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M. Kanan

Jeddah College of Engineering, University of Business and Technology, Jeddah 21448, Saudi Arabia,
m.kanan@ubt.edu.sa

R. Al-Khalili

Grand Optics, West Bank, Ramallah, Palestine, alkhilil.ruba@hotmail.com

E. Alshaibani

College of Business Administration, University of Karbala, Karbala, Iraq, ilham.nadhom@uokerbala.edu.iq

Y. Saleh

Department of Industrial Engineering, Faculty of Engineering and IT, An-Najah National University, P.O. Box 7, Nablus, West Bank, Palestine, ysaleh@najah.edu

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Assessing Service Quality at Optical Centers in Palestine Using SERVQUAL: Measuring Ambiguity

M. Kanan^{1,*}, R. Al-Khalili², E. Alshaibani³, Y. Saleh⁴, R. Assaf⁴, A. Al-Mimi⁵, and A. Bakir^{6,7}

¹Jeddah College of Engineering, University of Business and Technology, Jeddah 21448, Saudi Arabia

²Grand Optics, West Bank, Ramallah, Palestine

³College of Business Administration, University of Karbala, Karbala, Iraq

⁴Department of Industrial Engineering, Faculty of Engineering and IT, An-Najah National University, P.O. Box 7, Nablus, West Bank, Palestine

⁵Administrative and financial sciences department, Arab American University, P.O. Box 240, Jenin, Ramallah Campus, West Bank, Palestine

⁶Human Resources Department, College of Business Administration, University of Business and Technology, Jeddah 21488, Saudi Arabia

⁷Human Resources Department, Buckinghamshire New University, High Wycombe HP11 2JZ, UK

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Abstract: The main purpose of this article is to employ the SERVQUAL model to assess customers' perceptions and expectations of service quality in the optical centers in the West Bank of Palestine, and to examine the impact of this service quality on their satisfaction. A focused critical review of the service quality literature was undertaken. Data was collected from a convenient and purposeful sample of 251 customers of optical centers in the West Bank via personally administered and online questionnaires. Data was analyzed, with the aid of SPSS, using descriptive and inferential statistics, including the Mann-Whitney test, the Kruskal-Wallis test, regression analysis, and the Wilcoxon signed-rank test. The findings indicate that SERVQUAL proved to be a good tool for the purpose of assessing the gaps between customers' expectations and perceptions of the service quality of optical centers in the Palestinian context. The findings also confirmed that customers had higher service quality expectations than perceptions in all the five dimensions of SERVQUAL. The developed regression analysis model shows that tangibles, reliability, assurance, and empathy had a significant statistical impact on customers' satisfaction. No studies, to the best knowledge of the authors, were conducted on customers' perceptions and expectations of service quality in the optical centers in the Palestinian context. Limitations of the study's methodology and findings were discussed and avenues for further research suggested. The findings of this study could be valuable to interested parties including optometry regulators and managers of optical centers.

Keywords: Service Quality; SERVQUAL Model; Perceptions; Expectations; Customer Satisfaction; Optical Centers; Ambiguous, Construct.

1 Introduction

Service-sector businesses operate in an environment that is increasingly characterized by intense competition. Focusing on service quality, it is argued, plays a central role in the management and improvement of services provided to customers, and can be one of the most important requirements for these businesses to survive and succeed [1,2]. In this study, service quality is used to refer to the difference between customers' expected quality of a service and customers' perceived quality of the same service [3]. Studies have shown that service quality is an antecedent of customer satisfaction and customer loyalty [4,5,6,7,8,9]. This is because it is perceived by customers as the source of the value of product or service [10,11,12,13,14]. In fact, customer satisfaction is considered as one of the most important indicators of the level of service quality [15]. In this study, and following the consensus among academics, customer satisfaction is treated as distinct from service quality, and understood as the degree of pleasure felt by a customer resulting from comparing perceived quality from the good or service with expected quality [16]. Many researchers emphasized that better service quality is the cornerstone to achieve customer satisfaction, improve corporate image, retain current customers, attract new ones, and enhance corporate profits [1,2,17].

In the context of health service, customer perception of service quality is also considered as a success factor [18]. Research indicates that users' perceptions of service quality affect the profitability of the healthcare provider and user satisfaction with the service (e.g., [19]). Moreover, the centrality of perceived service quality to patients' satisfaction has a consequent impact on their loyalty and word-of-mouth; this requires healthcare providers to consider service quality as a necessity

*Corresponding author e-mail: m.kanan@ubt.edu.sa

which must always be improved [20]. Many studies have accordingly been undertaken to evaluate service quality in healthcare and its effect on patients' satisfaction. This research is concerned with eye care, focusing on optometry services offered by optical centers in the West Bank of Palestine. In the Palestinian context, optical centers need to have a clear picture of the perceptions of their customers to provide high level of quality services that meet and exceed customers' expectations, especially in the light of the increasing competition among these centers that total 249 in Palestine, with 154 of them located in the West Bank and 95 in Gaza Strip. Thus, and given the growing need to conduct more research regarding the assessment of service quality and its effect on customers' satisfaction, this study aims to fill this gap. It employs SERVQUAL as an instrument to assess the service quality of optical centers operating in the West Bank, and to investigate its impact on their customers' satisfaction.

