

# Health Care Quality and Patient Satisfaction in Hemodialysis Clinic: Investigation of Patient-Reported Outcomes

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## ABSTRACT

**Background:** Hemodialysis treatment requires a long-term and continuous relationship between the patient and the healthcare institution. Therefore, patient evaluations regarding the services provided are highly valuable. This study was conducted to assess patients' perceptions of the quality of services offered at the hospital and to examine the relationship between these perceptions and patient satisfaction.

**Methods:** This cross-sectional study included adult patients receiving hemodialysis treatment at a public hospital in Türkiye (n = 105). Data was collected using a face-to-face survey method. The survey included an information form about patients' sociodemographic and clinical characteristics, the SERVQUAL Scale, and the Patient Satisfaction Questionnaire (PSQ-18). The data were evaluated using descriptive statistics, nonparametric tests (Mann-Whitney U test and Kruskal-Wallis test), and Spearman correlation analysis. Additionally, the gap scores between expected and perceived service quality were calculated for the SERVQUAL Scale.

**Results:** A negative gap was identified between participants' quality expectation scores and their perceived service quality scores (SERVQUAL = -0.26). The most significant differences were found in the Reliability (-0.43), Tangibles (-0.38), and Assurance (-0.35) sub-dimensions. Participants' patient satisfaction scores were at a medium level (median: 54.00, min: 41, max: 71). Correlation analysis results indicated a statistically significant moderate positive relationship between patients' service quality scores and patient satisfaction levels ( $r = 0.501$ ,  $p < 0.01$ ) in the hemodialysis unit.

**Conclusion:** The results reveal that the quality expectations of hemodialysis patients are not adequately met and that patient satisfaction is not high. Furthermore, it has been found that the perception of service quality is positively and moderately related to patient satisfaction. The findings are expected to guide healthcare institutions and managers in providing patient-centered care, delivering quality services, and improving patient satisfaction for this specific patient group.

**Keywords:** Perceived service quality, Expected service quality, Patient satisfaction, Hemodialysis Patients, Chronic Kidney Diseases.

## Introduction

Chronic kidney disease (CKD) represents a significant global health challenge, affecting approximately 10% of the world's population and contributing to substantial morbidity and mortality [1]. The prevalence of CKD is expected to rise,

driven by increasing life expectancy and the growing incidence of diabetes and hypertension, the two leading causes of CKD [2-5]. The chances of survival and quality of life of patients with end-stage kidney disease (ESKD) are generally maintained by renal replacement therapy, which includes hemodialysis,

peritoneal dialysis, and kidney transplantation [6]. For eligible patients, transplantation offers a better quality of life, more prolonged survival, and lower costs compared to dialysis [7]. However, most patients opt for dialysis treatment due to infrastructure deficiencies, a few donors, and contraindications concerning transplantation. Even in countries that are more active in transplant operations, approximately 30-50% of the patients who need renal replacement therapy receive dialysis treatment [8]. More than 1 in 7 U.S. adults, approximately 35.5 million people, are estimated to have CKD, and approximately 808,000 people in the U.S. are living with End Stage Kidney Disease (ESKD), with 69% on dialysis and 31% having received a kidney transplant [9,10]. Therefore, hemodialysis is the most common treatment option referred to worldwide for the treatment of ESKD [12].

Hemodialysis is a repetitive and complex procedure for patients, often performed three times a week at short intervals in hospitals or dialysis centers. Therefore, patients must spend most of their lives in hospitals/hemodialysis centers [11]. Quality of service is a crucial factor that positively impacts patient satisfaction among kidney patients [13]. Studies have revealed that the expectations of patients receiving hemodialysis exceed their perceptions of the quality of the service provided [14,15] and that the requirements of hemodialysis patients are not fully met in healthcare institutions [16,17]. Hence, evaluating the expectations and perceptions of service quality among these patients, who must spend a considerable amount of time in the hospital, presents a significant opportunity to identify weaknesses in healthcare services and implement improvements in hemodialysis units.

Furthermore, Serrano-del Rosal and Loriente-Arín argued that the satisfaction of healthcare service beneficiaries significantly impacts their tendency to follow medical and therapeutic recommendations, thereby improving their health [18]. Additionally, it was emphasized that service redesign is necessary to meet patients' needs and that improving service delivery is essential to reduce the emotional and financial costs associated with hemodialysis [19]. Therefore, continuous efforts to improve the quality of healthcare services, particularly in hemodialysis, are essential. This includes addressing service quality gaps, enhancing patient-provider communication, and ensuring that care is patient-centered and empathetic.

