Prioritisation of service quality dimensions for healthcare sector

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Abstract: Due to the unique nature among the service industries, the overriding objective of the healthcare sector is to provide error free, impeccable services to their patients and clientele. It is not an option rather a norm for the healthcare sector to uphold and maintain the level of service that is quintessential and benchmark in the service industries. However, service quality has different meanings to different people. In this paper, SERVQUAL has been considered as the main tool to measure service quality and analytic hierarchy process (AHP) has been applied to prioritise the five dimensions of SERVQUAL for healthcare sector. In addition to this, AHP has been applied to prioritise the various items representing each of the dimensions. The results show that Reliability and Assurance are the two most important service quality dimensions in the healthcare sector. The priorities of dimensions and their items are also determined with respect to a selected demographic factors on the part of the respondents.

Keywords: service quality dimensions; healthcare; prioritisation; analytic hierarchy process; AHP.

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1 Introduction

Healthcare is a service industry with unique characteristics. In healthcare, customers are the immediate patients followed by their families and possibly their friends, as the outcome of the healthcare service potentially affects all of their lives. Error or mistake in this field can be devastating to individuals and groups alike as lives and quality of life are at risk (McDonald, 2013). In 1999, the Institute of Medicine published a report 'To Err is Human: Building a Safer Health System' which estimated that up to 98,000 people die annually in the USA alone due to medical errors (Hunt, 2002). Another report published in the *Journal of Patient Safety* reveals that each year 210,000–400,000 patients die because of preventable adverse events (PAEs) in USA hospitals (Allen, 2013; McDonald, 2013). According to the Centre for Disease Control and Prevention, the above figures make medical errors the third leading cause of death in the USA behind heart disease and cancer (Allen, 2013; American Data Network, 2013). All these suggest to pay maximum attention to uphold the quality at the healthcare sector at the maximum extent. Principles of quality management can play an important role in this regards. Here we look at service quality in general, followed by service quality in healthcare sector.

In the early 1970s, service quality was researched for its capacity to measure organisations' performance. Parasuraman et al. (1985, 1988, 1991) established the concept of SERVQUAL to evaluate the service performance of an organisation. They established SERVQUAL based on five dimensions, namely tangibles, reliability, responsiveness, assurance, and empathy. These five dimensions of SERVQUAL are discussed below:

1   *Tangibles:* This factor refers to the appearance of personnel, physical facilities, tools or equipment used to provide the service. Physical representation of the service such as plastic health insurance card or insurance letter, physical aspect of facilities such as signs, accessibility, spaciousness, functionality, cleanness are important in the service sector (Parasuraman et al., 1985). This factor has been noted as one of the important dimensions of service quality to improve quality performance in the service industry (Rad et al., 2010). In addition, this factor is primarily associated with varieties of service features to meet customer expectations (Caruana and Berthon, 2002).

2   *Reliability:* This factor involves consistency of performance and dependability. Basically, the dimension of reliability refers to the ability to perform the promised service dependably and accurately according to the customers' needs. It means that the organisation should perform their service in the right time and honours their own promises especially in billing with accuracy, keeping records correctly and delivering the service to the customer at the designated time. When service providers succeed to keep their promises, then customer satisfaction becomes higher and their level of confidence is increased (Rad et al., 2010).

3   *Responsiveness:* Responsiveness pertains to the willingness or readiness of service providers to provide prompt services to the customers. The factor of responsiveness deals with timeliness of service such as providing quick services to the customers, setting-up appointments as soon as possible, immediately sending the transaction slip to the customer so that they do not form the wrong impression. When the service providers increase speed of service, it is likely to have a positive effect on customer satisfaction (Parasuraman et al., 1985; Rad et al., 2010).

4   *Assurance*: This service quality dimension refers to employee knowledge, courtesy, and the ability to convey trust and confidence. Firstly, employee knowledge means employees should have knowledge and skills to serve customers in the best possible manner. Secondly, courtesy means politeness, respect, consideration and friendliness of the contact personnel. Finally, conveying trust and confidence means trustworthiness, believability and honesty of the employees. It involves having the customer's best interests at heart (Parasuraman et al., 1985).