The rest of the paper is organized as follows. In section 2, a focused critical review of the relevant service quality literature is undertaken, discussing the construct of service quality, pointing to its ambiguous nature (sub-section 2.1). The subsequent sub-section (2.2) deals with measuring service quality and how the literature dealt with its ambiguity and context specificity in general and in the healthcare service, leading to the reason why SERVQUAL was used in this research (2.3). The next sub-section (2.4) presents a brief expose of the equally ambiguous construct of customer satisfaction. This is followed by an overview of the optical service sector in the West Bank, the setting and context of this study (2.5). The literature review closes with the study's research problem and objectives (2.6). The study's methodology is presented in section 3, the theoretical framework and the study hypotheses are presented in sub-section 3.1, and materials and methods in 3.2. Section 4 displays a thorough presentation of the descriptive and inferential statistical analyses and results along with their discussion. Section 5. concludes this study and highlights some practical applications, and limitations of the study, as well as suggesting some future research directions.

2 Literature Review

2.1 Understanding Service quality: an ambiguous concept

Among the many concepts in service literature the concept of quality is the most debated, and as there is no consensus on its composition and meaning [21, 22, 23] this concept remains ambiguous and elusive. The lack of clarity over the concept of quality is also reflected in differences in its measurement. The literature indicates that to develop an understanding of the concept of quality, it is necessary to distinguish between manufactured goods and services, as the quality of manufactured goods is much easier to evaluate than the quality of services, and customers usually evaluate not just the outcome of the service but also the process of service delivery [24]. As such, researchers advise service providers to consider only customers' judgement in evaluating the outcome of service quality [3, 25]. The literature proffer on service quality the characteristics of being individualized, subjective, and intangible (e.g., [26,27,28]). This is because in delivering the service, employees bring to the fore their own personal skills, affective attributes, and emotions; thus, reflecting their values, beliefs, and culture; these are personal attributes which do not lend themselves to standardization or categorization [29]. As such, it is argued that service providers need to consider their whole service experience rather than just focusing on aspects of the service; this is because, customers normally assess the quality of the service based on their total experience with the service [30]. Nickson et al. [31] similarly stressed the importance of the tangible and intangible aspects of the service in customers' judgement of service quality and considered front-line service providers as crucial in the service delivery process. Furthermore, different customers are found to attach different weights to quality, dictated by their values, experiences, way of life, and background [32,33]. Additionally, as the items that indicate of service quality are different for different services; they are not always understood by respondents [34]. Also, being a multi-dimensional construct with many attributes, service quality is viewed differently by different people [25, 35]. These limitations indicate that the findings of service quality research are unlikely to be consistent across different contexts, settings, and services; and therefore, not easy to generalize [36,37, 38].

2.2 Measuring service quality: Dealing with ambiguity and contextual specificity

Service quality, being an elusive construct, suffers from ongoing problems and debates regarding its various dimensions and measurement items (e.g., [3,17,25,39, 40,41, 42, 43]). The elusiveness of service quality invited a host of studies attempting to classify and categorize its contents. For instance, service quality was classified into a technical dimension, referring to what is being delivered; and functional dimension, referring to the psychological and behavioral aspects of the service, and to interaction and atmosphere [44]. Mels et al. [45], on the other hand, advanced the terms: intrinsic and extrinsic as the two dimensions of service quality, and Rust and Oliver [42] proposed a three-factor service quality framework, namely, customer-employee interaction, service outcome, and service environment. Similarly, Brady and Cronin [25] developed a three-factor service quality scale, namely: interaction quality, physical environment quality, and outcome quality. They used attitude, behavior, and expertise to measure interaction quality; ambience, design, and social factors to measure physical environment quality; and waiting time, tangibles, and valence to measure outcome quality.

Other authors added a temporal dimension to the measurement of quality [46]. Studies also point out that service quality is defined differently in different cultural and ethnic contexts, as well as for different products [32,47]. Difficulties were further encountered in quantifying some of the qualitative attributes of service quality (e.g., [48]).

Parasuraman *et al.*'s [3] framework is designed to assess the quality of service by measuring the gap between customers' expectations from the service and their perceptions of the delivered service (see also, [49,50]). They pointed out that expectations reflect the wants of customers that they think a service provider should deliver, while perceptions denote customers' assessment of the service provided, including what and how the service was delivered [50]. Accordingly, Parasuraman *et al.* [3] developed the SERVQUAL instrument to measure this gap by comparing the difference scores or gaps between expectation and perception. They argued that service quality is higher, the higher the perception compared to the expectation; they further claimed that SERVQUAL is dependable as its use to measure service quality in different contexts has thrown consistent results. Their original scale consisted of ten dimensions, which was later reduced to five, namely: reliability, responsiveness, tangibles, assurance, and empathy. The service provider's ability to perform the service dependably and accurately is referred to as reliability; willingness to help and provide prompt service to customers as responsiveness; courtesy, knowledge, and ability to convey confidence and trust as assurance; caring and providing personal attention as empathy; and appearance of facilities, equipment, and personnel, as tangibles [3]. In the service sector, these authors found that customers view reliability as the most important and tangibles the least important.

