Service Quality and Patient satisfaction in Lean hospitals, Malaysia during the Covid-19 pandemic

Annie Ng Cheng San1*

1Faculty of Business and Finance, Universiti Tunku Abdul Rahman (Kampar Campus), 31900, Perak, Malaysia.
Email: ncsan@utar.edu.my

ABSTRACT

Patient satisfaction and healthcare service quality are tied together. During Covid-19 pandemic, Lean hospitals have experienced numerous of issues, resulting in drop in service quality and severe impact on patient satisfaction. To understand the patient expectation during the pandemic, service quality of Lean hospitals are further evaluate with employing the SERVQUAL model. 467 questionnaires were collected from the outpatient in the 52 Lean hospitals using non-probability quota sampling method. From the Partial least squares structural equation modelling (PLS-SEM) findings shows that all service quality aspects, reliability, assurance, tangibles, empathy and responsiveness has significant relationship with patient satisfaction. Particularly, patients view empathy as the most significant factor in service quality during the pandemic, whereas the healthcare reliability is discovered to have less influence in explaining the patient satisfaction. A success healthcare system's primary purpose is to ensure all people receive high service quality, respectful treatment and satisfaction to protect their health and well-being. Therefore, the findings provide valuable insights on the perception and expectation of patient towards the healthcare service quality measurement for future improvement. To safeguard the patient satisfaction, Lean hospitals must ensure that (1) sufficient care and attention given to patient to serve patient's best interests, (2) be responsive to assist and provide prompt services, (3) regularly monitor and ensure the equipment condition and the healthcare environment are clean and appealing, (4) provide professional service throughout interactions to reassure patient with skills and knowledge, and (5) provide timely service with a high accuracy and consistency of medical information.

Contribution/Originality: This research aims to investigate the satisfaction level of Malaysian Lean hospitals to understand the service quality concern from the outpatients’ perspective during the pandemic. It aids to provide practical guidelines for healthcare service providers and policymakers on how to effectively enhance the service quality provision to serve the best healthcare services to meet the patient
1. Introduction

According to World Health Organization (2022), health is defined as state of complete physical, mental and social wellbeing. Health is the essential drivers for the world and nation socio-economic growth. In Malaysia, the healthcare industry is one of the most important factors driving our country’s development, and the availability of high quality and affordable health care services is a crucial building stone on the journey to become a developed country. In last two years, the Coronavirus disease 2019 (Covid-19) pandemic causes the world as well as Malaysia has experiencing unprecedented challenges and healthcare industry is rapidly adjusting. According to Leite, Lindsay and Kumar (2020), as the disease has spread, the influx of patients has caused congestion in hospitals, resulting in long waiting time, poor quality of services, disrespectful of healthcare and consequently lead to greater patient dissatisfaction. Patient satisfaction is an essential driver to determine the success of healthcare services. Zun, Ibrahim, and Hamid (2018), defined that patient satisfaction is healthcare service assessment based on the patients’ judgment. The satisfaction level will increase, when the healthcare service quality fulfill the patient's expectation and needs (Rust & Oliver, 1994). The poor service quality leads to a failure to meet patient satisfaction, which may deter the public from utilizing the healthcare services supplied and result in negative health consequences. This is agreed by where it is reported that the utilization rate of Malaysia's healthcare service is quite low when compared to other countries (Yunus, Puteh, Ali & Daud, 2021). The problem of poor healthcare quality is not new for Malaysia’s public hospitals (Noris, Indera, Libasin & Krishnan, 2022) but it became more serious during the pandemic, resulting in widespread patient dissatisfaction (Babroudi, Sabri-Laghaie & Ghoushichi, 2021). The efforts of quality of healthcare service enhancement has become central of interest for policymakers, healthcare industry and service providers. To enhance the service quality in healthcare industry, people is demanding for more innovative way such as the implementation of Lean to restructure the healthcare operations and stronger service quality aspects to develop a patient-centric care with satisfied healthcare service to patients.

In Malaysia, Lean hospitals are the latest innovation in public healthcare. The Lean implementation into Malaysian healthcare industry happens before the pandemic. In year 2013, the first Lean hospital, Hospital Sultan Ismail was introduced. As per to date, there are 52 Lean hospitals exist in Malaysia. According to Vanichchinchai (2022), the effect of Lean implementation in healthcare industry contributes in service quality improvement. Several benefits can be evidenced after the Lean implementation into the said hospitals reported by Ministry of Health Malaysia (2020) such as (1) eliminate unnecessary process (2) focus on value-added process which map with the patients' interest, (3) reduce the waiting time; (4) improve communication among the patients and service provider; (5) enhance healthcare service quality and patient satisfaction.

However, the positive benefits were merely explained in the case stories form rather than in the empirical studies (Gupta, Sharma & Sunder, 2016). Furthermore, poor healthcare service quality has serious consequences, including an increase in death, avoidable health suffering, a loss of confidence, and poor utilization of healthcare services (Kruk et al., 2018). Understanding the healthcare service quality during the
pandemic is significant to ensure the healthcare service delivered are satisfying the patients and contribute positive health outcome. Although numerous of studies have examined the influence of service quality aspect towards outpatient’s satisfaction (AlOmari, 2021; Zun, Ibrahim, & Hamid, 2018; Owusu-Frimpong, Nwankwo & Dason, 2010), there is lacking of empirical studies which service quality aspect contribute the most influence on satisfaction perceived by patient. This is further agreed by Vanichchinchai (2020), who found that the past literatures have insufficient measures to examine the total conformity of service quality perception with expectations in healthcare. Therefore, it motivates this study to understand the service quality aspects and patient satisfaction in the Lean hospitals in Malaysia.

