

SERVQUAL Reliability and Validity A Pilot Study to Evaluate Patients' Satisfaction in the Jordanian Hospitals

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[Abstract] Like developed nations, the developing world strives for assuring high standards of healthcare services. To meet this demand, healthcare providers have begun their quest for services improvement using process re-engineering. This paper is a part of major research and documents the finding of a cross-sectional pilot study conducted in Jordan to check the reliability and validity of a patient satisfaction model, SERVQUAL. The study covers a sample of 50 patients who have visited the Emergency Department, ED, of hospitals in Amman and Irbid, Jordan. The pilot study also determines the different dimensions of the service quality in Jordanian hospitals and evaluates the service quality from the patients' perspective. The study concluded that, overall, the SERVQUAL questioner is reliable but not valid. The sub-scale of the questioner does not possess adequate reliability, except responsiveness for the perceived service quality. The study recommends modifying the number of dimensions in SERVQUAL before implementing it on a larger scale and using a shorter instrument.

[Keywords] *SERVQUAL, Patient Satisfaction, Jordan, Emergency Department, Hospital.*

Introduction

The business environment of healthcare systems has transformed rapidly throughout the past few decades (Purbey, Mukherjee & Bhar, 2017). Healthcare providers are expected to deliver excellent service and outcomes while maintaining high levels of accountability (Price, Cleary, Zaslavsky & Hays, 2015). Quality in health services entails two dimensions. First, technical quality, also known as outcome quality, focuses on the accuracy of medical diagnoses and procedures. Second, the functional quality, also known as the process quality, refers to the delivery methods of the health care services to patients (Lin et al., 2004).

Patient satisfaction is an essential element of healthcare systems, since it provides a metric for measuring the technical, service, and structural quality care providers' offer to their patients. Previous research has established a strong association between patient satisfaction and healthcare outcomes, such as patient retention, referrals, clinical readmissions, and recovery (Faezipour, & Ferreira, 2013; Tsai, Orav, & Hha, 2015; Youbd, et al., 2013; Reader, Gillespie, & Robetrs, 2014; Ferrand, et, al., 2016; Trzeciak, & Mazzarelli, 2016; Mohammed, et al., 2016).

Several studies have shown that patients' satisfaction with hospital emergency departments (EDs) is negatively correlated with the lack of necessary help, insufficient explanation of medical conditions, long waiting periods, inadequate explanation of prognosis, lack of accessible and comprehensible explanations of test results, and the inability to determine and schedule checkup visits (Boudreaux & Ohea, 2004; Thompson et al, 1996; Alexander et al, 2016). Previous research has also established that patient satisfaction in Jordan is lower when compared to its level in industrialized countries, such as the United States, United Kingdom, Canada, Australia, and New Zealand (Albusban & Abualrub, 2009; Zineldin, 2006; Alasad & Ahmad, 2003; Raed et al., 2017; Saif, 2016).

Within the health care system, developing countries have sufficiently explored the direct link between patient satisfaction and process design, mapping, and improvement, but there are minimal studies on patients' satisfaction in developing countries (Alasad & Ahmad, 2003; Alexander et al, 2016; Al Khani, 2015). Aharony and Strasser (1993. p. 49-79) observed that the situation worsened in

developing nations, like Jordan, where the application of systematic analysis of the relationship between process management, reengineering, and improvement is limited, and investigation of their effects on patients' satisfaction has been infantile (Al-Badayneh, 1991; Jafar & Muayyad, 2003; Zamil, Areiqat & Tailakh, 2012; Ware & Hays, 1998).

This study is a portion of the research conducted for a Ph.D. thesis on the impact of process improvements, through the application of Business Process Management (BPM) techniques, on patients' satisfaction in Jordanian hospitals' emergency departments (ED). The main objective of this study is to test the conceptual and operational framework for the patients' expectations and perceptions of service quality in Jordanian hospitals' EDs. The study uses the SERVQUAL questionnaire to test patients' satisfaction. The main objective of this pilot study is to test the validity and reliability of the SERVQUAL survey in Jordanian hospitals' EDs and test the research methods and procedures before their implementation on a larger scale.