Servqual's wide acceptance and use in various service industries led Parasuraman *et al.* [3] to assert that it is universally valid and applicable, however, many subsequent studies failed to produce evidence to support this claim (e.g., [37]). Servqual has also been criticized for the likelihood that its dimensions can be reduced to only two, specifically, core and augmented services [51] and that the scale cannot be applied in all service sectors unless the type of service sector is taken into consideration [52]. Just as problematic is the issue of asking respondents to rate their expectations from the service simultaneously with rating their perceptions of the quality of the service they received [53]. There is also the issue of similarity with the construct of customer satisfaction, for although there is a general agreement that service quality and customer satisfaction are two distinct constructs, many researchers still use one term to mean the other, prompting more ambiguity and spurious measurement and findings [43, 54]. Furthermore, Servqual was also persistently criticized for other shortcomings, for example: the use of "expectation" as a standard for measuring the "perception" of quality; and that expectation does not offer more useful information for measuring service quality [33,39,55]. Accordingly, Cronin and Taylor [39] called for abandoning the gap-based approach of Servqual in favor of using the performance-only scale, Servperf, as the latter functions better in measuring service quality. The service quality literature thus shows no consensus among academics over the more appropriate scale to use as a service quality measure, and no agreement over the measure's dimensions or contents. It also shows that in measuring service quality, studies mainly use Parasuraman *et al.*'s [3] perspective with Grönroos' [44] perspective as a distant second.

2.3 Measuring quality in healthcare: Why SERVQUAL?

Healthcare service quality can be defined in terms of technical and functional qualities, where technical qualities denote the skills, procedures, and medical treatment, and functional qualities focus on how the healthcare services are delivered to patients [56]. Nevertheless, assessing service quality in the healthcare sector is not an easy task since, a) understanding patients' attitudes is difficult, b) the fact that healthcare is provided by professionals of different attributes and personal characteristics, and c) healthcare services are intangible, heterogeneous, and simultaneous [57,58,59]. The simultaneity characteristic of healthcare services is attributed to the fact that they are created and consumed at the same time; they are heterogeneous as they encompass views and interests of different healthcare stakeholders; and they are largely intangible as their quality relies upon the service processes and patients' interactions with healthcare providers [58,60]. What constitutes quality in healthcare thus incorporates the views about these characteristics of different healthcare stakeholders, including: recipients, medical staff, policy makers [23], and many others. Healthcare is also complex, as: different healthcare providers have different delivery requirements and concerns, its provision requires conformity to a myriad of ethical considerations [61, 62], and it is provided for patients with different backgrounds and experiences by professionals of different attributes and personal characteristics [57,60]. These characteristics call for the near impossible task of developing a general model that integrates and coordinates, in a systematic way, managerial and medical inputs, processes, and outputs [63].

Many researchers endeavored to develop healthcare quality measurement models, mainly in hospital service settings in developing countries [64,65]. Some studies used the generic models of Servqual and Servperf; however, other researchers have adapted these generic scales to suit the context of their healthcare services. For example, drawing on the works of [3,66,67] adapted Servqual to develop HealthQual for measuring healthcare service quality of hospitals in Malta. This measure consists of six dimensions, namely: admission processes, attitudes of medical staff, attitudes of nurses, ward and hospital environment, patients' amenities and facilities, and discharge planning and coordination. Similarly, PubHosQual scale was developed from the patients' perspective to measure service quality of public hospitals in India [68]. It consists

of the dimensions of admission, medical service, overall service, discharge, and social responsibility. Using the disconfirmation concept of Servqual, Itumalla, et al. [69] developed the HospitalQual scale to monitor, control, and improve the service quality for in-patients in a public hospital in Hyderabad, India. However, healthcare service quality continues to be debatable regarding its various dimensions and items, as well as how different stakeholders perceive the service [23,70, 71]. There are many empirical studies using the original Servqual scale to assess service quality in healthcare contexts. However, hardly any studies were conducted in optical centers, especially in developing countries, including Palestine. In general, studies reported significant statistical differences in patients' perceptions and expectations of service quality due to demographic characteristics [72, 73, 74, 75, 76, 77, 78,79]. Some empirical studies reveal that the service quality gap in the health care context is statistically significant [77,78,80]. Also, many empirical studies indicate that service quality in the healthcare context positively affects patient satisfaction [70, 72, 81, 82,83, 84]. Other studies also stress the importance of providing excellent healthcare service quality to secure trust and loyalty among patients, as well as necessarily reducing the cases of complaints and lawsuits [85].

In this study we opted for the use of Servqual because: it is widely applied in the health service, its different components encompass the items needed to measure service quality in the optical centres, there is a general agreement over its reliability and validity, the scale's items are easy to answer, and the results can be analysed and interpreted employing widely used analytical procedures and techniques [59,86]. Furthermore, in using SERVQUAL, we follow most researchers who chose this scale to measure service quality (see [25]).

2.4 Customer Satisfaction

There are two classical formulations of satisfaction: The first is the confirmation/disconfirmation approach which posits that a customer's level of satisfaction with a service is determined by the difference between the customer's expectation and perception of the actual performance [87]. The second formulation is advanced by Locke [88] it contains the additional variable of importance, where the importance of a service is considered as a core determinant of satisfaction [87,88, 89]. It is argued that these formulations of satisfaction, though plausible, suffer from the conceptual problems of: ambiguity regarding a) the notion of "expectation" and the over-fulfilment effects of "expectation" [90]; b) offering a simple relative difference between performance and expectation, fails to consider absolute levels in the difference between expectation and performance [91]; and c) an assumption that performance, expectation, and importance all carry equal significance in determining satisfaction [89]. Furthermore, requiring respondents to rate their expectation from the service and the degree of their expectation fulfilment at the same time, rather than separately [92,93].