2. Literature Review

2.1. Patient Satisfaction

According to Andaleeb (2001), understanding the factors affected the patient satisfaction is crucial as it provides insight on what the patients’ wants and what are the healthcare services that they have received. This information assist policymakers, hospitals, and healthcare service providers in gaining a better understanding of their present healthcare service performance and how to improve their service aspect to ensure patient satisfaction (AlOmari, 2021). In the past literatures of healthcare, numerous of past studies have highlighted the importance of patient satisfaction in improving the healthcare image, which later leads to increased public confidence, trust, and loyalty as well as increased utilization of healthcare services for improved healthcare outcomes (Babroudi, Sabri-Laghaie & Ghoushichi, 2021; Asnawi, Awang, Afthanorhan, Mohamad & Karim, 2019; Naidu, 2009). To capture the patient satisfaction, it is important to evaluate the healthcare service quality. Patient satisfaction is frequently linked to the quality of healthcare services (Vanichchinchai, 2022).

2.2. Service Quality in Healthcare

In the past literature of service quality, various scale measurement of healthcare service quality can be found. For instance, Dagger, Sweeney and Johnson (2007) investigate the impact of healthcare service quality on the satisfaction and measure the service quality in interpersonal quality, technical quality, environment quality and administrative quality. The empirical results urged that the healthcare organization should focus and evaluate the overall healthcare service quality as well as it sub-dimensions of interpersonal, technical, environment and administrative quality as all these service quality dimensions contributes to patient satisfaction and patient’s behavioral intention. Additionally, Chahal and Kumari (2010) developed the HCSQ to measure the service quality in public hospital in north India. The service quality measurement divided into three main elements which are physical environmental quality, outcome quality and interaction quality. The findings support the connection of all these service quality elements with patient satisfaction. Furthermore, Choi and Kim (2013) examine the relationship between hospital’s service quality and satisfaction. The study focuses on the service quality aspect in outcome quality, peer to peer quality and interaction quality. With 296 surveys collected, the empirical shows that three of the service quality dimensions have significant influence on the patient satisfaction. Among these, patients view interaction quality as the greatest factor in assessing the hospital quality and satisfaction. Next, Itumalla, Acharyule and Shekhar (2014) developed HospitalQual to understand and assess the healthcare service quality. The HospitalQual measure the
healthcare in seven dimensions which are medical, nursing, supportive, administrative service, patient safety, communication and hospital infrastructure. From 246 data collect via self-administrated questionnaires and found that patient perceived the supportive service as the most significant driver for overall service quality. In the other hand, Sumaedi, Yarmen, and Bakti (2016) developed three primary dimensions in HSQ model which are healthcare service outcome, healthcare service interaction and healthcare service outcome to examine its relationship with patient satisfaction. From 154 surveys collected from the outpatients in Jakarta, Indonesia, the result reveals that the healthcare policymakers should improve these entire three dimensions to improve the service quality. It stress that the patients are concern about the condition of tangible equipment, the soft and hard interaction among the service providers as well as their expertise and the waiting time and effectiveness of medicine in the service quality assessment to generate the patient satisfaction.

Besides the above service quality scale measurement, the SERVQUAL model originated by Parasuraman, Zeithaml, and Berry (1988) has been widely adopted and recognize as the crucial and valid assessment tools in healthcare service quality. Vanichchinchai (2020) pointed that SERVQUAL model is the leading scale measurement in healthcare industry among the proposed model. Finally, other researches back up this assertion, including Zun, Ibrahim, and Hamid (2018), which used the SERVQUAL tool to assess patient satisfaction at 1Malaysia clinic. The SERVQUAL tool, according to the authors, was able to capture the genuine worth of patients’ satisfaction responses and feedback. The SERVQUAL model, according to Amin and Zahora Nasharuddin (2013), defined perceived service quality in healthcare and provided a thorough knowledge and practical suggestions to hospitals for future strategy improvement. Furthermore, according to AlOmari (2021), the SERVQUAL model has proven to be a viable and accurate assessment instrument for assessing service quality in healthcare industry. In the Malaysian healthcare sector, the SERVQUAL model is regarded as a reliable tool for policymakers, healthcare organizations, and service providers to assess objectively the quality of healthcare services (Butt & Run, 2010).

With the support from the past service quality literature, the five-dimensional SERVQUAL model provided by Parasuraman, Zeithaml, and Berry (1998) was used to conceptualize the healthcare service quality in this study in order to comprehend and capture the true value of healthcare service quality performance and understand its influence towards the patient’s satisfaction. The five-dimensional SERVQUAL model provided by Parasuraman, Zeithaml, and Berry (1998) included the reliability, assurance, tangible, empathy and responsiveness.

2.2.1. Reliability and Patient Satisfaction

According to Butt and Run (2010), reliability focuses on the ability to offer promised service in a trustworthy and accurate manner. In healthcare setting, patients expect to receive the clinical service at the promised time, keep informed on the service process and ensure there is no medical error (AlOmari, 2021). Consistently, reliability found to be an important element in healthcare service quality aspect to influence the satisfaction. According to Meesala and Paul (2016), promptness of service, faultless medical records, and communication of the timeliness of clinical processes all contribute to increased healthcare service reliability and satisfaction. Zun, Ibrahim, and Hamid (2018) further supported that when the healthcare service can be performed as
promised, reliable and accurately, it’s fulfill the patient’s needs and expectation and hence, it resulting in patient satisfaction.