Patients' Satisfaction and SERVQUAL

Many scholars and organizations have invested in defining, conceptualizing, and measuring patients' satisfaction. All such attempts revolve around the central premise that patient satisfaction is a reflection of the patients' experiences with the quality, service, and conditions of care they received at the visited healthcare facility. This understanding has generated a plethora of theoretical models trying to explain the process and formulations of patients' ratings of their experiences (Faezipour & Ferreira, 2013; Ware & Hays, 1998; Carr-Hill, 1992; Ferrand et al., 2016).

First, a family of theories known as expectancy theories argues that patient satisfaction is the gap between patients' expectations and the ratings of their experiences at healthcare providers' facilities (Reilly et al., 2014; Kocher et al., 2002; Alderman et al., 2000). Second, a family of theoretical models referred to as decision theories of patient satisfaction; it argues that patients' satisfaction is influenced by their preferences rather than their expectations or beliefs. Further, proponents of this understanding favor the consumption model for understanding how patients formulate ratings of their experiences (Taylor & Cronin, 1994). Third, a class of theoretical understandings known as performance models concluded that the quality of technical service and structure determines patient satisfaction and care elements received by patients, rather than their expectations, beliefs, or preferences. Such models argue that clinical attributes, such as the total recovery of patients, will determine the extent to which patients are satisfied or not with their experiences (Purbey, Mukherjee, & Bhar, 2017).

One of the most widely researched tools for increasing patients' satisfaction is SERVQUAL, developed by Parasuraman, Zeithmal, and Berry (1998). It is one of the best and most used models for evaluating customer expectations and their perceptions of the quality of the services (Zarei et al., 2012). In this study, SERVQUAL and service quality instrument are used interchangeably. Since the service is not a physical item but an experience, SERVQUAL relies on the idea that quality is a subjective evaluation of the customer. SERVQUAL suggests that five dimensions alter patients' perceptions about the quality of services offered by the hospital or ED (Figure 1). First dimension tangibles refer to the structural or facility related elements. Second, reliability refers to the consistency and dependability of the hospital to offer promised services to their patients. Third, responsiveness refers to the provision of services promptly. Fourth, assurance represents the knowledge, skills, and abilities of staff in establishing rapport and trust with patients for the services provided. Finally, empathy represents the extent to which healthcare and healthcare providers offer extended emotional support to their patients.

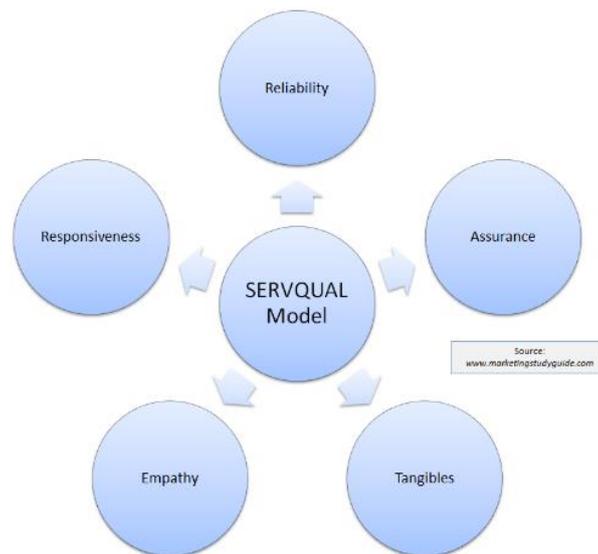


Figure 1. SERVQUAL five dimensions

The SERVQUAL, like any other business process management tool in healthcare, aspires to the full delivery of patient-centered care. Patient-centered care relates to the devotion of attention, resources, and decisions allocated by healthcare providers to the needs and outcomes desired by the patients. Such care requires superb communications skills on the part of the healthcare staff. Communications skills refer to the way, manner, and fashion by which healthcare professionals communicate with the patients. This dimension is equivalent to the empathy and assurance dimensions of SERVQUAL.