5   *Empathy:* This dimension refers to the level of caring, knowing customer needs and individualised attention that the organisation needs to provide to their customers. It pertains to capacity of the organisation to understand customer needs and ability to give response to them such as to recognise the regular customer and learn their specific requirements (Parasuraman et al., 1985).

Service quality has become an important research topic because of its palpable relationship to customer satisfaction, customer loyalty, positive word of mouth, costs and organisational profitability (Buttle, 1996; Rad et al., 2010). Therefore, healthcare sector has been applying SERVQUAL model to measure patient satisfaction and loyalty. This model helps healthcare service providers identify the gaps between delivered service and patient expectations. Once the healthcare service providers identify their service problems, they can immediately improve their quality performance for the betterment of their patients (Buyukozkan et al., 2011).

According to Buyukozkan et al. (2011), healthcare service quality can be measured by six factors, namely tangibles, responsiveness, reliability, assurance, empathy, and professionalism. Based on their research, it was observed that empathy was the most important factor for healthcare service quality in Turkey. Their research also found that professionalism and reliability factors were equally important for the service quality performance of the hospital. Similarly, Butt and de Run (2010) conducted a research in Malaysia to measure private healthcare service quality. They explored the service quality gaps between service expectations and service perceptions. They found that the Malaysian private healthcare service perception is higher than service expectations.

However, Andaleeb (2001) stated that all five dimensions of service quality (i.e., tangibles, responsiveness, reliability, assurance and empathy) were not always necessary to measure specific service situations. He suggested that quality dimensions are modified to evaluate specific service situations. In 2001, the author conducted a study on service quality perceptions and patient satisfaction in Bangladesh. The researcher measured patient satisfaction based on five dimensions: responsiveness, assurance, communication, discipline, and baksheesh (tips for service). The findings show that all the five dimensions of service quality have significant influence on patient satisfaction.

Manaf and Phang (2009) conducted a research on patient satisfaction as an indicator of service quality in Malaysian public hospitals. In their study, they measured patient satisfaction for Malaysian public hospitals based on two dimensions of service quality, namely clinical and physical dimension. The clinical dimension was defined by five variables such as service of doctors, service of nurses, clinical treatment received, the way the patients are managed and information given about condition. On the other hand, the physical dimension was defined by five different variables, namely cleanliness, environment, management of visitors to wards, bathroom and toilet, and noise in the wards. According to the findings, both clinical and physical dimensions have a positive and significant influence on inpatient and outpatient satisfaction in Malaysian public hospitals.

The following section provides a brief review of analytic hierarchy process (AHP) applications in healthcare sector. The main objective of the present research is also highlighted in this section. Data collection process and analysis of data are provided in Section 3 and concluding remarks are provided in Section 4.

2   AHP in healthcare

In one of the first applications of AHP in healthcare sector, Dolan (1989) used AHP to identify the best from the seven antibiotic regimens for initial treatment of acute pyelonephritis. Priorities of the criteria and subcriteria were determined by taking responses from 61 practicing clinicians from the Department of Medicine at Rochester General Hospital. The proposed model has been proved to be highly successful in the hospital.

Through the literature review and interviewing consumers, physicians and hospital administrators, nine criteria are used in making hospital selection decision (Javalgi et al., 1991). The authors used mailed survey instrument to collect the necessary data for AHP application. The respondents were the residents of the areas where three hospitals are located. From the computed weights, it is found that the convenience factor (hospital is

located near home) is almost twice as important as courteous employees. It is also found that the weights of reputation and availability of modern equipment and technology are almost twice as important as cost of care. Further, type of hospital possesses less weightage in comparison to all other criteria. Another observation is that the respondents did not assign higher weightage on cost of care in hospital choice. Further, AHP has been used in solving medical decision making problems for practitioners (Sloane et al., 2003; Dolan, 2000), medical personnel management (Forman and Gass, 2001), patient discharge planning (Sloane et al., 2001), benchmarking healthcare facilities (Min et al., 1997).