Empirical studies regarding satisfaction in healthcare contexts can be traced back to the 1960s [94, 95]. At first, researchers concentrated on patient satisfaction to achieve positive treatment results by following doctors' guidelines. Over time, empirical studies on patient satisfaction focused on assessing and then improving healthcare services [84]. It is argued that customer satisfaction is the sense of pleasure that occurs when needs and wants of a given customer are realized; it is the sensation of happiness that particularly results when customers' perceptions of the service exceed their expectations [96,97]. Similarly, Zeithaml et al. [14] referred to customer satisfaction as the consumers' actual experience with a certain service compared to previous anticipations. Other authors concurred with this understanding of the concept of satisfaction; for instance, Petruzzellis et al. [98] suggested that customers get satisfied if the services delivered to them meet their expectations, Rad and Yarmohammadian [99] saw satisfaction as an intended effort that makes customers feel happy, and Hansemark and Albinsson [100] viewed it as an overall customer opinion of a given service, or a response to the gap between what customers expect and what they experience, with reference to the fulfillment of a need or want. The general concept of customer satisfaction can be applied in the healthcare arena. In this context, patients' satisfaction has been described as patients' feelings, attitudes, and perceptions of healthcare services provided to them by healthcare service providers [101].

Research has reported a direct causal relationship between healthcare perceived service quality and patient satisfaction. It has shown that the higher the quality of healthcare service, the more prominent the patient satisfaction [2,39,102]. Badri et al. [103] found that patients and their satisfaction are the most basic elements in the organizing, operationalizing, and appraising of service delivery; and that addressing patients' healthcare requirements is central to accomplishing high reputation and service value. It has become customary in healthcare to use patient satisfaction to determine service quality, and many studies reported a positive association between healthcare service quality and patient satisfaction (e.g., [104]). It has also been shown that positive patient feelings and attitudes result in trust and favorable judgment about the healthcare provider [105], and that patient satisfaction mediates the relationship between service quality and behavioral intentions [106,107]

2.5 Overview of Optical Services Sector in Palestine

The profession of optometry in Palestine dates to the 1970s. At that time, optometric facilities were primitive and dependent on the skills of optometrists. In addition, there were few optometrists and limited number of optical centers.

Later, limited types of eyeglasses were available. During the 1980s, the profession witnessed great progress due to providing the local market with optometric specialists who obtained their scientific degrees in the field from Arab and international universities. Currently, the profession has been rapidly developing. This development is reflected in increasing numbers of qualified optometrists, diversified optical products and services, and advanced optical equipment used in eye examinations.

The Palestinian Council of Optometry and Optics, a member of the World Council of Optometry, was founded in 2005 to be the legal body that is responsible for regulating, organizing, and developing the optometry profession in Palestine. The council aims to protect and regulate the profession of optometry, make partnerships with the Ministry of Health and other related bodies to upgrade the level of services provided, encourage scientific research in this field, make the necessary amendments to the laws and bylaws of the council, and participate in international conferences. Services provided by optical centers in Palestine include, testing the visual systems of their clients, conducting routine and comprehensive eye examinations, carrying out adult eye examinations, providing primary eye care, recommending clients to refer to ophthalmologists for specialty care for eye diseases and disorders, delivering vision rehabilitation services for those who are experiencing vision impairment, and providing eyeglasses and contact lenses.

It is worth mentioning that there are 249 licensed optical centers in Palestine (154 in the West Bank and 95 in Gaza Strip). These optical centers employ approximately 441 optometrists, who are medical professionals whose job is to provide eye-related services including health of eyes, their physical structure, and overall vision system. Unfortunately, there are no formal data on the contribution of this sector to the national economy.

2.6 Problem Statement and study objectives

Service-sector businesses have recently been growing at an increasing rate. Today, these businesses are encountering significant challenges mainly represented by intense competition, which in turn affects their success and survival. Hence, service quality is an important concern for these businesses [108] since countless studies show that it affects many important variables including customer satisfaction, customer value, and customer loyalty [109]. The optical sector in the West Bank, Palestine is becoming highly competitive as well. This puts more pressure on optical centers to improve the quality of services provided to enhance their customers' satisfaction. It is essential for these centers to assess the quality level of their services and to investigate its impact on their customer satisfaction. This study aims at assessing the service quality of optical centers in the West Bank-Palestine and investigating its impact on customer's satisfaction through employing the SERVQUAL model.

The specific objectives include assessing the level of customers perceived and expected service quality levels, examining if customers perceived and expected service quality levels vary with their socio-economic characteristics, examining if there is any significant statistical gap between perceived and expected service quality levels, and identifying which SERVQUAL dimensions most significantly influence the overall level of customers' satisfaction in these optical centers.

3 Methodology

3.1 Theoretical Framework and Hypotheses Development

Figure 1 depicts the SERVQUAL model employed in this study where the five quality dimensions (independent variables) are hypothesized to have an impact on customer satisfaction (dependent variable). The model also includes the socio-economic profile which represents the demographics of the customers. Accordingly, as shown in the model, the following research hypotheses are formulated to be tested at significance level (α) of 0.05:

H1: There is a significant statistical difference in the customers' perceptions due to socio-economic characteristics.

H2: There is a significant statistical difference in the customers' expectations of the level of service quality due to socio-economic characteristics.

H3: Tangibles has a significant statistical impact on customer satisfaction.

H4: Reliability has a significant statistical impact on customer satisfaction.

H5: Responsiveness has a significant statistical impact on customer satisfaction.

H6: Assurance has a significant statistical impact on customers' satisfaction.

H7: Empathy has a significant statistical impact on customer satisfaction.