This study was conducted with patients undergoing hemodialysis treatment using established models such as SERVQUAL and the Patient Satisfaction Questionnaire-18 (PSQ-18). Specifically, the study aimed to: (i) evaluate the service quality perceived and expected by patients, (ii) assess whether there is a gap between perceived and expected service quality, (iii) to examine the level of patient satisfaction, (iv) to evaluate whether service quality perception and patient satisfaction differ according to the sociodemographic characteristics of patients, and (v) to reveal whether there is a relationship between patients' perceptions of service quality and their satisfaction levels. By identifying areas for improvement, healthcare providers can better meet the needs of CKD patients, ultimately enhancing their quality of life and treatment outcomes. The results of this study are expected to provide evidence and guidance to healthcare providers, healthcare managers, and policymakers.

The research hypotheses determined in line with the above specific objectives are presented below.

H1: There is a gap between the expected and perceived service quality among hemodialysis patients.

H2: The perception of service quality among hemodialysis patients differs according to their sociodemographic characteristics.

H3: Patient satisfaction among hemodialysis patients differs according to their sociodemographic characteristics.

H4: The perception of service quality in hemodialysis patients is positively related to patient satisfaction.

## Methods

### *Study design*

This study was designed as a descriptive and cross-sectional study.

### *Study population*

The study was conducted between January and February 2020 at a state hospital serving Kırıkkale, Türkiye, with the participation of patients with chronic kidney disease undergoing hemodialysis treatment. According to hospital records, during the study, a total of 122 patients were receiving hemodialysis treatment at the hospital's hemodialysis clinic on a rotating basis. The inclusion criteria for the study were: being conscious, being an adult, speaking Turkish, and agreeing to participate voluntarily. No sample was selected; all patients receiving hemodialysis treatment during the relevant period were invited to participate in the study. During the study, nine patients declined to participate, four patients could not speak Turkish, one patient died, and three patients were transferred to other treatment units. Data was collected using a face-to-face questionnaire method. After providing the necessary information and explanations, patients were asked to complete the questionnaire forms. For illiterate patients, the researcher read the questions aloud, and responses were obtained. The study was completed with 105 patients who agreed to participate voluntarily (participation rate: 86.06%).

Christian Grönroos first proposed the concept of perceived service quality, which expresses the three main determinants of service quality: technical quality, functional quality, and corporate image [20]. In 1985, Parasuraman et al. [21] developed the gap model, which is based on the Perceived Quality Model. In 1988, they simplified this model to establish a five-dimensional scale of service quality. The model is used to describe consumer-perceived gaps in service quality. The SERVQUAL scale comprises 22 items across five dimensions: physical appearance, reliability, responsiveness, assurance, and empathy. The dimensions of the SERVQUAL model are named as follows and address the specified elements [22]:

Tangibility: Appearance of physical facilities, equipment, employees, and communication materials.

Reliability: Ability to perform the promised service accurately with no errors

Responsiveness: The willingness to respond to and meet customer needs promptly and efficiently, as well as the attitude of the employees.

Assurance: Knowledge and the ability to provide information about the service provided, courtesy of employees, and their ability to inspire trust and confidence

Empathy: Individualized customer service.

The scale measures the quality of the service delivered by assessing the gaps between the expectations before delivery and the experience gained from using the service [23]. When gap scores on the SERVQUAL scale are greater than 0, it is concluded that the healthcare institution in question provides healthcare

services of a quality that exceeds patient expectations; when the score is less than 0, it is concluded that patient expectations have not been met. [21].

The Patient Satisfaction Questionnaire Short-Form (PSQ-18) is a short-form version of the 50-item PSQ-III. The PSQ-18 measures patients' satisfaction with medical services across seven dimensions, comprising 18 closed-ended questions: general satisfaction, technical quality, interpersonal manner, communication, financial aspect, time spent with the doctor, and accessibility and compliance [24]. All items on the scale were rated on a five-point Likert-type scale, with responses ranging from 1 (strongly agree) to 5 (strongly disagree). The service satisfaction score, as measured by the PSQ-18, was used in this study. According to the PSQ-18 scoring system, the total score for all sub-scales ranges between 18 and 90; 18 points represent the lowest possible rating, and 90 points represent the highest. Higher scores indicate higher patient satisfaction with the service provider [25]. Cronbach's alpha coefficient was calculated to assess the scale's internal consistency, indicating an acceptable level of reliability.