2.2.2. Assurance and Patient Satisfaction
Assurance emphasized the politeness and competence of healthcare service providers in order to increase services confidence and trust in healthcare (Ladhari, 2009). In healthcare industry, the knowledge and politeness of the healthcare staff is essential. Numerous of studies (Vanichchinchai, 2020; Akdere, Top, & Tekingündüz, 2018; Rohini & Mahadevappa, 2006, Andaleeb, 2001) found that patient will feel safe and secure during the service process when they are believed that the service providers have the sufficient expertise, competence and skills. As a result, the professionalism, expertise and devotion of the healthcare service providers give patient with a sense of assurance that they will received proper healthcare service and treatment and resulting in increased patient satisfaction.

2.2.3. Tangible and Patient Satisfaction
Parasuraman, Zeithaml, and Berry (1988) defined tangible as the physical quality whereas the tangible focus on the physical facilities, medical equipment and the appearance of the healthcare service providers (Wan Rashid & Jusoff, 2009). In the past literatures, it is evidenced that tangible is a significant factor with greatest expectations and perceptions among the patients (Sumaedi, Yarmen & Bakti, 2016; Zarei et al. 2012; Ariffin & Aziz, 2008). The findings conclude that updated equipment, appealing and clean environment together with tidy service provider apparel are enablers for service quality assessment, which leads to increased patient satisfaction. In the study of Akdere, Top and Tekingündüz (2018), the findings found that patients will also look into the tangible dimension of service quality. It demonstrates that a pleasant healthcare environment with well-equipped equipment and clean and neat workers creates a favorable attitude during the service process to satisfy the patients.

2.2.4. Empathy and Patient Satisfaction
According to Yousapronpaiboon and Johnson (2014), empathy focuses on the care and personalized attention given to patients to understand their needs and place patient’s value as the best interest. Patient satisfaction is hampered when hospitals and service providers fail to display and perform in the empathy dimension to care for and understand their patients’ needs. Similar findings show in the study of Zun, Ibrahim, and Hamid (2018) where patients seek for more empathy from healthcare providers so that they can understand them, care for them, and put them first in the clinical process. To improve patient satisfaction, it is critical for management and hospitals to look into the empathy component to urge employees to demonstrate greater care and individual attention throughout service delivery (Akdere, Top, & Tekingündüz, 2018).

2.2.5. Responsiveness and Patient Satisfaction
According to Akdere, Top and Tekingündüz (2018), the trait of responsiveness is to rapidly inform the service process; give assistance promptly; and demonstrate a willingness to assist the patient. In the other hand, Babroudi, Sabri-Laghiae and Ghoushchi (2021) pointed that responsiveness is about the readiness to provide timely service to assist the patient. The hospital employees must demonstrate persistent willingness to assist the patient. When patients found that the healthcare service is
responsive, constant help is given and they are informed for the process of service delivery, it then increase the satisfaction level. This is consistent in the findings show in Fatima, Malik and Shabbir (2018). From 611 usable surveys found that responsiveness has significant positive connection with patient satisfaction and patient loyalty. As a result, it is stated that the willingness of healthcare service providers to assist and provide prompt services (Responsiveness) is considered as a critical aspect in the patient’s opinion of health care service quality, which affects patient satisfaction.

With the above discussion on the SERVQUAL five dimensions model, it is then proposed the following model (Figure 1) to gauge the relationship between Reliability, Assurance, Tangibles, Empathy and Responsiveness towards patient satisfaction in Lean hospitals, Malaysia. This aids in providing a full grasp of what patients want and expect from healthcare services, particularly during pandemics, in order to improve healthcare outcomes.

Figure 1: The Relationship between SERVQUAL five dimensional model and patient satisfaction in Lean hospitals, Malaysia.

![Figure 1: The Relationship between SERVQUAL five dimensional model and patient satisfaction in Lean hospitals, Malaysia.](image)

3. Research Methodology

According to Ministry of Health Malaysia (2020), there are 52 Lean hospitals as to date. 29 Lean hospitals placed in central, southern and northern region of Malaysia were selected which covered more than 56% of the Lean hospitals in Malaysia. 500 self-administered surveys were distributed to the outpatient from the selected Lean hospitals during pandemic period through non-probability quota sampling method. From 500 surveys distributed, 467 observations are found usable after the removal of outlier and common method bias assessment was employed via full collinearity test using variance inflation factor (VIF). All the constructs’ VIF is below 3.3 suggested rule of thumb (Kock & Lynn, 2012), as a result it concludes that common method bias is not significant risk in this study. The sample size of 467 is adequate and meets the minimal sample size requirement of 40, as stated by the ten times rule by Hair, Hult, Ringle, and Sarstedt (2017).

3.1. Instrument measurement
The demographic profile of the target respondents is included in the questionnaire survey, followed by indicators for service quality characteristics. Table 1 displays the demographic profile of the target respondents.

The indicators for healthcare service quality and patient satisfaction are carefully adopted from the relevant past studies; total 18 items were adopted as the indicators for healthcare service quality from Vanichchinchai (2022) and Butt and Run (2010). It included four items in Reliability, Tangibles and Responsiveness respectively, whereas Assurance and Empathy consists of three items. Finally, the four indicators for patient satisfaction are adapted from Andaleeb (2001). All the constructs were employed the five point Likert scale from from 5, strongly agree to 1 strongly disagree.