The following hypothesis is a general one which is not shown in Figure 1:

H8: There is a significant statistical difference between the perceived and expected levels of service quality.

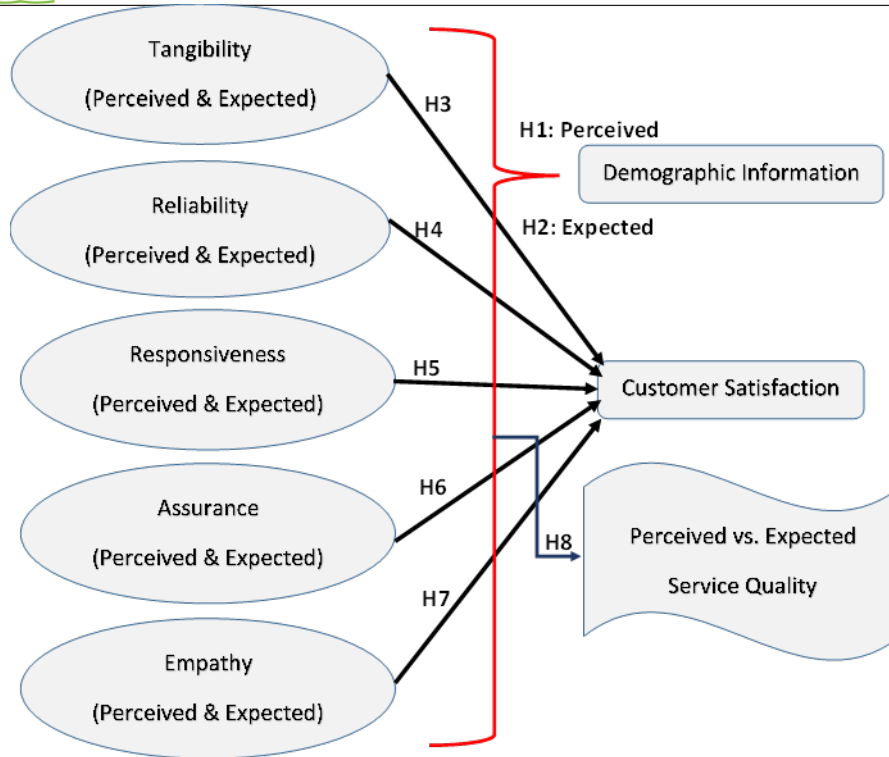


Fig. 1. The SERVQUAL model

3.2 Materials and Methods

Hypothesis-testing empirical approach was used. The primary data were gathered, using convenience and opportunistic sampling of optical centers' customers in the West Bank-Palestine via a structured questionnaire that is both personally administered and electronically distributed. Unfortunately, no official statistics are available on the total number of those customers. However, it is estimated that 60% of the population globally wear glasses, contact lenses, or other visual aids. Therefore, and assuming that the same percentage is applicable in the Palestinian context, the population of study is estimated to be 1.8 million, given that the total population in the West Bank-Palestine is 3 million [110]. The sample of the study is computed using the following formula [111]:

$$n = \frac{N \times p(1 - p)}{([N - 1 \times (d^2 \div z^2)] + p(1 - p))} \quad (1)$$

where:

- n: Sample size.
- N: Population size (1.8 million).
- z: Confidence level at 95% (1.96).
- d: Error proportion (5%).
- p: Probability of picking a choice (50%).

Accordingly, by substituting in the above formula, it is found that a sample of 385 customers of optical centers in the West Bank-Palestine are needed to be surveyed. However, due to the state of emergency because of the coronavirus pandemic, 251 completed questionnaires were received within a period of approximately 9 weeks, from 11/02/2020 until 16/04/2020. This represents a response rate of 65%. All these responses are found to be valid for further descriptive and inferential statistical analysis.

3.2.1 Instrument Development

A questionnaire was used to collect the primary data. The SERVQUAL model is mainly used to develop the questionnaire which consists of three parts. The first part aims to collect data on the socio-economic characteristics of respondents; it includes seven items: (1) gender, (2) age, (3) place of residence, (4) education, (5) employment status, (6) household income, and (7) insurance status. The second part aims to collect data on the level of service quality of optical centers in the West Bank- Palestine. This part consists of 22 items belonging to five dimensions: (1) tangibles: (four items), (2) reliability (five items), responsiveness (four items), assurance (four items), and empathy (five items). The third part,

consisting of 11 items, aims to collect data on the level of customers’ satisfaction with the services delivered by the optical centers.

A 5-point Likert scale was used in the second and third parts of the questionnaire, with 1 being “Strongly Disagree” and 5 being “Strongly Agree”. All items were positively worded. Therefore, no items needed to be reversed. Higher scores (moving from 1 to 5) indicate higher levels of expected or perceived service quality as well as higher levels of customers’ satisfaction. The levels of service quality in the optical centers and customer satisfaction with the services provided by these centers are evaluated as shown in Table 1.

Table 1: Evaluation criteria of service quality and customer satisfaction.

Low	Moderate	High
1 – 2.33	2.34 – 3.66	3.67 – 5

3.2.2 Validity and Reliability of Instrument

Validity refers to the extent to which the instrument measures the right concept. Content validity is the most important among all types of validity. It ensures that the instrument contains enough representative dimensions and items that capture the variable. The content validity of the instrument can be confirmed by several expert judges [112]. To establish content validity, two expert judges evaluated the instrument in terms of content, wording, format, and sequencing of questions. Based on their feedback, the necessary modifications have been made. On the other hand, the reliability of the instrument reflects the degree to which it is free of bias and therefore makes sure that the instrument is consistent over time and across the different items [112].