The question form, which includes the socio-demographic characteristics and clinical information of the patients, involves questions about the following: age, gender, marital status, employment status, education, average monthly income, the presence of other chronic diseases, dialysis time at that hospital, whether sufficient information about the disease was provided, whether the patient would prefer this hospital again in case of any health problem and whether the patient would recommend this hospital to other dialysis patients.

Statistical analysis

Descriptive statistics (frequency, percentage, etc.) were used to summarize participants' disease-related data and socio-demographic characteristics. The reliability of the scales was evaluated with Cronbach's alpha coefficient. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 24.0 for Windows and Microsoft Excel 2010. Non-parametric tests (Mann-Whitney U test and Kruskal-Wallis test) were used because the data did not exhibit a normal distribution. Spearman correlation analysis was also applied to examine the relationships between SERVQUAL and PSQ-18 scales. The following formula was used to calculate the gap score:

“Gap score = Perception score (P) – Expectation score (E)”

Negative scores obtained with the gap score indicate that customers perceive the quality of service they receive as low, while positive scores indicate a higher perception of service quality.

Results

It was found that 54.3% of the hemodialysis patients were male, 60% were over 60 years old, and most of them were married and unemployed (Table 1). 50.5% of the patients stated that they had been receiving dialysis treatment at this hospital for over two years. 61.9% of patients had one or more chronic diseases in addition to kidney disease. Most patients had information about kidney disease, stated that they would prefer the same hospital when they experience any health problems, and would recommend the hospital to other hemodialysis patients.

Table 1 Descriptive statistics of the participants

| Descriptive characteristics                                                 | Mean ± SD (Range) | n  | %    |
|-----------------------------------------------------------------------------|-------------------|----|------|
| <b>Gender</b>                                                               |                   |    |      |
| Female                                                                      |                   | 48 | 45.7 |
| Male                                                                        |                   | 57 | 54.3 |
| <b>Age (years)</b>                                                          |                   |    |      |
| <60                                                                         | 61.0 ± 13.5       | 42 | 40.0 |
| ≥60                                                                         | (26-83)           | 63 | 60.0 |
| <b>Marital status</b>                                                       |                   |    |      |
| Married                                                                     |                   | 91 | 86.7 |
| Single                                                                      |                   | 14 | 13.3 |
| <b>Education</b>                                                            |                   |    |      |
| Illiterate                                                                  |                   | 24 | 22.9 |
| Only literate                                                               |                   | 10 | 9.5  |
| Primary school                                                              |                   | 45 | 42.9 |
| Secondary school and above                                                  |                   | 26 | 24.8 |
| <b>Working status</b>                                                       |                   |    |      |
| Working                                                                     |                   | 11 | 10.5 |
| Not working                                                                 |                   | 94 | 89.5 |
| <b>Income (n=103)</b>                                                       |                   |    |      |
| Low                                                                         |                   | 18 | 17.5 |
| Medium                                                                      |                   | 48 | 46.6 |
| High                                                                        |                   | 37 | 35.9 |
| <b>Dialysis time at that hospital (month)</b>                               |                   |    |      |
| ≤24                                                                         | 43.2 ± 45.9       | 52 | 49.5 |
| >25                                                                         | (1-240)           | 53 | 50.5 |
| <b>Presence of other chronic diseases</b>                                   |                   |    |      |
| Yes                                                                         |                   | 65 | 61.9 |
| No                                                                          |                   | 40 | 38.1 |
| <b>Have you been informed about kidney disease?</b>                         |                   |    |      |
| Yes                                                                         |                   | 82 | 78.1 |
| No                                                                          |                   | 23 | 21.9 |
| <b>Would you prefer this hospital again in case of any health problems?</b> |                   |    |      |
| Yes                                                                         |                   | 97 | 92.4 |
| No                                                                          |                   | 8  | 7.6  |
| <b>Would you recommend the hospital to other dialysis patients?</b>         |                   |    |      |
| Yes                                                                         |                   | 98 | 93.3 |
| No                                                                          |                   | 7  | 6.7  |

SD: Standard Deviation

Table 2 presents the reasons why patients have preferred this hospital for treatment. The patients stated that they preferred this hospital based on their confidence in the state hospital, the

Table 2 Descriptive statistics of the participants

| Reasons                                            | n* |
|----------------------------------------------------|----|
| Because I trust the public hospital                | 57 |
| Accessible                                         | 38 |
| Because the health personnel are concerned/smiling | 21 |
| Because I think I get better quality service       | 19 |
| Because people recommended it, I know              | 8  |
| Because my doctor works in this hospital           | 6  |
| Because it has more modern tools and equipment     | 6  |
| Because I think it is more hygienic                | 5  |
| Insufficient financial situation                   | 5  |
| Obligation-referral                                | 3  |

\* Number in preferences.