### Table 1: Demographic profile of respondents

|                      | Frequency | %    |
|----------------------|-----------|------|
| **Age**              |           |      |
| 21-25                | 43        | 9.21 |
| 26-30                | 50        | 10.71|
| 31-35                | 70        | 14.99|
| 36-40                | 80        | 17.13|
| 41-45                | 117       | 25.05|
| 46-50                | 72        | 15.42|
| >50                  | 35        | 7.49 |
| **Gender**           |           |      |
| Male                 | 227       | 48.61|
| Female               | 240       | 51.39|
| **Race**             |           |      |
| Malay                | 250       | 53.53|
| Chinese              | 151       | 32.33|
| Indian               | 66        | 14.13|
| **Education level**  |           |      |
| Primary school       | 80        | 17.13|
| SPM/O Level          | 167       | 35.76|
| Diploma              | 80        | 17.13|
| Bachelor's degree    | 125       | 26.77|
| Master               | 15        | 3.21 |
| **Occupation**       |           |      |
| Employed             | 300       | 64.24|
| Self-employed        | 95        | 20.34|
| Student              | 26        | 5.57 |
| Retiree              | 20        | 4.28 |
| Unemployed           | 26        | 5.57 |
| **Current living state** |     |      |
| Central region       | 122       | 26.12|
| Southern region      | 150       | 32.12|
| Northern Region      | 195       | 41.76|
| **Monthly income level** |     |      |
| ≤ RM 1,000           | 40        | 8.57 |
| RM 1001-2000         | 31        | 6.64 |
| RM2001-3000          | 170       | 36.40|
| RM 3001-4000         | 161       | 34.48|
| RM4001 and above     | 65        | 13.92|
| **Frequency of visit to hospital** | | |
| Once a year          | 130       | 27.84|
| 2-3 times per year   | 90        | 19.27|
| 4-5 times per year   | 99        | 21.20|
| Once a month         | 148       | 31.69|

4. Statistical Analysis

To assess healthcare service quality in Lean hospitals and understand its relationship with patient satisfaction, Partial least squares structural equation modeling (PLS-SEM)
approach in Smart-PLS 3.0 was used to analyses the proposed model in Figure 1. The objective of this study is to examine the relationship of SERVQUAL five dimensional service quality and patients’ satisfaction. And the PLS-SEM is a prediction-oriented structural equation modeling approach that may be used for both theory explanation and prediction of useful elements for future recommendations in practice (Hair, Matthews, Matthews & Sarstedt, 2017; Gregor, 2006). As a result, PLS-SEM is appropriate technique for the statistical analysis in this study.

4.1. Measurement Model Inspection

Measurement model evaluation focuses on the construct reliability and validity. From the reading in Table 2, all the constructs have Cronbach’s alpha and composite reliability value above 0.70, the suggested threshold by Hair et al. (2017). Hence, the construct reliability for all the indicators is achieved. Additionally, the average variance extracted (AVE) value presented in Table 2 indicate that the convergent validity is attained as all the constructs’ AVE is above 0.5 beyond the recommended rule of thumb from Hair et al. (2017).

Table 2: Internal Consistency Reliability and Convergent Validity Analysis

|                         | Cronbach’s Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|-------------------------|------------------|-----------------------|----------------------------------|
| Reliability             | 0.834            | 0.900                 | 0.750                            |
| Assurance               | 0.817            | 0.892                 | 0.734                            |
| Tangibles               | 0.837            | 0.901                 | 0.753                            |
| Empathy                 | 0.738            | 0.851                 | 0.657                            |
| Responsiveness          | 0.892            | 0.933                 | 0.822                            |
| Patient satisfaction    | 0.905            | 0.934                 | 0.778                            |

In the other hand, the result of Fornell and Larcker (1981) criterion presented in Table 3 shows that square root of AVE (bold) in each indicator is loaded larger than the correlations among the other constructs, the discriminant validity is established. Additionally, when Heterotrait-monotrait ratio of correlations (HTMT) result is below than 0.90 (Hair et al., 2019), the discriminant validity is fulfill.

Table 3: Fornell-Larcker Criterion

|               | 1     | 2     | 3     | 4     | 5     | 6     |
|---------------|-------|-------|-------|-------|-------|-------|
| Reliability   | 0.866 |       |       |       |       |       |
| Assurance     | 0.734 | 0.857 |       |       |       |       |
| Tangibles     | 0.611 | 0.570 | 0.868 |       |       |       |
| Empathy       | 0.732 | 0.659 | 0.573 | 0.812 |       |       |
| Responsiveness| 0.762 | 0.734 | 0.631 | 0.643 | 0.907 |       |
| Patient       | 0.795 | 0.744 | 0.671 | 0.810 | 0.834 | 0.882 |

Table 4 shows that all the constructs’ HTMT value is below 0.90 except the value between empathy and reliability (HTMT = 0.926), reliability and patient satisfaction (HTMT = 0.908), empathy and patient satisfaction (HTMT = 0.937) and responsiveness and patient satisfaction (HTMT = 0.924). Given the HTMT between empathy and reliability, reliability and patient satisfaction, empathy and patient satisfaction, and
responsiveness and patient satisfaction are slightly greater than the suggested threshold of 0.90 value, it is then further assess the confidence interval for the HTMT value. When the confidence interval is less than one, it shows that the constructs are dissimilar.