To test the internal consistency reliability of the instrument, the coefficient of Cronbach Alpha was used as shown in Table 2. Generally, Cronbach Alpha coefficients that are less than 0.60, in the 0.70 range, and more than 0.80 are poor, acceptable, and good, respectively [84]. The results show that the Cronbach Alpha coefficients are 0.963, 966, and 0.943 for expected service quality, perceived service quality and customer satisfaction, respectively. These coefficients are well above the minimum acceptable level of 0.70, indicating that the reliability of each of the scales is very good.

Table 2: Cronbach Alpha coefficient values

Construct	Number of Items	Cronbach Alpha	
		Expectations	Perceptions
Service quality	22	0.963	0.966
Tangibles	4	0.853	0.887
Reliability	5	0.876	0.902
Responsiveness	4	0.915	0.924
Assurance	4	0.900	0.905
Empathy	5	0.903	0.904
Customer satisfaction	11		0.943

4 Results and Discussion

4.1 Respondents’ Socio-Economic Characteristics

Table 3 shows descriptive statistics of respondents’ socio-economic characteristics. The results indicate that 28.3% of respondents are males and 71.7% are females. With respect to age, 10% of respondents are 20 years or less, 49.8% are between 21 and 30 years, 24.3% are between 31 and 40 years, 10.8% are between 41 and 50 years, and 5.2 % are over 50 years. Moreover, 64.9% of respondents live in cities, 7.6% live in towns, 24.3% live in villages, and only 3.2% live in refugee camps. In terms of educational level, less than 1% of respondents have no education, 4.4% have secondary or primary education, 2% have vocational training, 6% hold Diploma degree, 65.3% hold BA (Sc.) degree, 18.7% hold Master’s degree, and 2.8% hold PhD degree.

The distribution of sample respondents according to employment status indicates that 65.3% of them are employed and 34.7% are unemployed. Regarding household income, 2.8% have low income, 88.4% have moderate income, and 8.8% have high income. 64.1% of respondents have health insurance, 33.1% have no health insurance, whereas 2.8% reported that their health insurance is under issuance.

4.2 Level of Service Quality

The gap analysis of SERVQUAL dimensions in the optical centers in the West Bank-Palestine are presented in Table 4. The results indicate that customers of optical centers have higher service quality expectations than perceptions regarding all the five dimensions, with a gap score of 0.18. This suggests that none of the customers’ expectations is met in all the SERVQUAL dimensions, as the gap scores are 0.17, 0.23, 0.18, 0.17, and 0.15 for tangibles, reliability, responsiveness,

assurance, and empathy, respectively. Moreover, the results indicate that reliability and responsiveness have the most significant gap scores while tangibles, assurance, and empathy have less gap scores.

Table 3: Respondents' socio-economic characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Male	71	28.3
	Female	180	71.7
Age	20 or less	25	10.0
	21–30	125	49.8
	31–40	61	24.3
	41–50	27	10.8
	Over 50	13	5.2
Place of residence	City	163	64.9
	Town	19	7.6
	Village	61	24.3
	Refugee Camp	8	3.2
Educational level	No education	2	.80
	Primary/secondary	11	4.4
	Vocational training	5	2.0
	Diploma	15	6.0
	BA	164	65.3
	Master's	47	18.7
	PhD	7	2.8
Employment status	Employed	164	65.3
	Unemployed	87	34.7
Household income	Low	7	2.8
	Moderate	222	88.4
	High	22	8.8
Insurance status	Health insurance	161	64.1
	No health insurance	83	33.1
	Under issuance	7	2.8

Table 4: Gap analysis of the SERVQUAL five dimensions

SERVQUAL Dimension	Expectations Score (ES)	Perceptions Score (PS)	Gap Score (= ES – PS)
Tangibles	4.12	3.95	0.17
Reliability	4.21	3.98	0.23
Responsiveness	4.26	4.08	0.18
Assurance	4.28	4.11	0.17
Empathy	4.14	3.99	0.15
Total	4.20	4.02	0.18

4.3 Level of Customer Satisfaction

The level of customers' satisfaction with services delivered by the optical centers are presented in Table 5. The results indicate that customers have a high level of satisfaction, with an overall score of 3.87 out of a possible maximum of 5. Although the overall level of customers' satisfaction is high, they are less satisfied with two aspects, namely, customers have a moderate level of satisfaction with the cost of services and the sense of wellbeing.

Table 5: Descriptive statistics of customer satisfaction

Item	Standard Deviation	Mean	Qualitative Level
Cost of services	1.229	3.39	Moderate
Sense of wellbeing	1.043	3.66	Moderate
Waiting time	1.055	3.71	High
Services delivered	0.848	4.02	High
Explanation given	0.962	3.95	High
Employees	0.867	4.06	High
Complaint procedures	1.055	3.80	High
Physical facilities	0.895	3.94	High

Item	Standard Deviation	Mean	Qualitative Level
Cleanliness	0.873	4.12	High
Location	0.945	4.06	High
Total		3.87	High

4.4 Testing for Normality

Before testing hypotheses, it is necessary to test if data are normally distributed. The well-known test of Kolmogorov-Smirnov was used. The output of normality test for the five SERVQUAL dimensions as well as customer satisfaction data are shown in Table 6. In this context, it is useful to recall that the null hypothesis of this test is that data do not follow normal distribution whereas the alternate hypothesis is that data are normally distributed. The results indicate that all dimensions of the SERVQUAL and customer satisfaction have significant P-values at the 0.001 level, indicating that there is a statistically significant deviation from normality. Therefore, the null hypothesis that data are not normally distributed is supported and the alternate hypothesis rejected.