**Table 3** SERVQUAL scores of participants

| Dimensions       | Items | Expectation Scores Mean ± SD | Perception Scores Mean ± SD | SERVQUAL Scores | SERVQUAL Scores by Dimensions | Overall Score |
|------------------|-------|------------------------------|-----------------------------|-----------------|-------------------------------|---------------|
| Tangibility      | 1     | 4.68 ± 0.67                  | 4.12 ± 0.80                 | -0.55           | -0.38                         | -0.26         |
|                  | 2     | 4.37 ± 0.90                  | 4.09 ± 0.79                 | -0.28           |                               |               |
|                  | 3     | 4.46 ± 0.80                  | 4.20 ± 0.74                 | -0.26           |                               |               |
|                  | 4     | 4.55 ± 0.71                  | 4.11 ± 0.74                 | -0.44           |                               |               |
| Reliability      | 5     | 4.75± 0.51                   | 4.41 ± 0.79                 | -0.34           | -0.43                         |               |
|                  | 6     | 4.75 ± 0.50                  | 4.30 ± 0.77                 | -0.45           |                               |               |
|                  | 7     | 4.82 ± 0.39                  | 4.47 ± 0.69                 | -0.35           |                               |               |
|                  | 8     | 4.77 ± 0.42                  | 4.27 ± 0.71                 | -0.50           |                               |               |
|                  | 9     | 4.66 ± 0.68                  | 4.13 ± 0.79                 | -0.52           |                               |               |
| Responsiveness   | 10    | 4.44 ± 0.83                  | 4.31 ± 0.74                 | -0.13           | -0.05                         |               |
|                  | 11    | 4.22 ± 1.02                  | 4.34 ± 0.71                 | 0.12            |                               |               |
|                  | 12    | 4.47 ± 0.83                  | 4.33 ± 0.82                 | -0.13           |                               |               |
|                  | 13    | 3.98 ± 1.09                  | 3.92 ± 1.13                 | -0.06           |                               |               |
| Assurance        | 14    | 4.61 ± 0.67                  | 4.34 ± 0.77                 | -0.27           | -0.35                         |               |
|                  | 15    | 4.70 ± 0.46                  | 4.30 ± 0.73                 | -0.41           |                               |               |
|                  | 16    | 4.69 ± 0.47                  | 4.47 ± 0.67                 | -0.22           |                               |               |
|                  | 17    | 4.54 ± 0.60                  | 4.04 ± 0.80                 | -0.50           |                               |               |
| Empathy          | 18    | 4.02 ± 1.14                  | 3.79 ± 1.19                 | -0.23           | -0.08                         |               |
|                  | 19    | 3.91 ± 1.25                  | 3.75 ± 1.22                 | -0.16           |                               |               |
|                  | 20    | 4.13 ± 1.04                  | 4.13 ± 0.99                 | 0.00            |                               |               |
|                  | 21    | 4.02 ± 0.98                  | 3.89 ± 1.06                 | -0.13           |                               |               |
|                  | 22    | 3.93 ± 1.22                  | 4.08 ± 0.95                 | 0.14            |                               |               |
| Cronbach's Alpha |       | 0.858                        | 0.914                       | 0.889           |                               |               |

SD: Standard Deviation

**Table 4** Participants' satisfaction scores (PSQ-18)

| Dimensions (Number of items)        | Mean | SD   | Scores Mean | SD   | Median | Min   | Max   |
|-------------------------------------|------|------|-------------|------|--------|-------|-------|
| General satisfaction (2)            | 3.74 | 1.03 | 5.97        | 1.19 | 6.00   | 3.00  | 10.00 |
| Technical quality (4)               | 4.10 | 0.73 | 12.30       | 1.69 | 12.0   | 9.00  | 20.00 |
| Interpersonal manner (2)            | 4.12 | 0.82 | 6.09        | 1.08 | 6.00   | 2.00  | 10.00 |
| Communication (2)                   | 3.10 | 0.85 | 6.42        | 1.28 | 6.00   | 4.00  | 10.00 |
| Financial aspect (2)                | 3.83 | 0.93 | 5.69        | 1.51 | 6.00   | 2.00  | 9.00  |
| Time spent with the doctor (2)      | 3.48 | 0.91 | 5.36        | 1.32 | 6.00   | 2.00  | 9.00  |
| Accessibility and convenience (4)   | 4.01 | 0.64 | 12.57       | 1.99 | 13.00  | 5.00  | 18.00 |
| PSQ overall score                   | 3.93 | 0.53 | 54.39       | 5.20 | 54.00  | 41.00 | 71.00 |
| Cronbach's Alpha (PSQ Total): 0.765 |      |      |             |      |        |       |       |