Research

Method

This research is explanatory rather than descriptive. Explanatory research design aims to describe the relationships, the strength, and the direction of a set of quantitative variables. This research will use a convenient sample of Jordanian patients, ages 18 and up, who used emergency departments at Jordanian public hospitals in 2017 and 2018. Thus, the research design is a cross-sectional, one sample at a one-time point. The research will examine the validity and reliability of SERVQUAL in Jordanian hospitals.

This study tested reliability through internal consistency using the split-half method, and inter-item correlation. SERVQUAL was then checked for face validity and construct validity. Construct validity is the overarching concern of validity research, subsuming all other types of validity evidence. This study used convergent and discriminant validity for construct validity.

Survey Instrument

The SERVEQUAL questionnaire is utilized to assess service quality in Jordanian hospitals. Patients rate their expectations and perceptions about an institution. The gap between them indicates the extent to which such institutions lag or lead in service quality. The questionnaire is modified to suit healthcare research.

Sample

To complete the pilot study, the researcher reached out to personal networks of physicians, nurses, and healthcare staff working in Amman and Irbid in Jordan. The researcher asked three doctors, two nurses, and two administrators working at public hospitals to recruit subjects for the pilot study. Each person was asked to obtain consent from anyone agreeing to complete the questionnaire, either in written format or orally. The survey was emailed to the subject once they decided to participate in the research. The researcher also conducted a few phone interviews via Skype. Phone interviews with participants lasted between 12 and 18 minutes where respondents were instructed to answer the items on the questionnaire as accurately as possible after obtaining their oral consent to the study. The

researcher did not receive any information on subjects unless the subject emailed or phoned the researcher based on the request of the personal connection upon the expression of interest in participating in the study.

From April 15th until May 28th, 2018, the researcher obtained responses from 50 participants. Note that each of the subjects visited an emergency department in Jordan in 2017/18. This sampling design of the pilot study, as well as the overall research, is convenience sampling. Such a method has allowed the researcher to obtain the necessary information to complete the pilot study in a timely and effective manner.

Data Analysis & Results

Descriptive Statistics - Patients' characteristics

Table 1 displays the sample characteristics for the pilot study. There were more males (58%) than females (42%) in the survey. The data correlate well with the conservative culture of Jordan where females do not engage in interactions with males. The study also identifies the large educated population in Jordan. Eighty-six percent of participants had a four-year degree or higher. Only 4% of the sample did not have a formal higher education or college degree. Most participants (60%) were relatively young, between the ages of 18 and 40. The survey also captures the divide in Jordan population. With the current turmoil in the Middle East, Jordan has been the home for 1.25 million refugees. The pilot data suggest that 60% of the population were Jordanians, and 24% were Arab, including Syrian, Palestinians, etc., indicating a very high number of refugees that are served by hospitals in Amman and Irbid.

*Table 1
Pilot Study Sample Characteristics*

Variable	N	%
<u>Gender</u>		
Male	29	58
Female	21	42
<u>Educational Level</u>		
Less than High School	2	4
High School	5	10
Some College	0	0
BA/BS	22	44
MA/MS	12	24
Ph. D./Equivalent	9	18
<u>Age</u>		
18-29	15	30
30-39	16	32
40-49	8	16
50-59	3	6
>60	8	16
<u>Nationality</u>		
Jordanian	30	60
Arab	12	24
Western	8	18

Reliability and Validity Analyses of the Questionnaire

Before deciding on adopting a survey, they are checked for psychometric properties, reliability, and validity. To investigate the stability, consistency, and robustness of the instrument in this research, an

analysis of reliability, internal consistency, and construct validity was conducted. Internal consistency has been widely used as a metric for assessing the reliability of surveys. The computation of the reliability analysis generates a number referred to as the Cronbach Alpha. It describes how closely all items on a survey are related. Conceptually, Cronbach Alpha is defined as follows:

$$\alpha = N \bar{a} / [\bar{u} + (N - 1) \bar{a}] \quad (1)$$

$$\alpha + \beta = \chi. \quad (1)$$

Where N is the number of total items comprising the survey, \bar{a} is the average inter-item correlation among all items, and \bar{u} is the average variance among all items. From the above formulation, it is clear that as the number of items on the survey increase, the alpha will increase. For the same reason, if the inter-item correlation average is low, the alpha is expected to be low as well. Nunally (1978) recommended that an alpha level of 0.70 or higher is reasonable to establish the reliability of surveys for research.