Table 6: Kolmogorov-Smirnov normality test

Construct	Statistic	Degrees of freedom (df)	Sig.	Decision
Perceived service quality				
Tangibles	0.135	251	0.000	Not normal
Reliability	0.136	251	0.000	Not normal
Responsiveness	0.137	251	0.000	Not normal
Assurance	0.146	251	0.000	Not normal
Empathy	0.138	251	0.000	Not normal
Expected service quality				
Tangibles	0.132	251	0.000	Not normal
Reliability	0.153	251	0.000	Not normal
Responsiveness	0.169	251	0.000	Not normal
Assurance	0.189	251	0.000	Not normal
Empathy	0.140	251	0.000	Not normal
Customer satisfaction				
	0.075	251	0.002	Not normal

Hypotheses Testing

Test of Hypothesis 1

To test hypothesis 1, the non-parametric tests of Mann-Whitney and Kruskal-Wallis were used as shown in Table 7. These tests were applied since data were not normally distributed. The results indicate that there are significant statistical differences in the customers’ perceptions of the level of service quality due to age, level of education, and level of income at the 0.05 level.

To examine among which groups the true differences were, the output of the multiple comparisons test is shown in Table 8. The results indicate that there is a significant difference between customers who are between 41 and 50 years old and customers who are 20 years old or less where the second age group has a higher level of perceived service quality. Similarly, there is a significant difference between customers who are between 21 and 30 years old and customers who are 20 years old or less where the second age group has higher perceptions of service quality. This result is consistent with that of Christia and Ard [74] who also confirmed that perceptions of service quality significantly differ between the different age groups; however, they did not test the age groups among which the true differences exist. In addition, there is a significant difference between customers who hold Master’s degree and customers who hold Diploma degree, where Diploma holders have higher perceptions of the level of service quality than Master’s holders.

Table 7: Customers’ perceived service quality with respect to socio-economic characteristics

Variable	Test	Significance	Decision
Gender	Mann-Whitney	0.079	Not supported
Age	Kruskal-Wallis	0.007	Supported
Place of residence	Kruskal-Wallis	0.572	Not supported
Level of education	Kruskal-Wallis	0.012	Supported
Employment status	Mann-Whitney	0.276	Not supported
Level of income	Kruskal-Wallis	0.012	Supported
Insurance status	Kruskal-Wallis	0.731	Not supported

This result is consistent with that of Lin et al. [77] who reported that there are significant differences in service quality perceptions between different educational levels. The results further show that customers' level of perceived service quality differs significantly between customers who have a high level of income and customers who have a moderate level of income, where the second category had higher perceived service quality than the first category. This result is similar to those of Christia and Ard [74] who reported a significant difference in the perceptions of service quality between the different income levels; however, these authors did not test the levels of income among which income levels the true differences exist.

Test of Hypothesis 2

To test hypothesis 2, the nonparametric tests of Mann-Whitney and Kruskal-Wallis were also used as shown in Table 9. These tests are selected since data are not normally distributed. The results indicate that there are significant statistical differences in the customers' expectations of the level of service quality due to level of education, employment status, and level of income at the 0.05 level.

Table 8: Multiple comparisons: customers' perceived service quality

Category 1	Category 2	Test Statistic	Significance *
Age			
41-50	20 or less	68.076	0.007
21-30	20 or less	46.560	0.034
Level of education			
Master's	Diploma	67.814	0.034
Level of income			
High	Moderate	48.270	0.009
* Only significant differences are displayed.			

More specifically, the results indicate that the level of customers' expected service quality in the optical centers varies between the employed and the unemployed at the 0.05 level where the employed have higher expectations than the unemployed.

Table 9: Customers' expected service quality with respect to socio-economic characteristics

Variable	Test	Significance	Decision
Gender	Mann-Whitney	0.667	Not supported
Age	Kruskal-Wallis	0.492	Not supported
Place of residence	Kruskal-Wallis	0.053	Not supported
Level of education	Kruskal-Wallis	0.000	Supported
Employment status	Mann-Whitney	0.024	Supported
Level of income	Kruskal-Wallis	0.046	Supported
Insurance status	Kruskal-Wallis	0.483	Not supported

To examine among which educational and income levels the true differences were, the output of the multiple comparisons test is shown in Table 10. The results indicate that there is a significant difference between customers with Master's degree and customers with PhD degree, where PhD degree holders have higher level of expected service quality than Master's holders. Similarly, customers with Master's degree and customers with Diploma degree have different levels of expected service quality, where Diploma holders have higher expectations than Master's holders. This result is inconsistent with that of Manulik, et al. [79] who found that the level of education does not affect expected level of service quality.

Table 10: Multiple comparisons: customers' expected service quality

Category 1	Category 2	Test Statistic	Significance *
Level of education			
Master's	PhD	-100.397	0.013
Master's	Diploma	76.368	0.008
Level of income			
High	Low	19.573	0.037
* Only significant differences are displayed.			

