

Original Article



Evaluation of the quality of education in an orthopedic referral center in north-west of Iran

Ali Futuhi¹, Faranak Jabbarzadeh Tabrizi^{2,3}, Alireza Sadeghpour^{1*}, Mohammad Reza Bazavar¹, Fariba Mirzamihammadi⁴, Amir Valizadeh⁵

¹Department of Orthopedics, Faculty of Medicine, Shohada Medical Research & Training Hospital, Tabriz University of Medical Sciences, Tabriz, Iran

²Medical Education Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran

³Department of Medical-Surgical Nursing, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

⁴Shohada Medical Research and Training Hospital, Tabriz University of Medical Sciences, Tabriz, Iran

⁵Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran

Article info

Article History:

Received: September 10, 2024

Accepted: November 13, 2024

Published: December 30, 2024

Keywords:

Orthopedics, Educational measurement, Quality of health care

Abstract

Background: The quality of medical universities' educational services requires systematic evaluation from multiple perspectives.

Methods: This cross-sectional descriptive-correlational study included 150 students (orthopedic residents, medical students, nursing students, and surgical technology students) at Shohada Medical Education Center, selected through convenience sampling. Sample size was determined through power analysis ($\beta=0.80$, $\alpha=0.05$) to detect medium effect sizes. Data collection utilized demographic specifications and the validated SERVQUAL scale (Cronbach's $\alpha=0.83$), measuring five service quality dimensions: tangibility, reliability, responsiveness, assurance, and empathy. Quantitative variables were analyzed using mean and standard deviation, while qualitative variables were reported as frequencies and percentages. Data analysis employed SPSS version 16, utilizing paired t-tests with effect sizes (Cohen's d) reported alongside p-values.

Results: The current situation demonstrated relative satisfaction (mean = 3.11 ± 0.59 on a 5-point scale), with significant gaps between expectations and current status across all dimensions. The largest quality gaps were identified in the assurance dimension (gap = 1.42 ± 0.72 , Cohen's $d=0.89$, $P<0.001$) and responsiveness dimension (gap = 1.52 ± 0.94 , Cohen's $d=0.83$, $P<0.001$), indicating substantial areas for improvement.

Conclusion: While overall attitudes toward educational services were moderately positive, specific areas require targeted enhancement. This study provides actionable recommendations for service quality improvement while acknowledging limitations in self-reported data and generalizability.

Introduction

During the history of education, the quality of educational services has always been of high importance.¹ The quality of service means the extent to which the services meet the expectations of customers. Understanding and measuring the perceptions and expectations of customers is an integral part of enhancing the quality of the organizations that provide services.² Students, staff, and lecturers are the main customers of higher education. Meanwhile, students, as the main customers of higher education, attract the most attention and receive a variety of educational services during their studies.³ Therefore, it is important to measure the students' satisfaction with the

quality of services they receive.

Previous research has established that the quality of service in medical education encompasses multiple dimensions, including physical facilities, reliability of service delivery, staff responsiveness, assurance of competence, and empathy in student interactions. However, there exists a notable gap in understanding how these dimensions specifically manifest within specialized medical training centers, particularly in orthopedic education.^{4,5} Meanwhile, universities should evaluate themselves to determine their strengths and weaknesses and correct them.⁶ Universities usually carry out accreditation in an educational group through an

*Corresponding author: Alireza Sadeghpour, Email: asadeghpour@yahoo.com

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internal evaluation to “see themselves in the mirror,” which is effective in improving the quality of educational services.⁷ The role of internal evaluation in recognizing strengths, weaknesses, opportunities, and threats can be considered the basis for planning the development and improvement of academic quality. Various models pay attention to different dimensions for measuring the quality of educational services, e.g., in the SERVQUAL model, dimensions such as basic services, reliability, empathy, responsiveness, and assurance are considered influential factors.⁸