Table 4: Heterotrait-Monotrait Ratio (HTMT)

|                | 1        | 2        | 3        | 4        | 5        | 6        |
|----------------|----------|----------|----------|----------|----------|----------|
| Reliability    | 0.879    |          |          |          |          |          |
| Assurance      |          | [0.828, 0.927] |          |          |          |          |
| Tangibles      | 0.715    | 0.686    | [0.643, 0.779] | [0.614, 0.753] |          |          |
| Empathy        | 0.926    | 0.836    | 0.723    | [0.874, 0.974] | [0.782, 0.889] | [0.614, 0.753] |
| Responsiveness | 0.885    | 0.829    | 0.713    | 0.785    | [0.839, 0.927] | [0.779, 0.877] | [0.653, 0.769] | [0.721, 0.845] |
| Patient satisfaction | 0.908    | 0.856    | 0.753    | 0.937    | 0.924    | [0.867, 0.946] | [0.816, 0.893] | [0.699, 0.802] | [0.883, 0.988] | [0.895, 0.950] |

From the reading in Table 4, the confidence interval between empathy and reliability (0.874, 0.974), reliability and patient satisfaction (0.867, 0.946), empathy and patient satisfaction (0.883, 0.988) and responsiveness and patient satisfaction (0.895, 0.950) are smaller than the value of one, therefore it can concluded that the discriminant validity is achieved.

4.2. Structural Model Inspection

When the construct reliability and validity is met, structural model will further evaluate. To obtain the inferential statistic for hypothesis testing purpose, 5000 subsample in bootstrapping procedures was employed. Table 5 shows the result of hypotheses testing with detail statistics.

Table 5: Hypotheses Testing Result

| Path | Path coefficient | T statistics | P value | Supported? |
|------|-----------------|--------------|---------|------------|
| H1   | Reliability → Patient satisfaction | 0.096 | 2.456 | 0.014 | Yes |
| H2   | Assurance → Patient satisfaction | 0.090 | 2.720 | 0.007 | Yes |
| H3   | Tangible → Patient satisfaction | 0.099 | 3.842 | 0.000 | Yes |
| H4   | Empathy → Patient satisfaction | 0.371 | 9.255 | 0.000 | Yes |
| H5   | Responsiveness → Passenger satisfaction | 0.395 | 11.111 | 0.000 | Yes |

From the Table 5, it shows that reliability has positive and significant relationship with patient satisfaction (β =0.096, t= 2.456 p<0.05), hence the H1 is supported. This is in line with the past studies of Meesala and Paul (2016), Zun, Ibrahim, and Hamid (2018), and AlOmari (2021) who argue that the importance of providing promised healthcare service which is reliable and accurate to enhance the patient satisfaction. Next, the relationship between assurance and patient satisfaction also found to be significant (β =0.090, t= 2.720, p<0.05). Therefore, the significant result is confirming the H2. This finding is consistent with Rohini and Mahadevappa (2006), Akdere, Top and Tekingündüz (2018) and Vanichchinchai (2020). It is agreed that the professionalism, competence and devotion of healthcare practitioners tends to let patient feel safe and confidence on the medical treatment and subsequently increased the patient
satisfaction. Besides, Tangibles ($\beta = 0.099, t = 3.842, p < 0.001$) has significant relationship with patient satisfaction. The significant impact of Tangibles in patient satisfaction can be found in the empirical findings of Ariffin and Aziz (2008), Zarei et al. (2012) and Sumaedi, Yarmen and Bakti (2016). As a result, Tangibles’ contribution to providing a pleasing environment, adequate medical equipment, and clean and fresh worker apparel has been proven, resulting in greater patient satisfaction. As such, the H3 is supported. Additionally, the Table 5 also displays a significant relationship can be found between the empathy and patient satisfaction ($\beta = 0.371, t = 9.255, p < 0.001$). The significant result has confirming the H4, in which it is agreed with the findings from Yousapronpaiboon and Johnson (2014) and Akdere, Top and Tekingündüz (2018). When care providers show compassion, empathy, and attention to patients, they are better able to comprehend their needs and serve them in their best interests. This leads to improve the patient satisfaction. Finally, responsiveness was discovered to be a key factor in patient satisfaction ($\beta = 0.395, t = 11.111, p < 0.001$). It is in line with the findings reported in Fatima, Malik and Shabbir (2018) and Baboudi, Sabri-Laghaie and Ghoushchi (2021). It reaffirmed the importance of responsiveness in the healthcare service process, encouraging service providers to be available to assist patients and contact with them to keep them informed about the state of their care. With the significant result show between responsiveness and patient satisfaction, it’s confirming the H5.

To provide more insight on the structural model proposed by this study, the coefficient of determination ($R^2$) and predictive relevance of the model ($Q^2$) as well as the effect size ($f^2$) were further evaluate. Firstly, the $R^2$ highlights the explanatory power of the proposed model. Secondly, the $Q^2$ can be further assessing to understand the predictive relevance of the said proposed model. According to Hair et al. (2019), $R^2$ value of 0.75 demonstrates a substantial explanatory power in the proposed model and $Q^2$ value larger than 0.50 depict large predictive relevance in the structural model. From the result presented in Table 6 reveals that proposed model had an $R^2$ of 0.840 and $Q^2$ of 0.646, indicating that it had strong explanatory power as well as a high level of predictive relevance on the patient satisfaction in Lean hospitals, Malaysia.

| Component       | $R^2$ | $Q^2$ | $f^2$ | Effect Size   |
|-----------------|-------|-------|-------|---------------|
| Passenger Satisfaction | 0.840 | 0.646 | 0.017 | Little effect |
| Reliability     |       |       |       |               |
| Assurance       | 0.020 |       |       | Weak effect   |
| Tangibles       | 0.033 |       |       | Weak effect   |
| Empathy         | 0.359 |       |       | Strong effect |
| Responsiveness  | 0.332 |       |       | Moderate effect|