AHP has been well used in measuring performances of organisations (Cheng and Li, 2001), departments (Rangone, 1996), employees (Islam and Rasad, 2006). In the same line, Hariharan et al. (2004) used absolute measurement process of AHP to measure performance of multi-specialty tertiary care hospitals. This is essentially an evaluation process which identified the areas of the hospitals where quality needs to be enhanced. Ahsan and Bartlema (2004) also used AHP (along with Delphi process) to evaluate performance of healthcare service providers, particularly, thana health complexes in Bangladesh.

Liberatore et al. (2009) used AHP and logistic regression to assist men whether or not they should go for prostate cancer screening examination. Basically, the AHP was used to prioritise the importance of the factors in deciding the screening examination. AHP has also been used in combining multiple clinical outcomes of healthcare interventions (Hummel et al., 2012). In order of decreasing importance, the authors found the following outcome measures: response to drug treatment, cognitive function, social function, no anxiety, remission, and no relapse.

Lee and Kwak (2011) have applied goal programming and AHP in designing, evaluating and implementing a strategic enterprise resource planning (ERP) for a leading healthcare service provider in Korea. The application of the integrated method is considered a unique one to handle ERP project implementation. In another Korean context, Shin et al. (2009) used AHP to assess the expanded national immunisation programs and to evaluate two alternative healthcare policies. The results show that the free vaccination services should be provided by the private hospitals rather than public health centres.

Kadohira et al. (2015) used risk profiling process and AHP to prioritise 98 zoometric diseases in Japan. The researchers involved four different stakeholders groups: researchers, physicians, public health officials, and citizens and found the six top-ranked diseases were similar among all stakeholders.

Liberatore and Nydick (2008) in a review paper, analysed 50 articles and categorised them in seven areas: diagnosis, patient participation, therapy/treatment, organ transplantation, project and technology evaluation and selection, human resource planning, and healthcare evaluation and policy. The largest number of articles was found in the project and technology evaluation and selection category (14) with substantial activity in patient participation (9), therapy/treatment (8), and healthcare evaluation and policy (8). According to the authors, the AHP appears to be a promising support tool in various decision making areas related to medicine and healthcare.

From the literature, we did not find any work on prioritisation of various service quality dimensions for healthcare sector especially using AHP. The objective of the present research is to fill up this research gap. In the present work not only the dimensions, but their individual items are also prioritised. The findings are expected to

provide useful guidelines to the administrators working in the healthcare sector regarding where to put more efforts to maintain excellence in healthcare services.

3 Data collection and analysis

Data for the present research were collected from 27 respondents in Malaysia through interviews on personal contact basis. In the beginning, the respondents were asked to fill out a page providing their demographic information that consists of gender, age, educational qualification, and nationality. Nationality was included in the list as not all the respondents were Malaysians. Many internationals that are either working or studying in Malaysia were also contacted for their responses. Table 1 provides the account of their demographic information.

Table 1 Respondents' demographic information

Variable	Frequency	Percent
Gender		
• Male	18	72
• Female	9	28
Race		
• Malaysian	8	29.63
• Internationals	19	70.17
Age group		
• 21–30 years	7	25.93
• 31–40 years	14	51.85
• 41–50 years	4	14.81
• 51 years and above	2	07.40
Highest level of education		
• Diploma	3	11.11
• Bachelors	2	07.40
• Masters	13	48.15
• PhD	9	33.33

The table shows that male respondents (66.57%) were more than females (33.33%). Respondents also comprised local Malays (29.63%) and internationals (70.17%). All the international respondents are originally from various developing countries. So, the views expressed by them are applicable for developing countries only. It is also noted that the majority of the respondents (81.48%) have either Masters or PhD qualification.