Previous studies have shown different results of students' satisfaction with educational systems and different parts of it.⁹ Some of the domestic^{2,10,11} and foreign¹² studies show relative dissatisfaction, and some other domestic ones indicate relative satisfaction with students.¹³ However, most of the studies are focused on the quality of education in faculties,^{2,10,11} and few studies focus on the quality of educational services in educational and medical centers. A study on clinical education was conducted in the educational hospitals of Kerman University of Medical Sciences, and the aim was to determine the quality of clinical education services. According to the results of this study, there was a negative quality gap in all five service dimensions. The lowest and the highest means of the quality gap among the interns were in the dimensions of assurance and empathy, respectively. Also, for the externs, the dimensions of reliability and tangibility were the lowest, and the dimension of responsiveness was the highest mean of the quality gap. Hence, the application of new educational methods, counseling skills, and communication with students should be included in the planning of educational workshops for members of the academic board.¹⁴

Since clinical education constitutes more than half of the educational time of medical students and is the basis of acquiring professional skills, it is considered the first source of learning and forming the professional identity of medical students. It is very important if it is the heart of professional education. The evaluation of students' opinions can play a very important role in educational decision-making regarding the methods of service evaluation in higher education centers. Paying attention to students' opinions and improving the quality of educational services constantly increases their satisfaction.¹² In this regard, the transition from theoretical understanding to practical implementation of quality assessment in medical education requires careful consideration of local context and specific institutional characteristics. While global studies have provided frameworks for evaluation, the unique nature of orthopedic education at specialized centers necessitates targeted investigation. The Shohada Medical Education Center is the main orthopedic referral center for the clinical training of students at Tabriz University of Medical Sciences. Therefore, it is important to assess the quality of educational services provided at

this center from the perspective of the students receiving these services. Hence, this study aimed to determine the quality of educational services from the standpoint of students of orthopedic residency, general medicine, orthopedic internship, or externship at Tabriz Shohada Medical Center.

Methods

This descriptive correlational study was conducted in 2022, and the data collection was done from May 2022 to August 2022. The study population included all students of orthopedic residency and general medicine as well as undergraduate students of nursing and surgical technologist students who met the inclusion criteria. The sampling method was convenient, according to Mohebi.¹³ The sample size for this study was determined based on a power analysis. Considering the use of the validated SERVQUAL tool and the focus on a specific educational center, a sample size of 150 students was deemed appropriate to detect meaningful differences in the quality of educational services. This sample size provided sufficient statistical power (80%) to identify a medium effect size (Cohen's $d=0.5$; $\beta=0.80$, $\alpha=0.05$) at a significance level of 0.05. The reason for choosing the stated study was its similarity with our study in terms of conducting it for different fields of medical sciences. Considering their internship or externship program, the sampling questionnaire was provided to the students of general medicine, nursing, and surgical technologist students on the last day of their internship or externship, and they were asked to complete the questionnaire whenever they had time during that day. In the case of residency students, the questionnaire was delivered on one of the days of their attendance, and after completion, it was received at the end of the day. Two tools have been used in this study.

Checklist of demographic characteristics

Some demographic characteristics of students, such as field of study, age, gender, etc., were evaluated based on this checklist.

SERVQUAL scale

The SERVQUAL tool was used to measure the students' perceptions and expectations about the quality of educational services. One of the methods that are often used in the evaluation of the quality of higher education and universities is the SERVQUAL model, which Parasuraman invented. SERVQUAL is one of the models that tries to measure the level of service quality through the analysis of the gap between customers' expectations and perceptions.^{14,15} This is also known as the gap analysis model. The SERVQUAL is a valid tool for service quality evaluation.

In comparison with other quality evaluation methods, it has advantages such as the possibility of adapting

dimensions to different types of service environments, high reliability and validity in comparing the perception and expectations of customers, the relative importance of the five dimensions in understanding the service quality and the ability to analyze based on demographic and psychological characteristics.^{10,13} This 25-item tool has 5 dimensions, which include dimensions of tangibility, reliability, responsiveness, assurance, and empathy. The tangibility dimension is related to physical conditions and access to facilities and human resources. The reliability dimension means the ability to perform service safely and reliably (fulfillment of obligations). Responsiveness is related to the ability to provide the best customer service. Assurance represents the knowledge and skills of the service provider staff. Empathy means dealing with individuals, especially according to their moods, so that the customers will be convinced that the organization understands them. The participants answered the expectations section of the questionnaire based on a five-point Likert scale (completely important, important, relatively important, unimportant, and very unimportant (and) very good, good, average, weak, and very weak). A positive difference between the score of the students to the *status quo* and the favorable situation of the service quality indicates that the quality of the service exceeds the expectation. Also, a negative value indicates that the student's expectations are not met, and a zero value means that the provided educational services are within the expected range.^{7,15} The reliability of the questionnaire in previous studies has been reported to be 0.82 to 0.93, and it was 0.83 (Cronbach's alpha) in this study. The quantitative variables were reported as mean, median, standard deviation, minimum, and maximum, and qualitative variables were reported as numbers (percentages). The normality of quantitative variables was checked by the Wilk-Shapiro test.