Furthermore, Hair et al. (2019) also proposed evaluating the effect size ($f^2$) to report the rank order of the components in explaining the dependent variable. This aids in determining what patients desire and is seen as the most critical component to safeguard in the delivery of healthcare services during the pandemic. For the effect size, Cohen (1988) suggests that $f^2$ values more than 0.35 imply a big impact size, whereas values greater than 0.15 indicate a moderate effect size, and values greater than 0.02 indicate a small effect size. From the Table 6, it demonstrates that the strongest contributors on patient satisfaction is empathy ($f^2 = 0.359$), followed by responsiveness ($f^2 = 0.332$). In the other hand, assurance and tangibles reported to have weak influence on the patient satisfaction with $f^2$ value of 0.020 and 0.033 respectively. Lastly, reliability with $f^2$, 0.017 shows little influence on patient satisfaction in Malaysian Lean hospitals.
From the effect size interpretation, it sends a strong message to policymakers, hospital management, and service providers to improve empathy and responsiveness, as these are the most critical aspects of healthcare service that people want during the epidemic.

5. Discussion

The objective for this study is to gauge the relationship between Lean hospitals service quality and patient satisfaction during the pandemic. The statistical research revealed that all of the SERVQUAL model's service quality aspects, such as reliability, assurance, tangibles, empathy, and responsiveness, had a substantial impact on healthcare service quality and can help improve patient satisfaction. Among the service quality dimension, empathy is ranked number one in the effect size ($F^2$) presented in Table 6 as well as it has the stronger influence towards the patient satisfaction. This indicates that patients concern about caring and attention given from the hospitals and healthcare practitioners. They expect and hope that hospitals and healthcare providers would prioritize their needs, understand them, and provide services in their best interests during this pandemic. As a result, in order to improve patient happiness in Lean hospitals, an effective approach and investment in developing empathy is required.

Additionally, the responsiveness is the top two service quality dimension which significantly contributes into the patient satisfaction. Responsiveness refers to the ability and willingness to assist patients in receiving prompt service and being informed about the status of their service as quickly as possible. Patients expect precise and true information on the service offered in the responsiveness component of the healthcare service quality dimension, and the hospital service provider must display a willingness to assist and support as well as deliver effective and efficient service. When all of these aspects of responsiveness are enhanced, the level of patient satisfaction rises. Although tangible, assurance and reliability have a minor impact on patient satisfaction, they are important contributions that should not be neglected. The findings can help hospitals and policymakers guarantee that physical assets like medical equipment, facility hygiene, and service professionals’ neat clothes are effectively maintained in order to improve patient satisfaction. As a result, failure to maintain the cleanliness and comfort of the environment, as well as insufficient medical equipment and dirty apparel of healthcare practitioners, may jeopardize service quality in Lean hospitals, resulting in adverse impact on patient’s satisfaction.

Next, the assurance shows to have weak effect in explaining the patient satisfaction in the Lean hospitals. The possible reason is that patient is lack of professional medical expertise, making it difficult for them to assess the medical service as well as the practitioners' skill and knowledge (Verma, Kumar and Sharma, 2022). Lastly, patients believe that reliability is important, but that it has a minor impact on their satisfaction with the quality of healthcare services. Reliability aspect of service quality focus on ability of hospitals and healthcare service providers offered promised service with failure-free manner. The minor impact of reliability on the patient satisfaction could be explained by the increased influx of patient referred to hospitals and cause the healthcare practitioners does not unable to give accurate services at the first time as expected (Babroudi, Sabri-Laghaie & Ghoushichi, 2021). Another cause could be that the Lean hospital’s reliability is not entirely protected, causing patients to be prompted to seek better service reliability in the healthcare context. As mention by Butt and Run (2010), patients distrust healthcare practitioners because they have not received prompt responses and services, and they are skeptical that they will obtain the correct
service the first time. Hence, it is crucial for hospital to increase their efforts to improve the reliability of care in Lean hospitals.

6. Implications

The literature's status quo as highlighted in Babroudi, Sabri-Laghaie and Ghouseichi (2021) motive this study to re-evaluate the healthcare service quality and their influence on the patient satisfaction in Malaysian Lean hospitals during the pandemic. Theoretically, this study has contributed to the recognition of the SERVQUAL five-dimensional model as a trustworthy and viable instrument for understanding service quality gaps in Malaysian Lean hospitals. Furthermore, healthcare industry like Lean hospital is suffering challenges on how to safeguard and enhance its service quality during the Covid-19 pandemic. With the increasing patient attendance, it is critical for the healthcare business to pay special attention to patient demands and expectations in order to increase service quality and satisfy them in the current situation. Therefore, the findings from the SERVQUAL model provides a valuable diagnostic assessment to understand patient demands and monitor healthcare service quality, allowing policymakers and Lean hospital management to identify the improvements required to please patients and produce the best possible health outcome. This study suggests the following implications to policymakers, Lean hospitals, and service providers based on the empirical findings:

i. The management may implement the relationship marketing practice in healthcare setting. This is to encourage healthcare providers to constantly care for and communicate with their patients, to provide flexible services in response to their requests, and to keep them informed about the progress of their services, all while improving the relationship between service providers and patients.

ii. Lean hospitals can set up an appointment concept and updating the current registration number and time lets the patient understand how long the treatment will take.

iii. Healthcare service providers are also encouraged to respond quickly to patients’ requests and to make themselves available to assist them.

iv. Senior management need to constantly audit or checking on the equipment, environment and the personnel’s attire. Maintain a clean and hygienic environment, and play soothing music in hospitals is crucial which help to improve the tangibles aspect of service quality.

v. Hospitals may post award winners, publications, or other activities on the notice board, door, or in the waiting room to reassure patients by boosting their trust in the care providers’ competence and professionalism.