After collecting the demographic information, the respondents were briefed about the five dimensions of SERVQUAL, namely tangibles, reliability, responsiveness, assurance, and empathy. These dimensions are directly taken from Parasuraman et al. (1985). Obviously, in order to provide fair judgements, the respondents need to have clear understanding about these dimensions. A sheet of paper was shown to them that provided the SERVQUAL items. This is shown in Table 2. After explaining the problem

background as mentioned above a brief explanation was made on 1–9 scale of AHP (Saaty, 1990). They were requested to be cautious in using the number of the scale as it is different from the 1–5 Likert scale on which the respondents are usually familiar with. However, the respondents were encouraged to use verbal judgements of the scale as shown in Table 3. On the average, each interview lasted about 25 minutes. There was no missing entry as the survey was administered personally. Team Expert Choice software was used to obtain the priorities from the pairwise comparison matrices. Since, there are multiple respondents for the survey, geometric mean procedure was used (it is actually done by Expert Choice) to obtain the average response for each pairwise comparison (Basak and Saaty, 1993; Saaty and Peniwati, 2013). Priorities of the dimensions and the items are calculated on the basis of gender, nationality and overall. The average pairwise comparison matrices considering all the respondents are provided in Figure 1.

Table 2   Service quality dimensions and their individual items

Service quality dimensions		*Individual items*
Tangibles (D1)	1	Modern equipment (D11)
	2	Visually appealing facilities (D12)
	3	Professional appearance of the staff (D13)
	4	Cleanliness of the hospital (D14)
Reliability (D2)	1	Perform the services at the right time as promised (D21)
	2	Sincerity to solve patients' problems (D22)
	3	Providing the service right the first time (D23)
	4	Maintain error-free records (D24)
	5	Availability of the doctors (D25)
Responsiveness (D3)	1	Minimal waiting time to get the service (prompt services) (D31)
	2	Willingness to help the patients (D32)
	3	Staff are never too busy to respond to their patients (D33)
	4	Ease of obtaining information from the hospital pertaining to patients' queries (D34)
	5	Response to the patients' complaints (D35)
Assurance (D4)	1	Hospital is capable to handle patients' medical problems effectively (D41)
	2	Hospital takes sufficient measure for the safety of their patients (D42)
	3	Doctors are well-mannered (D43)
	4	Doctors and nurses are knowledgeable and professional to answer patients' questions (D44)
Empathy (D5)	1	Individual attention with friendly manner (D51)
	2	Hospital has the best interest in mind for their patients (D52)
	3	Understand patients' specific needs (D53)
	4	Convenient consultation hours (D53)

Table 3 1–9 AHP scale

Verbal judgment of importance	Numerical rating
Equal importance	1
Equal to moderate importance	2
Moderate importance	3
Moderate to strong importance	4
Strong importance	5
Strong to very strong importance	6
Very strong importance	7
Very strong to extreme importance	8
Extreme importance	9

Note: If any factor F_i has importance strength over F_j as any of the above non-zero numbers, then F_j has the reciprocal importance strength with F_i, i.e., $a_{ji} = 1a_{ij}$.

Figure 1 Average pairwise comparison matrices

Overall	D1	D2	D3	D4	D5
D1	1	0.42	0.37	0.28	0.33
D2		1	1.63	0.83	1.90
D3			1	0.90	1.32
D4				1	1.28
D5					1
CR = 0.02					

Tangibles	D11	D12	D13	D14
D11	1	3.51	1.50	0.73
D12		1	0.89	0.78
D13			1	0.29
D14				1
CR = 0.02				

Reliability	D21	D22	D23	D24	D25
D21	1	0.94	0.71	0.84	0.48
D22		1	1.42	1.50	0.77
D23			1	1.74	0.52
D24				1	0.64
D25					1
CR = 0.02					

Responsiveness	D31	D32	D33	D34	D35
D31	1	0.64	1.70	0.76	0.49
D32		1	2.12	1.63	0.95
D33			1	0.98	0.58
D34				1	0.55
D35					1
CR = 0.01					

Assurance	D41	D42	D43	D44
D41	1	1.74	0.96	1.19
D42		1	1.04	0.53
D43			1	0.58
D44				1
CR = 0.02				