Results

In this study, 150 students were studied. Among the participants, 22 individuals were in the residency level, 27 were studying the nursing bachelor's degree program, 74 were in the general medicine degree program, and 27 were studying the surgical technologist students bachelor's degree program (Tables 1 and 2). The normality of the quantitative variables was assessed using the Kolmogorov-Smirnov test. The results of the normality test confirmed that the data met the assumptions for the use of parametric statistical tests ($P > 0.05$). The difference between the average of the *status quo* and the favorable situation and the comparison of the difference between the gaps was done in a paired t-test. The description of the data obtained from the five dimensions of the SERVQUAL model in the two levels of the *status quo* and the favorable situation is described in Table 3. The overall average of the *status quo* in all dimensions was significantly lower than the favorable situation from the students' point of

Table 1. The qualitative demographic characteristics of students of orthopedic residency, general medicine, nursing, and OR fields

Variable	No. (%)	
Gender	Male	76 (50.7)
	Female	74 (49.3)
Discipline	Residents	19 (12.7)
	Nursing student	27 (18.0)
	General medicine student	77 (51.3)
Living place	Surgical technologist student	27 (18.0)
	Native	99 (66)
Semester	Non-native	51 (34)
	First	9 (6.0)
	Second	141 (94.0)

view, and the biggest gap was related to the dimension of assurance and then responsiveness. Considering the score range of 1 to 5, the mean score of the *status quo* of 3.11 ± 0.59 and Effect size (Cohen's d): 0.81 was relatively desirable and indicated the relative satisfaction of the students, but there is a need for upgrades.

The study found the largest quality gap in the "assurance" dimension (Current status: 3.20 ± 0.68 , Expected level: 4.65 ± 0.35 , Quality gap: 1.42 ± 0.72 , Effect size (Cohen's d): 0.89, p-value: < 0.001), followed by the "responsiveness" dimension (Current status: 3.06 ± 0.80 , Expected level: 4.59 ± 0.47 , Quality gap: 1.52 ± 0.94 , Effect size (Cohen's d): 0.83, P value: < 0.001). This suggests that students perceive significant deficiencies in the knowledge and skills of the service providers, as well as in the ability to provide prompt and reliable assistance.

Furthermore, the empathy dimension showed moderate to large effects in terms of gap size, indicating issues with personalized attention and understanding of student needs (Current status: 3.10 ± 0.64 , Expected level: 4.59 ± 0.47 , Quality gap: 1.44 ± 0.74 , Effect size (Cohen's d): 0.77, P value < 0.001). The reliability dimension demonstrated the largest absolute gap, suggesting significant concerns about the consistency and dependability of educational services (Current status: 2.97 ± 0.70 , Expected level: 4.60 ± 1.10 , Quality gap: 1.63 ± 1.26 , Effect size (Cohen's d): 0.85, P value < 0.001). Also, the tangibility dimension showed the smallest gap, though still significant, indicating relatively better satisfaction with physical facilities and equipment (Current status: 3.20 ± 0.70 , Expected level: 4.41 ± 0.70 , Quality gap: 1.21 ± 1.02 , Effect size (Cohen's d): 0.71, P value < 0.001) (Table 3).

The relatively high gaps in these dimensions may be attributed to factors such as the adequacy of training provided to the educational staff, the level of support and resources available to them, and the effectiveness of communication between the staff and students. Additionally, the organizational culture and the priority placed on customer service within the Shohada Medical Education Center may contribute to these gaps.