SD: Standard Deviation

hospital's accessible location, the caring/smiling faces of the healthcare personnel, and the delivery of better-quality health services.

Table 3 presents the scores from the SERVQUAL scale, indicating patients' expectations and perceptions of the quality of health services they received. Cronbach's alpha value of the sub-scale with the expectation expressions in the SERVQUAL scale was found to be 0.858, whereas the reliability of the sub-scale with the perception expressions was found to be 0.914. General SERVQUAL items of the scale have an alpha value of 0.889. These results confirmed that the scale is reliable.

Service quality perceptions of patients regarding healthcare services were generally lower than their expectations in all sub-dimensions. The most prominent use of the SERVQUAL scale is to determine the quality gaps in service delivery (Table 3). Study findings indicated that the highest quality gap based on

dimensions is in the reliability sub-dimension, whereas the lowest quality gap is in the responsiveness dimension. In other words, the patients' expectations regarding the reliability sub-dimension were higher; however, their expectations could not be met.

On the other hand, the patients' expectations regarding the responsiveness sub-dimension, which represents the desire to respond to and meet patients' needs quickly and efficiently, were low. However, the quality perception of the services delivered in the healthcare institution is low. Patients' evaluations of the hospital's overall service quality were generally negative (overall SERVQUAL score -0.26). In line with these results, it can be concluded that the perceived service quality of patients receiving hemodialysis service from the relevant institution was below their expectations. According to these results, hypothesis H1 is accepted.

**Table 5** Participants' satisfaction scores (PSQ-18)

| Socio-demographic Characteristics | Gender                    |      | Age                     |      | Level of income                            |        |      |
|-----------------------------------|---------------------------|------|-------------------------|------|--------------------------------------------|--------|------|
|                                   | Female                    | Male | <60                     | ≥60  | Low                                        | Medium | High |
| Overall SERVQUAL                  | 58.2                      | 48.6 | 49.0                    | 55.7 | 61.9                                       | 52.2   | 47.0 |
|                                   | u=1118.0 p=0.108          |      | u=1156.0 p=0.275        |      | $\chi^2=3.011$ p= 0.222                    |        |      |
| Expectation                       | 53.1                      | 53.0 | 50.8                    | 54.5 | 48.4                                       | 53.9   | 51.3 |
|                                   | u=1365.0 p=0.985          |      | u=1230.5 p=0.545        |      | $\chi^2=0.478$ p= 0.787                    |        |      |
| Perception                        | 60.3                      | 46.9 | 44.5                    | 58.7 | 56.9                                       | 55.0   | 45.7 |
|                                   | <b>u=1020.0 p=0.025</b>   |      | <b>u=965.0 p=0.019</b>  |      | $\chi^2=2.589$ p= 0.274                    |        |      |
| Overall PSQ-18                    | 64.3                      | 43.5 | 45.4                    | 58.1 | 70.5                                       | 49.5   | 46.2 |
|                                   | <b>u=825.0 p&lt;0.001</b> |      | <b>u=1004.0 p=0.037</b> |      | <b><math>\chi^2=8.617</math> p= 0.013</b>  |        |      |
| Overall satisfaction              | 62.4                      | 45.1 | 47.9                    | 56.4 | 66.3                                       | 51.5   | 45.8 |
|                                   | <b>u=919.0 p=0.003</b>    |      | u=1109.0 p=0.155        |      | $\chi^2=5.904$ p= 0.052                    |        |      |
| Technical quality                 | 62.7                      | 44.9 | 48.0                    | 56.3 | 56.7                                       | 54.5   | 46.5 |
|                                   | <b>u=904.5 p=0.002</b>    |      | u=1113.0 p=0.160        |      | $\chi^2=2.152$ p= 0.341                    |        |      |
| Interpersonal manners             | 60.3                      | 46.8 | 45.5                    | 58.0 | 65.9                                       | 50.4   | 47.4 |
|                                   | <b>u=1016.0 p=0.020</b>   |      | <b>u=1007.5 p=0.034</b> |      | $\chi^2=5.168$ p= 0.075                    |        |      |
| Communication                     | 60.2                      | 46.9 | 45.2                    | 58.2 | 66.1                                       | 55.0   | 41.2 |
|                                   | <b>u=1020.5 p=0.022</b>   |      | <b>u=993.5 p=0.027</b>  |      | <b><math>\chi^2=9.781</math> p= 0.008</b>  |        |      |
| Cost                              | 58.6                      | 48.3 | 58.9                    | 49.1 | 57.3                                       | 42.0   | 62.4 |
|                                   | u=1099.0 p=0.078          |      | u=1077.5 p=0.102        |      | <b><math>\chi^2=10.820</math> p= 0.004</b> |        |      |
| Time spent with the doctor        | 58.2                      | 48.6 | 44.7                    | 58.5 | 65.3                                       | 49.4   | 48.9 |
|                                   | u=1119.0 p=0.104          |      | u=974.5 p=0.021         |      | $\chi^2=4.440$ p= 0.109                    |        |      |
| Accessibility and compliance      | 62.2                      | 45.3 | 47.8                    | 56.5 | 69.6                                       | 50.8   | 45.1 |
|                                   | <b>u=926.5 p=0.004</b>    |      | u=1104.5 p=0.150        |      | <b><math>\chi^2=8.422</math> p= 0.015</b>  |        |      |