To summarize, in order to improve patient satisfaction and the quality of healthcare services, Lean hospitals should focus on demonstrating care and personalized attention to patients in order to understand their needs and prioritize the patient’s best interests (empathy) to develop a patient-centered healthcare service is critical. In addition, service providers must be responsive (responsiveness) in order to give prompt service and be willing to assist and support the patient at all times. Apart from that, hospitals and policymakers should invest and ensure that equipment, the healthcare environment, and hygiene are all regularly monitored (tangible). Healthcare practitioners must speak professionally with patients, demonstrating their competence and skill (assurance), and
deliver services on time while maintaining the quality and consistency of medical information to ensure the service is reliable (reliability).

7. Limitations and Future Studies Suggestions

Although this study shed a light for importance insight in service quality dimension to understand the patient satisfaction in Lean hospitals during the pandemic, however the empirical results cannot be generalized because this study focuses on Lean hospitals in Malaysia. Given the current findings, future study are encourage to wider the sample by focusing on private healthcare organizations or healthcare in other countries to better understand the importance of service quality. In addition, the limitation of this study was employed cross-sectional research method in understanding the service quality dimension and patient satisfaction in Lean hospitals. This may reduce the capacity to forecast the time evolution in service quality results over time and to understand its true causal relationship between service quality and patient satisfaction. As a result, future study should take a longitudinal approach to expand the observation and provide a thorough knowledge of how these service quality dimensions and their relationships change over time. Future research can extend the model by incorporating the mediating influence and incorporating patient loyalty and experience, resulting in an interesting and enlightening study in the body of literature. Lastly, the SERVQUAL model employed in this study mainly focus on the functional quality which is significant for healthcare service quality determinant. The contribution of outcome quality of healthcare sector cannot be neglected. As a result, future research is encouraged to incorporate the outcome quality and investigate its impact on patient satisfaction.

8. Conclusion

Healthcare service quality and patient satisfaction are tied together. Given the Covid-19 pandemic, healthcare sector experiencing unprecedented challenges and it is rapidly adjusting to serve the patient better with world class healthcare service quality. Therefore, understand what patients expect and need in Lean hospitals during this pandemic is utmost important. Failure to satisfy patients’ expectations for the quality of healthcare services is not an option for any healthcare institution or country, but it might spell disaster and lead to negative health effects which impair the socio-economic growth. Finally, the empirical findings of this study provide valuable insights for policymakers, hospitals, and healthcare service providers in identifying what patients need and expecting to design and develop strategies as well as continuous improvement approaches to improve healthcare service quality in pandemic situations. A good healthcare system’s primary purpose is to ensure that all people receive high-quality, respectful treatment and satisfaction in order to protect their health and well-being, and this is always the country’s and the world’s primary goal.

Funding

This study received no funding.

Conflict of Interests

The authors declare no conflict of interest in this study.
References

Akdere, M., Top, M., & Tekingündüz, S. (2018). Examining patient perceptions of service quality in Turkish hospitals: The SERVPERF model. Total Quality Management & Business Excellence, 31(3-4), 342-352.

AliOmari, F. (2021). Measuring gaps in health care quality using SERVQUAL model: challenges and opportunities in developing countries. Measuring Business Excellence, 25(4), 407-420.

Amin, M. & Zahora Nashruddin, S. (2013). Hospital service quality and its effects on patient satisfaction and behavioural intention. Clinical Governance: An International Journal, 18(3), 238–254.

Andaleeb, S. S. (2001). Service quality perceptions and patient satisfaction: a study of hospitals in a developing country. Social Science & Medicine, 52(9), 1359 –1370.

Ariffin, A. A. M. & Aziz, N. A. (2008). Determining the service quality dimensions and zone of tolerance for hospital services in Malaysia. The Business Review, 10(2), 164-169.

Asnawi, A., Awang, Z., Afthanorhan, A., Mohamad, M., & Karim, F. J. M. S. L. (2019). The influence of hospital image and service quality on patients’ satisfaction and loyalty. Management Science Letters, 9(6), 911-920.

Babroudi, N. E. P., Sabri-Laghaie, K. & Ghoushchi, N. G. (2021). Re-evaluation of the healthcare service quality criteria for the Covid-19 pandemic: Z-number fuzzy cognitive map. Applied Soft Computing, 112(2021), 1-17.

Butt, M. M., & Run, E. C. (2010). Private health care quality: applying a SERVQUAL model. International Journal of Health Care Quality Assurance, 23(7), 658-673.

Chahal, H., & Kumari, N. (2010). Development of multidimensional scale for health care service quality (HCSQ) in Indian context. Journal of Indian Business Research, 2(4), 230-255.

Choi, B. J., & Kim H. S. (2013). The impact of outcome quality, interaction quality and peer-to-peer quality on customer satisfaction with a hospital service. Managing Service Quality: An International Journal, 23(3), 188-204.

Cohen, J. (1988). Set correlation and contingency tables. Applied psychological measurement, 12(4), 425-434.

Dagger, T. S, Sweeney, J. C, & Johnson, L. W. (2007). A Hierarchical Model of Health Service quality: Scale Development and Investigation of an Integrated Model. Journal of Service Research, 10(2), 123-142.