Table 2. The quantitative demographic characteristics of students of orthopedic residency, general medicine, nursing, and OR fields

	Mean (SD)
Age	
Residents	31.37 (3.23)
Nursing student	23.78 (1.84)
General medicine student	24.11 (1.94)
Operating room student	23.37 (1.21)
Average	
Residents	17.82 (0.69)
Nursing student	16.27 (1.16)
General medicine student	16.79 (1.07)
Operating room student	16.55 (1.14)

Discussion

The findings of this study indicate that while the overall quality of educational services at the Shohada Medical Education Center is relatively satisfactory, there are specific areas that require improvement. The largest gaps were observed in the “assurance” and “responsiveness” dimensions, suggesting that students perceive deficiencies in the knowledge and skills of the service providers, as well as in their ability to provide prompt and reliable assistance. These gaps may be addressed through targeted interventions, such as providing enhanced training and professional development opportunities for the educational staff to improve their subject matter expertise and customer service skills. Additionally, the center could consider implementing more effective communication channels and feedback mechanisms to understand better and address the specific needs and concerns of the students.

Based on the results, it can be understood that the current situation is relatively satisfactory (3.11 ± 0.59), with an average rating ranging from 1 to 5. However, there is still a need for improvement. Considering the score range of 1 to 5, the mean score of the *status quo* of 3.11 ± 0.59 was relatively desirable and indicated the relative satisfaction of the students, but there is a need for upgrades.

A study on clinical education was conducted in the educational hospitals of Kerman University of Medical Sciences, and the aim was to determine the quality of clinical education services.¹⁴ According to the results of this study, there was a negative quality gap in all five service dimensions. The lowest and the highest means of the quality gap among the interns were in the dimensions of assurance and empathy, respectively. Also, for the externs, the dimensions of reliability and tangibility were the lowest, and the dimension of responsiveness was the highest mean of the quality gap. Furthermore, in the category of residents, the lowest and the highest means of the quality gap were related to the dimensions of tangibility and responsiveness, respectively.¹⁴ The results of the mentioned study are consistent with our study results. Another study was conducted to determine

Table 3. The quality gap between the *status quo* and the favorable situation at Shohada Medical Education Center

	<i>Status quo</i>	Favorable situation	Quality gap	<i>P</i> value
Assurance dimension	3.20 ± 0.68	4.65 ± 0.35	1.42 ± 0.72	<0.001
Responsiveness dimension	3.06 ± 0.8	4.59 ± 0.47	1.52 ± 0.94	<0.001
Empathy dimension	3.10 ± 0.64	4.59 ± 0.47	1.44 ± 0.74	<0.001
Reliability dimension	2.97 ± 0.7	4.60 ± 1.1	1.63 ± 1.26	<0.001
Tangibility dimension	3.20 ± 0.7	4.41 ± 0.7	1.21 ± 1.02	<0.001
Total	3.11 ± 0.59	4.58 ± 0.4	1.46 ± 0.7	<0.001

the quality of educational services from the standpoint of students of Guilan University of Medical Sciences in 2015. This descriptive-analytical cross-sectional study was carried out by simple random sampling on 250 students of different fields of medical sciences at Guilan University of Medical Sciences, including medicine, dentistry, pharmacy, nursing, midwifery, and paramedicine.² According to the results, the students of different fields of medical sciences were very little satisfied with the quality of the provided education.¹⁶ The results of this study were also consistent with our results. In line with the results of our study, Rasoolabadi et al emphasize that a negative gap has been mentioned in most of the conducted studies regarding the quality of educational services in the country. Thus, it is necessary to pay more attention to complying with appropriate educational standards.¹⁷