Validity refers to whether the constructs or items comprising the instrument measure the intended concepts. There are many types of validity, and this study utilizes three main metrics of validity to evaluate whether the instrument at hand possesses validity or not. First, face validity refers to whether the researcher, a team of experts or stakeholders, believe that the instrument is excellent and sound enough to measure the intended constructs based on their subjective judgment built on assumed expertise. Second, content validity, which involves the degree to which the content of the survey matches a content domain associated with the construct, is used. Third, construct validity refers to the degree of similarity and discrimination of the items or sub-scales comprising an instrument.

Within construct validity, discriminant validity refers to the extent to which a group of items or sub-scale measures a distinct construct from other sub-scales. This type of validity refers to the extent to which a dimension corresponds to a qualitatively different attribute from other dimensions in the same instrument or others. A correlation matrix between the sub-scales is calculated to evaluate the discriminant validity. If correlations among them fall below 0.5 or -0.5, then the instrument is judged to possess discriminant validity.

Reliability of the Service Quality Instrument

Table 2 demonstrates the reliability analysis, internal consistency, and split-half for the SERVQUAL. Results indicate that the instrument possessed strong reliability; the alphas for the perceived and the expected portions were 0.877 and 0.895, higher than 0.7 cut-off value. Needless to say, the alphas obtained from the two halves, the first 11 items and second 11 items in each portion, respectively, are also higher than the 0.7 cut-offs. Overall, the service quality questionnaire in its entirety is reliable in the Jordanian context.

Table 2
Reliability Analysis for Service Quality

Perceived Service Quality		Expected Service Quality	
Measure	Value	Measure	Value
Alpha (22)	0.748	Alpha (22)	0.854
Split-Half Part 1 (11)	0.727	Split-Half Part 1 (11)	0.761
Split-Half Part 2 (11)	0.848	Split-Half Part 2 (11)	0.841

The reliability analysis for items in the SERVQUAL questionnaire was conducted, using the Item Total Correlation method. Table 3 displays results from the sub-scale study using Item-Total Correlation for the SERVQUAL questionnaire. Cronbach's Alphas for perceived responsiveness is above 0.70, the threshold defining the adequate reliability (Nunnally & Bernstein, 1994).

Table 3
Item Analysis- Correlation for SERVQUAL

Item	Perceived Item- Total Correlation	Expected Item- Total Correlation
Tangibles	($\alpha = .622$)	($\alpha = .596$)
Excellent Emergency Departments will have modern looking equipment.	.680	.574
The physical facilities at excellent Emergency Departments will be visually appealing.	.593	.298
Employees at excellent Emergency Departments will be neat appearing.	.400	.198
Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent Emergency Departments.	.040	.474
Reliability	$\alpha = (.601)$	$\alpha = (.330)$
When excellent Emergency Departments promise to do something by a certain time, they do.	.350	.196
When a customer has a problem, excellent Emergency Departments will show a sincere interest in solving it.	.407	.399
Excellent Emergency Departments will perform the service right the first time.	.206	.296
Excellent Emergency Departments will provide the service at the time they promise to do so.	.578	-.015
Excellent Emergency Departments will insist on error free records	.306	.010
Responsiveness	$\alpha = (.837)$	$\alpha = (.710)$
Employees of excellent Emergency Departments will tell customers exactly when services will be performed.	.617	.750
Employees of excellent Emergency Departments will give prompt service to customers.	.604	.471
Employees of excellent Emergency Departments will always be willing to help customers.	.677	.654
Employees of excellent Emergency Departments will never be too busy to respond to customers' requests.	.797	.152
Assurance	$\alpha = (.511)$	$\alpha = (.783)$
The behaviour of employees in excellent Emergency Departments will instil confidence in customers.	.519	.806
Patients of excellent Emergency Departments will feel safe in transactions.	.031	.530
Employees of excellent Emergency Departments will be consistently courteous with customers.	.577	.312
Employees of excellent Emergency Departments will have the knowledge to patients' questions.	.245	.758
Empathy	$\alpha = (.572)$	$\alpha = (.858)$
Excellent Emergency Departments will give customers individual attention.	.074	.411
Excellent Emergency Departments will have operating hours convenient to all their customers.	.241	.515
Excellent Emergency Departments will have employees who give customers personal attention.	.584	.288
Excellent Emergency Departments will have their customer's best interests at heart.	.684	.531
The employees of excellent Emergency Departments will understand the specific needs of their patients.	.129	.321