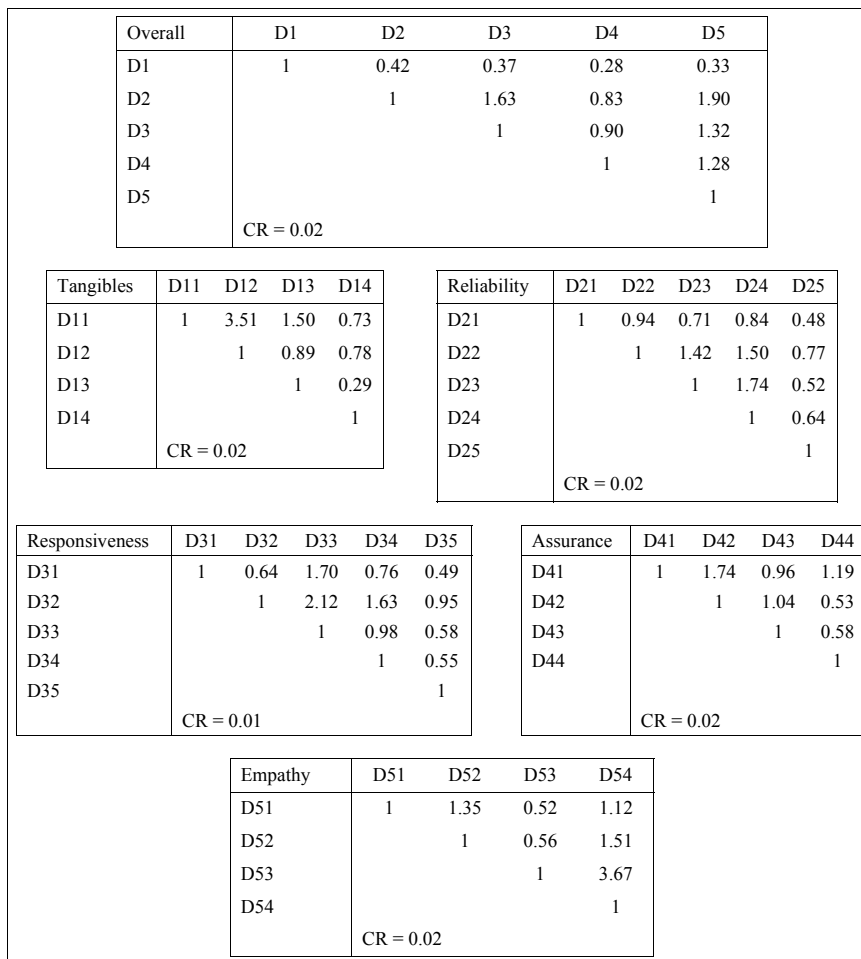| Empathy	D51	D52	D53	D54
D51	1	1.35	0.52	1.12
D52		1	0.56	1.51
D53			1	3.67
D54				1
CR = 0.02				