Table 4 exhibits the satisfaction scores reported by patients receiving hemodialysis services. Cronbach's alpha value for the PSQ-18 is 0.765. The mean total satisfaction score was  $54.39 \pm 5.20$ . The results indicated that patient satisfaction scores were at a medium level (median: 54.00, min: 41–max: 71); the lowest satisfaction was measured in the communication sub-dimensions, and the highest was measured in the interpersonal manner and technical quality sub-dimensions.

Table 5 presents the findings comparing participants' scores from the SERVQUAL and PSQ-18 scales according to their socio-demographic characteristics. The results show that there is no statistically significant difference between the scores obtained from the SERVQUAL (Total) scale and the socio-demographic characteristics examined (age, gender, income level, marital status, education level, and employment status) ( $p > 0.05$ ). While participants' SERVQUAL (Expected) scores did not differ according to socio-demographic characteristics, SERVQUAL (Perceived) scores showed significant differences according to gender and age. Accordingly, women and patients aged 60 and over were found to have higher quality perception scores compared to men and younger patients ( $p < 0.05$ ). In other words, they perceive the quality of the services provided as good. (Table 5). According to these results, hypothesis H2 is accepted.

Overall patient satisfaction, technical quality, interpersonal manner, communication, accessibility, and compliance sub-dimensions of the PSQ-18, as well as the overall PSQ-18 score, were found to differ significantly according to gender ( $p < 0.05$ ). Specifically, women's satisfaction scores in these sub-dimensions were higher than those of men. Interpersonal manners, communication, time spent with the doctor, and overall PSQ-18 score differed significantly according to age ( $p < 0.05$ ). Accordingly, participants aged 60 and over were found to have higher satisfaction scores in these dimensions compared to those under 60 years of age. On the other hand, statistically significant differences were observed in communication,

financial dimension, accessibility, and compliance, and overall PSQ-18 scores, when measured according to income level ( $p < 0.05$ ). The results show that low-income patients scored higher satisfaction scores than patients with higher incomes (Table 5). According to these results, hypothesis H3 is accepted.

Table 6 (see it on the next page) presents the results of the Spearman correlation analysis between SERVQUAL and PSQ-18 scale scores, as well as their subdimensions. Upon examining Table 6, it is observed that a positive and significant relationship exists between perceived service quality and patient satisfaction among hemodialysis patients ( $r = 0.501$ ,  $p < 0.01$ ). The results indicate that perceived service quality is positively correlated with patient satisfaction, particularly in terms of reliability ( $r = 0.448$ ,  $p < 0.01$ ) and responsiveness ( $r = 0.310$ ,  $p < 0.01$ ), exhibiting a moderate and statistically significant relationship. In other words, if the services provided to these patients in the institution wholly and accurately meet their needs, and healthcare professionals respond to these needs promptly, patient satisfaction levels can be increased. According to these results, hypothesis H4 is accepted.