Perceived tangibles, reliability, assurance, and empathy all had alphas below the sufficient level of reliability, indicating poor reliabilities (Table 3). Expected responsiveness, assurance, and empathy all featured adequate reliabilities, whereas expected tangibles and reliability had lower-than-recommended levels of reliability. These low reliability scores are potentially due to small sample size and convenience sampling.

Item-Total Correlation (“discrimination,”) refers to how well a question differentiates between participants who, in SERVQUAL case, lined up with the majority of the respondents for the same question. Values for an item-total correlation (point-biserial) between 0 and 0.19 may indicate that the question is not discriminating well; values between 0.2 and 0.39 indicate good discrimination; and values 0.4 and above mean perfect discrimination. Gliem & Gliem (2003) recommend a threshold of 0.3. The negative values of item-total correlation are a red flag, as it states that participants who get low scores on a question have scores similar to the majority of the respondents.

Reviewing the Item-Total Correlations, Table 3, suggest that many items have lower than recommended levels of stability and robustness: 0.3, as highlighted in Table 3. Among the 22 items comprising the perceived scores of respondents on the five dimensions of the SERVQUAL, seven items possessed lower correlations with the total score of their construct than 0.3. Similarly, six items among the 22 total number of items measuring the five dimensions on the expected scores reflected correlations with their respective constructs of lower than 0.3. Again, such a result is not out of range, given the small sample size and the sampling biases introduced by the design of this research. Also, if the item total correlation for any item is less than the desired value expected, it has a higher value in preserved and vice-versa. This indicates that the item does correlate well in at least one and is reliable.

Validity of the SERVQUAL Instrument

Before the distribution of the SERVQUAL instrument, a group of experts in customer satisfaction research verified its face validity. Three different Arabic language translators also validated the Arabic version of the survey. Further, as SERVQUAL is a commonly used instrument in many customer satisfaction applications and contexts, it authenticated its content validity.

For construct validity, the convergent and discriminant validity was conducted. To check if the items are converging for the same construct or an exploratory factor analysis (EFA) will be beneficial. The Kaiser-Meyer-Olkin (KMO) analysis is required to answer this question. The KMO measures the sampling adequacy. A KMO of greater than 0.5, indicates that a factor analysis may be useful with the data.

Table 4, illustrate that for the perceived items, the KMO value is greater than 0.5; therefore, EFA analysis would help in gaining more insight on items and their respective construct.

Table 4
KMO Test for SERVQUAL

	Perceived	Expected
Kaiser-Meyer-Olkin Measure	.651	0.636

The EFA results in Table 5, indicate that when the seven dimensions possess an Eigenvalue larger than 1, the criterion of factors extraction specified. The seven dimensions explain about 79% of the variance in the dataset.

Table 5
Exploratory Factor Analysis SERVQUAL

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cum %	Total	% of Variance	Cumulative %
	1	7.051	32.049	32.049	4.802	21.829
2	2.535	11.522	43.570	2.586	11.754	33.583
3	2.172	9.874	53.444	2.435	11.067	44.650
4	1.767	8.030	61.474	2.102	9.557	54.207
5	1.534	6.974	68.448	2.069	9.406	63.613
6	1.315	5.979	74.427	1.761	8.006	71.619
7	1.016	4.617	79.043	1.633	7.424	79.043

Table 6 demonstrates the distribution of items on their respective dimensions by showing their unrotated loadings structure. Notice that items with loadings lower than 0.4 were excluded from the table; this eases the readability and interpretation of the table. Also, it only includes those items with robust relationships with their respective factors. Components 6 and 7 have only two items and can be ignored, as these items are also cross loaded with other components, while item P7 can be ignored.