Fatima, T., Malik, S.A. & Shabbir, A. (2018). Hospital health care service quality, patient satisfaction and loyalty: An investigation in context of private health care systems. International Journal of Quality & Reliability Management, 35(6) 1195-1214.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Gregor, S. (2006). The nature of theory in information systems. MIS Quarterly, 30(3), 611-642.

Gupta, S., Sharma, M. & Sunder M., V. (2016). Lean services: a systematic review. International Journal of Productivity and Performance Management, 65(8), 1025-1056.

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (2nd ed.). Sage.
Hair, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2-24.

Itumalla, R., Acharyulu, G. V. R. K., & Shekhar, B. R. (2014). Development of hospitalqual: a service quality scale for measuring in-patient services in hospital. *Operations and Supply Chain Management: An International Journal, 7*(2), 54-63.

Kock, N. & Lynn, G. (2012). Lateral collinearity and misleading results in variance-based SEM: an illustration and recommendations. *Journal of the Association for Information Systems, 13*(7), 546-580.

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., Doubova, S. V., English, M., García-Elorrio, E., Guanais, F., Gureje, O., Hirschhorn, L. R., Jiang, L., Kelly, E., Lemango, E. T., Liljestrand, J., Malata, A., Marchant, T., Matsoso, M. P., Meara, J. G., Mohanan, M., Ndiaye, Y., Norheim, O. f., Reddy, K. S., Rowe, A. K., Salomon, J. A., & Thapa, G. (2018). High-quality health system is sustainable development goals era: time for a revolution. *Lancet Global Health, 2018*(6), e1196-e1252.

Ladhari, R. (2009). Service quality, emotional satisfaction, and behavioural intentions: A study in the hotel industry. *Managing Service Quality: An International Journal, 19*(3), 308-331.

Leite, H., Lindsay, C., & Kumar, M. (2020). COVID-19 outbreak: implications on healthcare operations. *The TQM Journal, 33*(1), 247-256.

Meesala, A. & Paul, J. (2018). Service quality, consumer satisfaction and loyalty in hospitals: thinking for the future. *Journal of Retailing and Consumer Services, 40*(2018), 261-269.

Ministry of Health Malaysia (2020). Health fact 2020. Retrieved from https://www.moh.gov.my/moh/resources/Penerbitan/Penerbitan%20Utama/HEALTH%20FACTS/Health%20Facts%202020.pdf

Noris, N. J., Indera, P. K, Libasin, Z. & Krishnan, M. (2022). Lean healthcare implementation in Malaysian specialist hospitals: challenges and performance evaluation. *Journal of Health and Translational Medicine, 25*(1), 27-39.

Owusu-Frimpong, N., Nwankwo, S., & Dason, B. (2010). Measuring service quality and patient satisfaction with access to public and private health care delivery. *International Journal of Public Sector Management, 23*(3), 203-220.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing, 64*(1), 12-37.

Rohini, R., & Mahadevappa, B. (2006). Service quality in Bangalore hospitals-an empirical study. *Journal of Services Research, 6*(1), 59-84.

Rust, R. T., & Oliver, R. L. (1994). Service quality: insights and managerial implications from the frontier. In Rust, R. T., & Oliver, R. L. (Eds.), *Service quality: new directions in theory and practice.* (p. 1-19). Thousand Oaks, CA: Sage Publications.

Sumaedi, S. Yarmen, M., & Bakti, I. G. M. Y. (2016). Health care service quality model: A multi-level approach with empirical evidence from a developing country. *International Journal of Productivity and Performance Management, 65*(8), 1007-1024.

Vanichchinchai, A. (2020). Priority nonconformity and service quality analysis of hospitals in Thailand: a care provider perspective. *The TQM Journal, 33*(6), 1395-1410.
Vanichchinchai, A. (2022). Relationships among lean, service quality expectation and performance in hospitals. *International Journal of Lean Six Sigma, 13*(2), 457-473.

Verma, P., Kumar, S. & Sharma, S. K. (2022). Evaluating the total quality and its role in measuring consumer satisfaction with e-health care services using the 5Qs model: a structure equation modeling approach. *Benchmarking: An International Journal, 29*(1), 22-46.

Wan Rashid, W. E., & Jusoff, H. K. (2009). Service quality in health care setting. *International Journal of Health Care Quality Assurance, 22*(5), 471-82.

World Health Organization. (2022, February). WHO Coronavirus (COVID-19) Dashboard. https://covid19.who.int/table

Yousapronpaiboon, K. & Johnson, W.C. (2013). Measuring hospital out-patient service quality in Thailand. *Leadership in Health Services, 26*(4), 338-355.

Yunus, S. Z. S. A., Puteh, S. E. W., Ali, A. M., & Daud, F. (2021). The Covid impact to public healthcare utilization among urban low-income subsidized community in Klang Valley Malaysia. *Health Services Research and Managerial Epidemiology, 8*, 560-581.

Zarei A, Arab M, Froushani A. R., Rashidian A, & Tabatabaei, M.G. (2012). Service quality of private hospitals: the Iranian patients’ perspective. *BMC Health Service Research, 12*(31), 1-7.

Zun, A. B., Ibrahim, M. I., & Hamid, A. A. (2018). Level of Satisfaction on Service Quality Dimensions Based on SERVQUAL Model Among Patients Attending 1 Malaysia Clinic in Kota Bharu, Malaysia. *Oman Medical Journal, 33*(5), 416-422.