.997	< 0.001
16	0.433	0.139
17	0.813	0.001
18	0.614	0.260
19	0.495	0.850

Table 3. Spearman's correlation coefficient for questions of the perception domain

Question No.	Spearman's correlation coefficient	P
1	0.830	< 0.001
2	0.278	0.357
3	0.439	0.134
4	0.730	0.005
5	0.502	0.810
6	0.857	< 0.001
7	0.580	0.380
8	0.380	0.200
9	0.602	0.290
10	0.580	0.380
11	0.560	0.460
12	0.849	< 0.001
13	0.582	0.370
14	0.689	0.009
15	0.711	0.006
16	0.930	< 0.001
17	0.767	0.002
18	0.412	0.0162
19	0.726	0.002

Cronbach's alpha is a coefficient of internal consistency and is commonly used as an estimate of reliability. It was 0.917 for the whole questionnaire.

The Main Study: The questionnaire items are scored on a Likert scale ranging from 7 (complete agreement) to 1 (complete disagreement). The main purpose of the SERVQUAL questionnaire is to find the gap between expectations and perceptions from the point-of-view of a service receiver. In this study, the service provided was residency education and the service receivers were PM&R residents.

The gap mentioned above was calculated in 3 phases.

First, the gap was calculated between the expectations and perceptions of all residents. This showed that there is a global negative gap between the expectations and perceptions of all residents.

The mean score of expectations was 90.33, mean score of perceptions was 130.12 with a 39.78 gap that was statistically significant ($P < 0.001$).

Second, the gap was calculated in each of the 5 dimensions of the questionnaire, including empathy, reliability, responsibility, security, and tangibility (Table 4). This illustrated a negative gap between expectations and perceptions of all residents in all of the five dimensions of the questionnaire, which was statistically significant. The highest mean score of expectations was in the tangibility dimension and the lowest was in the reliability dimension. The highest mean score of perceptions was also in the tangibility dimension and the lowest was in the empathy dimension. The highest gap was found in the empathy and responsibility dimensions, respectively, and the lowest gap was found in the tangibility dimension.

Third, the gap was calculated in each of the 19 questions of the questionnaire (Table 5). This showed that there is a statistically significant negative gap between expectations and perceptions of all residents in every question of the questionnaire. The highest mean scores of expectations were observed in question no. 7 (In your residency education program, professors must persist on doing their job without error) and question no. 15 (Professors must have adequate academic knowledge for solving resident's educational issues).

The lowest mean score of expectations was in question no. 17 (Professors must pay equal attention to each resident at your medical ward). The highest mean score of perceptions was in question no. 3 (Professors at the medical ward must present themselves in a manner appropriate to their position), and the lowest was in question no. 17 (Professors must pay equal attention to each resident at your medical ward).

Table 4. Mean scores and the gap of the 5 dimensions of the questionnaire

Dimension	Mean score of expectations	Mean score of perceptions	Gap	P*
Tangibility	26.80	20.87	5.92	< 0.001
Reliability	21.52	13.60	7.92	< 0.001
Responsibility	27.52	18.26	9.26	< 0.001
Security	27.53	20.46	7.07	< 0.001
Empathy	26.73	17.13	9.60	< 0.001
Whole questionnaire	130.12	90.33	39.78	< 0.001

*P-values < 0.05 are considered statistically significant.

Table 5. Mean scores and the gap of every question of the questionnaire

Question No.	Mean score of expectations	Mean score of perceptions	Gap	P
1	6.64	4.84	1.80	< 0.001
2	6.70	5.13	1.56	< 0.001
3	6.83	5.92	0.90	< 0.001
4	6.61	4.96	1.64	< 0.001
5	6.67	4.84	1.83	< 0.001
6	6.90	4.55	2.35	< 0.001
7	6.93	4.20	2.73	0.001
8	6.87	4.61	2.26	< 0.001
9	6.86	4.66	2.20	< 0.001
10	6.90	4.44	2.46	< 0.001
11	6.83	4.93	2.33	< 0.001
12	6.80	4.52	2.27	< 0.001
13	6.83	4.93	1.89	< 0.001
14	6.96	5.78	1.18	< 0.001
15	6.93	5.21	1.72	< 0.001
16	6.75	4.20	2.46	< 0.001
17	6.33	4.00	2.33	< 0.001
18	6.80	4.47	2.32	< 0.001
19	6.84	4.36	2.47	< 0.001

The highest gap was found in question no. 7 (In your residency education program, professors will persist on doing their job without error). The lowest gap was found in question no. 3 (Professors at the medical ward must present themselves in a manner appropriate to their position).

Discussion

According to the results presented in table 2, there is a negative global gap between residents' expectations and perceptions, which means that their expectations are not met. According to the results presented in table 3, there is a negative gap between expectations and perception of all residents in all five dimensions of the questionnaire.

The highest gap was in the empathy dimension (including providing hours of conventional education to all residents, paying equal attention to each resident, focusing on the best education for their residents, and knowing their residents' educational needs and expectations), which means the maximum educational defects are observed in this dimension. The lowest gap was in the tangibility dimension (including modern educational equipment, conserving the equipment, clothing and appearance of the professors and attractiveness, and up-to-date tools), which means there are minimum defects in this dimension.

According to the results presented in table 4, the highest gap is in question no. 7, which means the highest defect exists in the professors' performance of their job without error). In addition, the lowest gap is in question no. 3, which means the minimum defect exists in the professor's appropriate appearance and clothing. Although there was a negative gap in all of the questions, it is noteworthy that all of the perception scores were between 4 and 5.92, which means the question obtained a satisfactory or good score on a 7-point Likert scale.[11]

A limitation of this study was the residents' failure to respond to the questionnaire because of its possible complexity. We tried to eliminate this limitation to the extent possible by using a manual for distant cities such as Tabriz and Shiraz, and attendance at the universities in Tehran to help residents in filling out the questionnaire.

Failure to deliver questionnaires to the researcher was another limitation, which was eliminated to the extent possible by attendance at universities, frequent phone calls, and reminder text messages or emails.

Conclusion

As mentioned in the discussion, there are some quality defects in the residency

educational program. Therefore, it can be concluded that there are opportunities for improving the education system in the field of PM&R. The medical education system must recognize the needs, field of interests of residents,[14] and the weak points with focus on the empathy and responsibility dimensions.

This study showed that the Farsi (Persian) version of the SERVQUAL questionnaire is a valid and reliable quality assessment tool for medical education environments and can be adapted to any situation due to its flexibility. Further research on the Farsi (Persian) version of the SERVQUAL questionnaire is highly recommended due to the lack of such research in the country, especially in the field of residency education programs.

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Conflict of Interest

Authors have no conflict of interest.

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