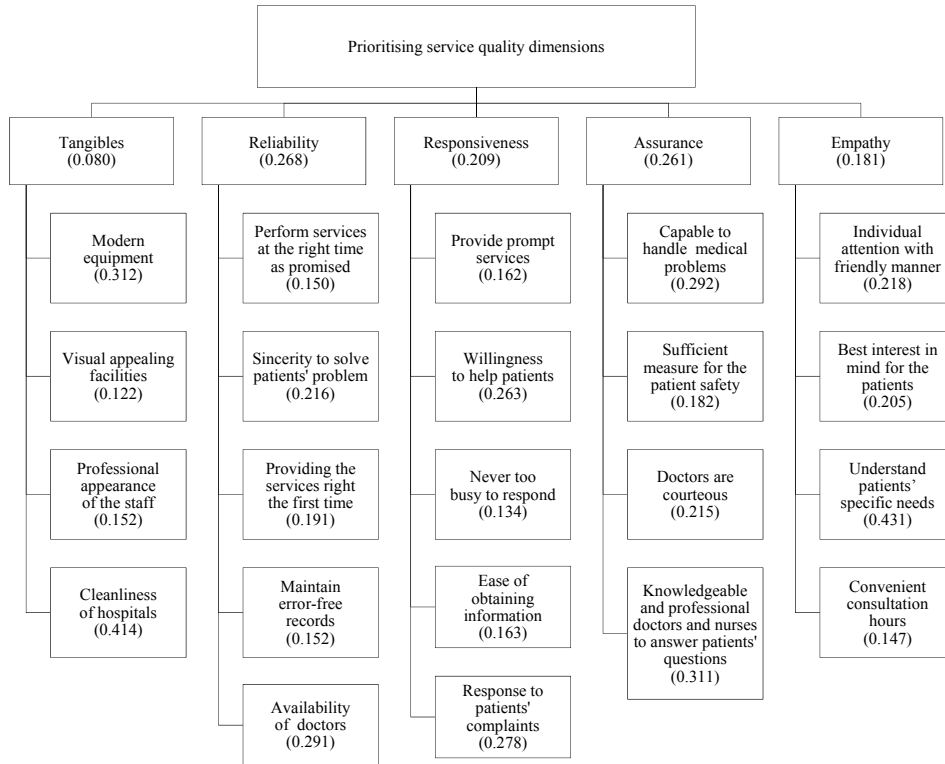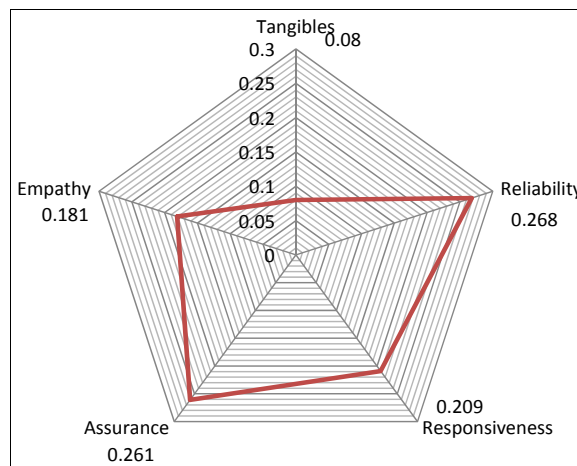**Figure 2**   Hierarchy of the service quality dimensions for healthcare sector

Figure 3   Radar chart that shows the priorities of the five dimensions (see online version for colours)

The overall priorities of the dimensions and their corresponding items are shown in Figure 2, whereas the priorities of the dimensions (and individual items) on the basis of selected demographic factors are provided in Table 4. Radar charts (Figures 3, 4, and 5) also show the overall priorities of the five dimensions where the similarity/closeness among the priorities can be visually discerned. From Figure 4, we find that male respondents placed higher priority to Reliability and Responsiveness compared to female respondents, whereas female respondents placed higher priority to Empathy and Assurance compared to their male counterparts. A similar observation can be made from Figure 5 drawn for Malaysians and internationals.

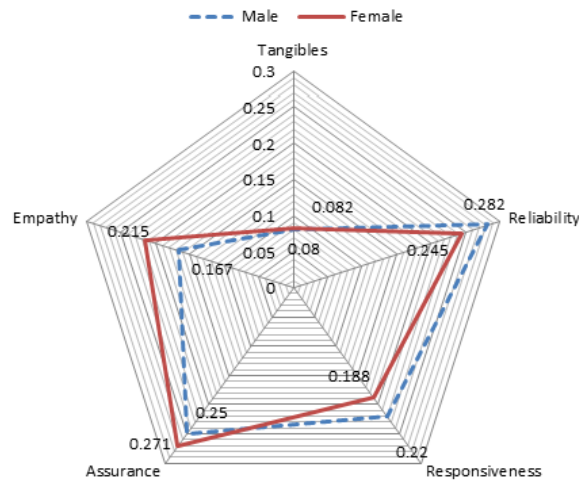**Figure 4** Radar chart for male and female (see online version for colours)