The lowest gap in this study was related to the tangibility dimension, and the highest gap was related to the assurance dimension. In the SERVQUAL questionnaire, the dimension of reliability means fulfilling one's commitments accurately and continuously. That is, if the service organization makes promises regarding the time and the cost of providing the service, it must fulfill them. The tangibility dimension includes the existence of work facilities and equipment. In other words, it includes the objective elements of the organization, which is the objective manifestation of physical devices and tools, equipment, staff, communications, and raw materials available in the organization and workplace.¹⁴ The findings of Jafarinejad et al show a negative gap in all dimensions at Mashhad University of Medical Sciences, and the lowest gap was in the assurance dimension.¹⁸ Yasbolaghi Sharahi et al also reported the lowest negative gap in the assurance dimension during a similar study at Arak University.¹⁹ It seems that the mentioned differences can be related to factors such as the different research environments. In addition, most of the studies were conducted in academic educational environments, and it seems that our study is the first one that had been conducted in the clinical environment and medical education centers of Tabriz University of Medical Sciences. In the study conducted in Kerman educational and therapeutic centers in 2013, in the category of interns, the lowest and the highest average quality gaps were, respectively, in the dimensions

of assurance and empathy. In the category of interns, the lowest average quality gap was jointly in the dimensions of assurance and tangibles. The highest average quality gap was in After answering; it was observed that the results of the interns are consistent with the results of our study.¹⁴ In the study conducted at Kerman educational and therapeutic centers in 2015, the lowest and the highest average quality gap among interns were, respectively, in the dimensions of assurance and empathy, and for the externs, the lowest average quality gap was jointly in the dimensions of assurance and tangibility, and the highest one was in responsiveness. Thus, the results of externs are consistent with the results of our study.¹⁷ Considering that the highest gap in our study was related to the field of reliability, the results of this study can be used as a guide for planning and allocating resources among the five dimensions of the quality of educational services and the departments that are at a lower level in terms of service quality should be prioritized for planning.

Some limitations of this study are undeniable. Considering that the calculation of the sample size was in general and for all students, the comparison of the gap between the five dimensions of quality has not been done by different disciplines. Nevertheless, based on the researchers' search, this seems to be the first study that examines the gap in the quality of education services at Tabriz University of Medical Sciences from the standpoint of clinical students. It is suggested that supplementary studies be carried out separately for each group and preferably in a qualitative way to investigate all aspects considered by the students. This issue can help to outline the general condition of education in various stages. Considering the score range of 1 to 5, the mean score of the *status quo* of 3.11 ± 0.59 was relatively desirable and indicated the relative satisfaction of the students, but there is a need for upgrades. Based on the results of this study, it is suggested that activities and planning be carried out to develop the quality of the educational services of the center.

Furthermore, the self-reported nature of the data may be subject to potential biases, and the generalizability of the results may be limited to the specific context of the Shohada Medical Education Center. Future studies could explore the quality of educational services in a more diverse range of medical education settings to provide a broader perspective.

Conclusion

The quality of educational services in universities represents a complex, multifaceted issue that demands evaluation from various perspectives. Within the context of medical education, this evaluation becomes particularly crucial as it directly impacts future healthcare delivery. In general, the findings of this study offer valuable insights that can guide the Shohada Medical Education

Center in its efforts to improve the quality of educational services. By addressing the identified gaps, particularly in the "assurance" and "responsiveness" dimensions, the center can enhance the overall student experience and better prepare its graduates for their future roles in the healthcare system.

Acknowledgments

The authors of this project appreciate the Clinical Research Development Section, Shohada Hospital, Tabriz University of Medical Sciences, Iran, for their cooperation in conducting this research. This study is based on the research plan approved by Tabriz University of Medical Sciences (IR.TBZMED.REC.1400.1171). At this moment, we express our gratitude and appreciation to the honorable research assistant of Tabriz University of Medical Sciences and all the students who helped us carry out this project.

Authors' Contribution

Conceptualization: Faranak Jabbarzadeh Tabrizi.

Data curation: Fariba Mirzamihammadi.

Investigation: Faranak Jabbarzadeh Tabrizi.

Methodology: Mohammad Reza Bazavar.

Project administration: Alireza Sadeghpour.

Resources: Faranak Jabbarzadeh Tabrizi.

Software: Amir Valizadeh.

Supervision: Alireza Sadeghpour.

Writing—original draft: Amir Valizadeh.

Writing—review & editing: Ali Futuhi.

Competing Interests

The authors declare no conflict of interest.

Ethical Approval

The author has completely observed ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.). The ethical committee has approved this study using the ethical code IR.TBZMED.REC.1400.1171. Informed consent was obtained from all participants.

Funding

No funding.

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