On the other hand, it was found that the sub-dimensions of the Patient Satisfaction Scale, “time spent with the doctor” ( $r = 0.326$ ,  $p < 0.01$ ) and “accessibility” ( $r = 0.432$ ,  $p < 0.01$ ), were positively related to the patients' SERVQUAL scale overall scores at a moderate level. In summary, if the time spent with the doctor and the accessibility of services and healthcare personnel are improved, patients' perceptions of service quality may increase.

**Discussion**

The results obtained generally revealed that patients' perceptions of service quality regarding healthcare services were lower than their expectations. The highest quality gap was observed in the reliability sub-dimension, and the lowest quality

**Table 6** Relationships between participants' quality expectations/perceptions, and patient satisfaction

| Parameter                  |   | Tangibility | Reliability | Assurance | Responsiveness | Empathy | Expectation | Perception | SERVQUAL |
|----------------------------|---|-------------|-------------|-----------|----------------|---------|-------------|------------|----------|
| Overall satisfaction       | r | 0.217*      | 0.445**     | 0.176     | 0.261**        | 0.129   | 0.069       | 0.436**    | 0.329**  |
|                            | p | 0.026       | 0.000       | 0.073     | 0.007          | 0.191   | 0.482       | 0.000      | 0.001    |
| Technical quality          | r | 0.113       | 0.427**     | 0.220*    | 0.186          | 0.045   | 0.187       | 0.434**    | 0.208*   |
|                            | p | 0.250       | 0.000       | 0.024     | 0.058          | 0.649   | 0.056       | 0.000      | 0.033    |
| Interpersonal              | r | 0.187       | 0.251**     | 0.192     | 0.228*         | 0.112   | 0.105       | 0.359**    | 0.252**  |
|                            | p | 0.056       | 0.010       | 0.050     | 0.019          | 0.256   | 0.286       | 0.000      | 0.009    |
| Communication              | r | 0.149       | 0.348**     | 0.303**   | 0.176          | 0.010   | 0.211*      | 0.424**    | 0.202*   |
|                            | p | 0.130       | 0.000       | 0.002     | 0.073          | 0.923   | 0.031       | 0.000      | 0.039    |
| Cost                       | r | -0.239*     | -0.095      | -0.127    | -0.044         | -0.090  | 0.029       | -0.177     | -0.138   |
|                            | p | 0.014       | 0.333       | 0.196     | 0.659          | 0.360   | 0.773       | 0.071      | 0.161    |
| Time spent with the doctor | r | 0.148       | 0.276**     | 0.317**   | 0.257**        | 0.221*  | 0.091       | 0.458**    | 0.326**  |
|                            | p | 0.131       | 0.004       | 0.001     | 0.008          | 0.023   | 0.353       | 0.000      | 0.001    |
| Accessibility              | r | 0.284**     | 0.403**     | 0.220*    | 0.295**        | 0.271** | -0.040      | 0.386**    | 0.432**  |
|                            | p | 0.003       | 0.000       | 0.024     | 0.002          | 0.005   | 0.682       | 0.000      | 0.000    |
| PSQ-18                     | r | 0.198*      | 0.448**     | 0.270**   | 0.310**        | 0.154   | 0.137       | 0.501**    | 0.361**  |
|                            | p | 0.043       | 0.000       | 0.005     | 0.001          | 0.116   | 0.162       | 0.000      | 0.000    |

\**p* < 0.05 level (two-tailed).  
\*\**p* < 0.01 level (two-tailed).

gap was in the responsiveness sub-dimension. Other studies in the literature support these findings. For instance, Bahadori et al. determined, in their study conducted with individuals with CKD, that the service quality perceptions of the patients regarding the health care services were lower than their expectations. It was further determined in the research mentioned above that the highest mean service quality perception score was obtained in the assurance sub-dimension ( $4.30 \pm 0.36$ ), and the lowest mean service quality perception score was obtained in the empathy sub-dimension ( $3.84 \pm 0.34$ ) [14]. Bowen Bucheli and Fosado Téllez determined that quality perception is high only in the sub-dimension of empathy [16]. In another study conducted in Türkiye, it was demonstrated that the quality of service perceived by CKD patients was most influenced by the “tangibles” subdimension and least influenced by the “empathy” subdimension [15].

This study revealed that women and patients aged 60 and over have higher quality perception scores than men regarding the care service delivered ( $p < 0.05$ ). It can be concluded that young male patients have higher expectations and require services in more technologically advanced and professional environments. This result is similar to the literature [26].