Figure 5 Radar chart for Malaysians and internationals (see online version for colours)
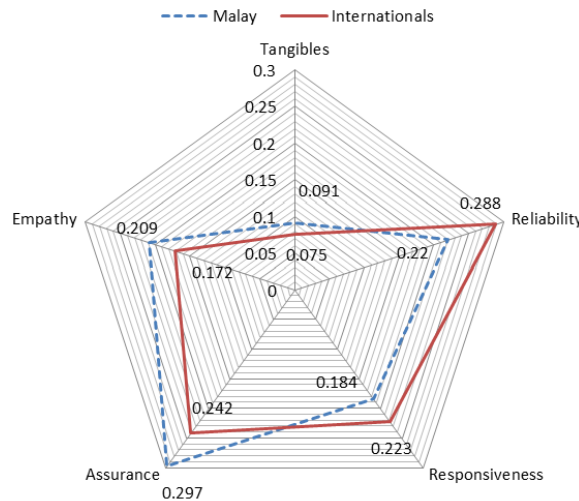
Table 4   Priorities and ranks of the SERVQUAL dimensions and individual items (gender, nationality, and overall)

Dimensions and items	Male		Female		Malaysian		International		Overall	
	Priority	Rank	Priority	Rank	Priority	Rank	Priority	Rank	Priority	Rank
D1	0.08	5	0.082	5	0.091	5	0.075	5	0.080	5
D11	0.33	2	0.27	2	0.20	2	0.37	1	0.312	2
D12	0.13	4	0.10	4	0.10	4	0.14	4	0.122	4
D13	0.14	3	0.19	3	0.18	3	0.14	3	0.152	3
D14	0.39	1	0.44	1	0.53	1	0.36	2	0.414	1
D2	0.282	1	0.245	2	0.220	2	0.288	1	0.268	1
D21	0.150	5	0.147	4	0.142	4	0.152	5	0.150	5
D22	0.234	2	0.183	3	0.216	3	0.215	2	0.216	2
D23	0.169	4	0.236	2	0.231	2	0.173	3	0.191	3
D24	0.172	3	0.117	5	0.115	5	0.171	4	0.152	4
D25	0.275	1	0.371	1	0.295	1	0.289	1	0.291	1
D3	0.220	3	0.188	4	0.184	4	0.223	3	0.209	3
D31	0.168	3	0.150	4	0.119	4	0.183	3	0.162	4
D32	0.253	2	0.276	2	0.297	2	0.244	2	0.263	2
D33	0.163	4	0.091	5	0.084	5	0.162	4	0.134	5
D34	0.153	5	0.181	3	0.203	3	0.146	5	0.163	3
D35	0.264	1	0.303	1	0.297	1	0.265	1	0.278	1
D4	0.250	2	0.271	1	0.297	1	0.242	2	0.261	2
D41	0.338	1	0.211	3	0.217	3	0.329	1	0.292	2
D42	0.184	3	0.176	4	0.170	4	0.188	4	0.182	4
D43	0.183	4	0.285	2	0.245	2	0.201	3	0.215	3
D44	0.295	2	0.328	1	0.368	1	0.282	2	0.311	1
D5	0.167	4	0.215	3	0.209	3	0.172	4	0.181	4
D51	0.255	2	0.156	4	0.134	4	0.265	4	0.281	2
D52	0.222	3	0.170	3	0.175	3	0.214	3	0.205	3
D53	0.390	1	0.501	1	0.492	1	0.397	1	0.431	1
D54	0.132	4	0.174	2	0.199	2	0.125	2	0.147	4

3.1 Analysis of the priorities and ranks

We first look at the priorities and ranks of the five dimensions of SERVQUAL in healthcare sector. These are arranged according to the importance (in decreasing order) assigned by the respondents: reliability, assurance, responsiveness, empathy, and tangibles. It may be noted that reliability (0.268) and assurance (0.261) are rated almost equally as the difference in their priorities is only 0.007. Among these five dimensions, only tangibles has received low priority compared to other four dimensions. As for the individual items for each dimension, the following observations were made:

1 tangibles

- cleanliness of the hospital (rank 1)
- modern equipment (rank 2)

2 reliability

- availability of doctors (rank 1)
- sincerity to solve patients' problems (rank 2)

3 responsiveness

- response to the patients' complaints (rank 1)
- willingness to help patients (rank 2)

4 assurance

- doctors and nurses are knowledgeable and professional to answer patients' questions (rank 1)
- hospital is cable to handle patients' medical problems effectively (rank 2)