Regression Analysis

To test hypotheses 3, 4, 5, 6 and 7, the multiple regression analysis was used. This technique was selected since we are interested in explaining the variance in one dependent variable (i.e., customers’ satisfaction) using more than one independent variable (i.e., SERVQUAL dimensions). The output of regressing the five service quality dimensions on customers’ satisfaction is shown in Table 11.

The results indicate that tangibles, reliability, assurance, and empathy had positive and significant coefficients at the 0.05 level of 0.188. This indicates that each of these SERVQUAL dimensions positively affects customer satisfaction. To say it differently, improving each of these dimensions in the optical centers in the West Bank-Palestine leads to more satisfied customers. Therefore, hypotheses 3, 4, 6 and 7 are supported. In contrast, the coefficient of responsiveness is not significant at the 0.05 level, indicating that this SERVQUAL dimension has no effect on customer satisfaction. Hypothesis 5 is thus not supported; this is in agreement with that of Al-Damen [70], Nawaz et al. [82], and Alrubaiee and Alkaa’ida [72] who all reported a statistically significant impact of patients’ perceived health care services on their satisfaction.

Furthermore, the results indicate that the F-statistic of 119.169 is significant at the 0.001 level. Therefore, the overall regression model is significant. The following regression equation summarizes the relationship between customer satisfaction and the significant SERVQUAL dimensions:

$$Customer\ Satisfaction = 0.145 + 0.188 * Tangibles + 0.140 * Reliability + 0.239 * Assurance + 0.295 * Empathy \quad (2)$$

Table 11: Regression results

Constant & Variables	Unstandardized Coefficients		Standardize Coefficients	t	Significance
	β	Std. Error	Beta		
Constant	0.145	0.163		0.887	0.376
Tangibles	0.188	0.050	0.176	3.741	0.000
Reliability	0.140	0.064	0.151	2.184	0.030
Responsiveness	0.065	0.070	0.067	0.925	0.356
Assurance	0.239	0.063	0.249	3.793	0.000
Empathy	0.295	0.057	0.315	5.211	0.000
R-square			0.709		
Adjusted R-square			0.703		
F-statistic			119.169		
Sig.			0.000		

Test of Hypothesis 8

To test hypothesis 8, the Wilcoxon test is used as shown in Table 12. This test is selected since we are interested in comparing the means of two variables in the same group (i.e., perceived and expected levels of service quality) while data are not normally distributed. The results indicate that the gap between perceived and expected service quality is statistically significant at the 0.001 level for all the five SERVQUAL dimensions. Thus, hypothesis 8 is supported. This result is consistent with that of Heng [80] who found that patients expected, and perceived levels of service quality are significantly different in all dimensions, and with Lin et al.’s [77] conclusion that the service quality gap is statistically significant.

Table 12: Wilcoxon signed-rank test: perceived and expected service quality

Dimension	Z Value	Significance	Decision
Tangibles	-4.782	0.000	Supported
Reliability	-5.608	0.000	Supported
Responsiveness	-4.736	0.000	Supported
Assurance	-4.069	0.000	Supported
Empathy	-2.996	0.003	Supported

5 Conclusion, Limitations and Implications

The findings indicate that the SERVQUAL model proved to be a good tool in assessing service quality in the optical centers of the West Bank, Palestine, as it identified the shortcomings in the quality of the services they offer. The findings reported that customers of the optical centers have higher service quality expectations than perceptions in all the five service quality dimensions. Nevertheless, customers were highly satisfied with the services provided by these centers with a satisfaction level of nearly 77%, as shown in the regression model. Moreover, customers’ age, educational level, and level of income were statistically significant in their perceptions of the level of service quality. There was also a

significant statistical difference in the customers' expectations of the level of service quality caused by their place of residence, educational level, employment status, and level of income. The developed linear regression model, with 70% coefficient of determination, confirms that tangibles, reliability, assurance, and empathy have significant statistical impacts on customers' satisfaction in the optical centers in the West Bank. This findings differs slightly from previous studies, as these studies reported that reliability is the most important and tangibles, the least important.

Some of the limitations of this study originate in the construct of service quality, as it has been shown that this construct suffers from inconsistency of definition and understanding in different services, contexts, and cultures ([22, 25,35]), and from temporal instability (e.g., [113]). Additionally, its indicators are different in different services and not easily understood by respondents ([34]). Furthermore, as seen in the literature review part of this paper, many researchers use the term service quality to indicate customer satisfaction and vice versa, resulting in confusion and invalid findings [113]. These limitations suggest that the findings of service quality studies are unlikely to be consistent across different contexts and are, therefore, difficult to generalize [36].

Other limitations specific to this study concern the nature of convenience sampling which does not lend itself to generalization of the results. Also, the sample size, being smaller than the theoretically accepted size, limiting its use. Thus, special attention should be made at applying these results to other settings and contexts. The inadequate sample size was due to the state of emergency prompted by the coronavirus pandemic during the data collection process. Furthermore, some customers of the optical centers who responded to the questionnaire were apparently confused between service quality perceptions and expectations.

Notwithstanding the shortcoming of this research, its findings would be useful indicators for relevant decision makers, including the Palestinian Council of Optometry and Optics, managers of optical centers, and officials in optical colleges. These findings also highlight some directions for service quality improvement in the optical centers in the West Bank, Palestine.

In the future, researchers are recommended to assess levels of service quality and customer satisfaction from the viewpoints of stakeholders other than customers. They are also advised to investigate the impact of service quality on customer satisfaction, using scales other than the SERVQUAL. Finally, interested researchers are encouraged to carry out similar studies on other health care service providers.

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Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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