Our study has revealed that patients are moderately satisfied with the services. In particular, it has been determined that the satisfaction levels of patients aged 60 and over, women, and those with low income are statistically significantly higher than those of other groups ( $p < 0.05$ ). This finding is consistent with the existing literature [27, 28]. On the contrary, a study conducted with CKD patients in Türkiye found that male patients had higher satisfaction levels than female patients [29].

This research was conducted in the hemodialysis clinic of a public hospital providing services in Türkiye. Most of the patients who participated in the study (60%) were aged 60 years or older. The majority had been receiving treatment at the same hospital for a long time (24 months or more). Most participants stated that they would choose the same hospital for treatment again (92.4%) and would recommend it to others (93.3%). This can be attributed to the trust in public hospitals in Turkey. The highest satisfaction scores were obtained in the “interpersonal communication and technical quality” sub-dimensions.

In contrast, the lowest satisfaction scores were obtained in the “communication” sub-dimension. Additionally, it was found that low-income patients scored higher than patients with higher incomes in the sub-dimensions of communication, financial dimension, accessibility, and adaptation, as well as in the total PSQ-18 scale ( $p < 0.05$ ). The lower expectations of patients with lower income levels can explain this finding.

Finally, the results obtained in this study revealed a significant positive correlation between “perceived service quality” and patient satisfaction ( $r = 0.501$ ,  $p < 0.01$ ). The most crucial quality perception sub-dimensions affecting the satisfaction of hemodialysis patients were found to be “reliability” and “responsiveness”. Similarly, another study conducted in India revealed that the sub-dimensions of “reliability” and “responsiveness” of service quality perception affect patient satisfaction [30]. The patients’ total SERVQUAL scale scores were found to be moderately positively correlated with “time spent with the doctor ( $r = 0.326$ ,  $p < 0.01$ )” and “accessibility ( $r = 0.432$ ,  $p < 0.01$ )” sub-dimensions of patient satisfaction. These results are supported by other studies conducted with CKD patients in national and international literature [17,31-37]. In these studies, the factors that most influenced patient satisfaction in CKD patients were ranked as concrete factors such as reliability, empathy, staff behavior, courtesy, persuasiveness, accessibility of services, accurate information, and communication [17,31-37]. Another study conducted in India revealed that accreditation statistically significantly improved the average satisfaction scores of hemodialysis patients compared to those before accreditation [38].

**Conclusion**

The results obtained from the study indicate that the perceptions of hemodialysis patients regarding the quality of healthcare services are lower than their expectations; in other words, there is a negative gap between the expected quality of services and the perceived quality of services. The most important contribution of this study to the literature is the identification of these gap areas. Indeed, the highest quality

difference between expected and perceived service quality was found in the “reliability (accurate and complete delivery of services)”, “tangibility (condition of physical facilities, equipment, staff, and communication materials)” assurance (Employees' ability to provide information about the services offered, their courtesy, and their ability to inspire confidence" dimensions. This suggests that hemodialysis patients who require hospital visits 2-3 times a week expect more modern devices and a more comfortable treatment environment. Furthermore, patient perceptions of reliability can be improved by enhancing the reliability of services, providing clear and effective information about the clinical process to healthcare personnel, implementing accurate and timely treatment interventions, and ensuring patient participation in clinical processes and decision-making. Furthermore, although the patients participating in the study generally achieved high satisfaction scores, they were less satisfied with “interpersonal approach” and “technical quality.” These results are consistent with patients' quality perception assessments.

Providing participant and patient-centered services is a common goal of all healthcare institutions. Feedback obtained directly from patients regarding the services provided in healthcare institutions offers valuable information for managers to inform future planning and identify improvements that need to be implemented. By addressing these areas, the hospital can work towards closing the gap between patient expectations and their perceptions of service quality, ultimately leading to higher overall patient satisfaction.

Limitations

This study is a single-center investigation conducted with patients receiving hemodialysis treatment at a state hospital in Türkiye; therefore, the results cannot be generalized to patients in other countries or regions. Additionally, patients' assessments of service quality and patient satisfaction are based on their statements, which may be considered a potential source of bias. Furthermore, the mandatory nature of hemodialysis services, which must be repeated at specific intervals, the necessity for patients to continue receiving this service until they undergo kidney transplantation or pass away, and the limited-service capacity of the institution have contributed to the limited number of patients included in the study. Finally, the survey method used to obtain research data is susceptible to social desirability bias. Including qualitative research methods in future studies may increase the depth of the analysis. We also recommend that researchers contribute to the literature through

quality measurements and satisfaction assessments in centers of different sizes or through cross-cultural studies.

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