Table 6

Principal Component Analysis SERVQUAL

	Component						
	1	2	3	4	5	6	7
P13	.877						
P21	.876						
P12	.852						
P14	.828						
P11	.746						
P16	.732						
P20	.726						
P1	.682		-.488				
P10	.636				-.445		
P3	.565	-.448		-.473			
P2	.537		-.504				
P19	.433			.426			
P15		-.743					
P17		.738					
P4		.732					
P8			.662		.430		
P9			.518				.486
P22				-.638			
P6			.521	-.539			
P18					.598		
P7						.563	-.515
P5						.509	

Table 7 illustrates the inter-item correlation for the tangible construct for the expected SERVQUAL values. The results illustrate that only one item converges on the tangible construct. The results for all other four constructs also did not attain coverage.

Table 7

Inter-Item Correlation for Tangible Construct

	E1	E2	E3	E4
E1	1.000	.317	.205	.542
E2	.317	1.000	.092	.217
E3	.205	.092	1.000	.150
E4	.542	.217	.150	1.000

Table 8 and Table 9 display the results of discriminant validity for the SERVQUAL on the pilot study sample. Results indicate that the survey does not possess discriminant validity. Out of the five constructs, for both perceived and expected, few items correlate with each other; correlations are higher than 0.5. As no correlation exceeds 0.7 or fall below -0.7, each dimension, as measured, may not be treated as the independent construct expected by the service quality model. The discriminant validity

test for SERVQUAL as applied in the Jordanian hospitals failed.

Table 8
Perceived SERVQUAL Discriminate Validity Analysis

Dimensions	1	2	3	4	5
Tangibles (1)	1.00				
Reliability (2)	.176	1.00			
Responsiveness (3)	.686	.420	1.00		
Assurance (4)	.554	.287	.675	1.00	
Empathy (5)	.532	.312	.616	.630	1.00

Table 9
Expected SERVQUAL Discriminate Validity Analysis

Dimensions	6	7	8	9	10
Tangibles (6)	1.00				
Reliability (7)	.580	1.00			
Responsiveness (8)	.545	.468	1.00		
Assurance (9)	.617	.566	.629	1.00	
Empathy (10)	.607	.527	.619	.615	1.00

Overall, the pilot study indicated that the service quality instrument, SERVQUAL, when applied to Jordanian hospital environment does possess adequate reliability; however, it has inadequate validity. Sixty-eight percent of the item-total correlations between each item and the total score of its sub-scale have positive correlations of more than 0.3.

Conclusions

Several survey instruments and methods are available to test patients' satisfaction; however, the SERVQUAL model is the most commonly used one. This study conducted a test of SERVQUAL's applicability in Jordan's hospitals using a pilot study. This research checks the stability, consistency, and robustness of SERVQUAL in Jordan hospitals by analyzing its reliability, internal consistency, and construct validity. The pilot study assumed that each dimension is treated as an independent construct and that the perceived and expected portions are autonomous.

Findings of the pilot study rendered the survey instrument utilized in this research to be reliable but not valid. Results indicate that the instrument possessed strong reliability; alphas were high for the perceived (0.877) and the expected (0.895) portions of the SERVQUAL. At the same time, the test indicated that SERVQUAL is internally consistent with 68% of the item-total correlations between each item and the total score of its sub-scale is positively correlated with values greater than 0.3.

The results of item analysis conclude that sub-scales of the SERVQUAL questionnaire do not possess adequate reliability, except responsiveness for the perceived service quality portion. Dimensions' alpha values were all lower than the recommended 0.7, while, the items, defined under each dimension, demonstrated a moderate to low correlations with their specific dimensions. Factor analysis concluded that for the Jordanian hospitals' Eds, the total number of dimensions could still be five. The low correlation threatens the internal validity of the study, since it leads respondents to provide inaccurate scores on the items.

This pilot study also concluded that the SERVQUAL for Jordanian hospitals might have five

dimensions, but items should move among constructs to ensure high correlation among items of the same construct. The pilot study recommended modifying the SERQUAL dimensions before implementing it on a larger scale and using a shorter instrument.

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