5 empathy

- understand patients' specific needs (rank 1)
- individual attention with friendly manner (rank 2)

The findings provide valuable information to hospital administrators so as they can see where to put priority in course of serving their patients. It is observed that the respondents have provided higher priority to 'sincerity to solve patients' problems' over 'providing the service right the first time'. Clearly, if the doctors and nurses are sincere enough to cure the patients' diseases, then right kinds of medication would be forthcoming. Further, under responsiveness, the respondents assigned considerably higher weightage to responding patients' complaints and hospital's willingness to help patients. These two items have received higher weightage over 'prompt service'. Under empathy, the item 'understand patients' specific needs' has received almost half (43.1%) of the total weightage. This may be due the fact that if the patients' needs are identified through right diagnosis, then it is expected that their medical problem will receive proper treatment. Under assurance, the respondents have pointed out knowledge and professionalism on the part of the doctors as well as nurses as the most important factor. Doctors' knowledge and professionalism are *sine qua non* in medical treatment. Under tangibles, hospital administrators must pay attention to maintain utmost cleanliness of the hospital premises and they also need to have the latest available equipment and technology to serve their patients' problems.

Table 5   Frequency distribution of ranks of the five dimensions

Rank \ Dimension	Tangibles	Reliability	Responsiveness	Assurance	Empathy
1st	1 (3.7)*	9 (33.3)	3 (11.1)	11 (40.7)	4 (14.8)
2nd	2 (7.4)	8 (29.6)	13 (48.1)	5 (18.5)	1 (3.7)
3rd	3 (11.1)	5 (18.5)	4 (14.8)	6 (22.2)	8 (29.6)
4th	2 (7.4)	5 (18.5)	4 (14.8)	3 (11.1)	13 (48.1)
5th	19 (70.4)	0 (0)	3 (11.1)	2 (7.4)	1 (3.7)

Note: The figures within parenthesis provide percentage of respondents.

Using expert choice software, the priorities of the five dimensions are calculated for individual respondents and their corresponding ranks are also determined. A frequency analysis has been made on the basis of the ranks. Table 5 provides the frequency distribution of ranks of the dimensions calculated for all the individual respondents. Findings show that out of 27 respondents, 11 respondents placed 'assurance' as the most important dimensions. This is followed by 'reliability' where frequency is nine for the first rank. Only one person ranked 'tangibles' as the most important dimension. The table also shows that 19 respondents (70.4%) said 'tangibles' as the least important dimension. From the table, the following points are also noted:

- thirteen respondents (48.1%) considered 'responsiveness' as the second most important dimension and 'empathy' as the fourth most important dimension

- no respondent considered 'reliability' as the least important dimension

- more than 15 respondents (out of 27) viewed 'reliability', 'responsiveness', and 'assurance' as either most or second most important dimension

- almost similar ranking distribution is observed for 'reliability' and 'assurance'.

4   Conclusions

Not just for healthcare sector, in every part of business, customers have become increasingly quality-conscious. It is essential for any firm to provide superior quality service in order to ensure customer satisfaction and garner customer loyalty. In this context, it is important to know the priorities of various dimensions of service quality so that the service providers can optimally use their resources in designing service delivery system to orchestrate maximum customer satisfaction. The present prioritisation exercise for the various dimension of service quality will provide useful guidelines to healthcare service providers, such as hospitals, polyclinics, clinics, etc. to relook into their service delivery system. For example, they need to keep high priority to the following:

1 understanding patients' specific needs

2 having knowledgeable and professional doctors and nurses

3 responding to all the complaints lodged by the patients

4 providing individualistic attention to the patients with smiling face

5 ensuring availability of the doctors at the designated office hours.

It is also observed that, overall, the ranks assigned by the respondents to the SERVQUAL dimensions and their constituent items are consistent across various demographic factors. This shows the robustness of the findings.

The present work can be extended further by increasing sample size and priorities can be obtained from different nationalities and cultures so that those can be compared in order to see whether or not the present ranks of the dimensions of SERVQUAL for healthcare sector stays universally.

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