ORIGINAL ARTICLE

Reimagining Healthcare Delivery: Enhancing Patient-Centric Services in Pakistan Public Hospitals

Zaki Hasan[1], Syeda Zeerak[2], Humaira Fatima[3], Tabassum Zubair[2], Amna Munir[2]

Assistant Professor, College of Physical Therapy, Faculty of Allied Health Sciences, Ziauddin University[1], Senior Lecturer, College of Physical Therapy, Faculty of Allied Health Sciences, Ziauddin University[2], Physiotherapist, College of Physical Therapy, Faculty of Allied Health Sciences, Ziauddin University[3]

Corresponding Email: *syeda.zeerak@zu.edu.pk*

Abstract

Background: The study explored the allied health services provided by Karachi public hospitals. Patient engagement, treatment quality, digital marketing efficacy, accessibility, patterns of usage, and satisfaction with health outcomes were the primary areas of interest. With the potential to improve patient experiences and health outcomes, the findings offered recommendations to enhance patient-centered care, service accessibility, and communication strategies.

Methodology: This cross-sectional study focused on the health outcomes in public healthcare facilities. Stratified random sampling and Smart Partial Least Squares (PLS) analysis were used to examine the associations among the variables. The sample-to-variable ratio determined a sample size of 410 for executing Smart PLS regression and correlation analysis.

Results: The study found a robust correlation between factor loadings and demographic traits. Positive relationships between patient utilization, service accessibility, the efficacy of digital marketing, and the quality of care were revealed. Further, the moderation analysis highlighted that empathy was critical in determining patient happiness. The model fit indices showed a good fit, with some minor differences amongst models. The structural equation model results confirmed the crucial role of patient engagement, care quality, and service accessibility in influencing patient utilization.

Conclusion: The study emphasized that patient-provider relationships and moderating factors like empathy helped serve the patients better and positively. These findings underline the significance of holistic methods in promoting patient-centric care delivery and eventually improving healthcare.

Keywords

Digital Marketing Effectiveness, Patient Engagement, Quality of Care Delivery, Service Accessibility and Convenience.

Check for updates

Cite as: Hasan Z, Zeerak S, Fatima H, Zubair T, Munir A. Reimagining Healthcare Delivery: Enhancing Patient-Centric Services in Pakistan Public Hospitals. Allied Med Res J. 2024;2(2):61-75. Available from: https://ojs.amrj.net/index.php/1/article/view/147/80.

DOI: https://doi.org/10.59564/amrj/02.02/008 **Received:** 19th March 2024 , **Revised:** 11th June 2024 , **Accepted:** 28th June 2024

Introduction

Developing countries frequently encounter continuous asymmetrical growth in population and healthcare facilities, driving increased demand for healthcare services[1]. The incidence of morbidity and diseases is comparatively high, and the quality of healthcare is not always optimal in nations with little or mismanaged resources that results in overworked and overcapacity hospitals when it comes to treating patients hence resulting in compromised quality of provided services, whether a complex skill or a soft one[2].

This study aimed to cover the situation facing multi-disciplinary treatment-related services of public hospitals in Karachi. This contrasts with traditional health systems where several organizations provide different healthcare services[3]. Moreover, this study explored the possible modulating function of empathy and understanding between the positiveness of services and patient health outcomes in different types of hospitals. This research was of great significance for the public healthcare system in Karachi. An in-depth scrutiny of 1) patient involvement, 2) care quality, 3) digital marketing effectiveness, and 4) convenience of service access opened hospitals to vital aspects of multi-disciplinary treatment[4]. With a thorough analysis of these factors, hospitals were in a better position to customize their services to the needs of patients directly. Service accessibility has also, as a result, been improved dramatically, thereby raising overall healthcare outcomes for patients in public institutions[5]. Finally, this study sought to measure health outcomes satisfaction among patients by looking at such indicators as perceived treatment effectiveness and health improvement. It also investigated whether the presence or absence of understanding would influence patient satisfaction with different health outcomes in hospitals today.

This research also focused on digital marketing effectiveness, meaning hospitals could adjust internet communication strategies to engage with patients more effectively across various platforms. In addition, the information relating to patient usage patterns and health outcome satisfaction is of practical value for government departments and hospital administrations[6]. These pointers can help determine the allocation of resources and guide efforts to improve services to raise the standards of healthcare delivery within public institutions in Karachi. Overall, the significance of this research is in its power to influence sweeping improvements in patient-centered care, service accessibility, and communication strategies.

Research Questions

1. Does a significant relationship exist between patient engagement and the utilization of allied health services within Karachi's public hospitals?

2. Is there a significant correlation between the quality-of-care delivery and the utilization of allied health services among patients in Karachi's public hospitals?
3. Is there a significant association among patient engagement, care quality delivery, digital marketing effectiveness, service accessibility, patient utilization or service intake, health outcome satisfaction, and the mediating role of empathy and understanding within Karachi's public hospitals?
4. Does the effectiveness of digital marketing strategies exhibit a significant relationship with patient utilization of allied health services within Karachi's public hospitals?
5. Is there a notable correlation between service accessibility/convenience factors and patient utilization of allied health services in Karachi's public hospitals?
6. What is the relationship between patient utilization of allied health services and health outcome satisfaction among patients in Karachi's public hospitals?
7. Does the mediating role of empathy and understanding significantly influence the relationship between patient utilization and health outcome satisfaction within Karachi's public hospitals?

Theoretical Framework

The following are the theories associated with our model:

- ***Health Service Quality Theory***

  This theory suited this research model by emphasizing the pivotal role of service quality dimensions within healthcare settings. Patient utilization or service intake was intricately tied to public hospitals' perceived quality of care. It facilitates the accessibility of resources, patient engagement, and the actual delivery of care and provides a comprehensive framework for evaluating and enhancing allied health services. Moreover, it focuses on health outcome satisfaction and is aligned seamlessly with the research's aim to understand how service quality impacted patient experiences and health outcomes in Karachi's public hospitals[7].

- ***Patient-Centered Care Theory***

  This theory complemented our model by highlighting the significance of empathy and understanding in healthcare interactions[8]. As a mediator, empathy fostered a patient-provider relationship crucial for improved health outcomes and enhanced utilization. Further, it accentuated the pivotal role of empathetic communication, personalized care, and patient involvement in decision-making, serving as a bridge between the independent variables—patient engagement, care quality, and marketing effectiveness—and the ultimate goal of optimizing health outcomes and service utilization in Karachi's public healthcare context[9].

- ***Patient Engagement***

  This theory emphasized the active participation of patients in health education programs and community events and their interaction level with digital health platforms provided by Karachi public hospitals[10].

- ***Quality of Care Delivery***

  This theory focused on patients' perceptions regarding the expertise, empathy, patient-centric approach, and overall effectiveness of care received within these hospitals[11].

- ***Digital Marketing Effectiveness***

  This theory concerns the reach, engagement, and perceived information of digital content disseminated by hospitals across various online platforms[12].

- ***Service Accessibility and Convenience***

  The theory applies to patients' feedback on appointment scheduling ease, convenience of hospital locations, utilization of telemedicine services, and satisfaction with waiting times in these public healthcare facilities[12-13].

- ***Patient Utilization or Service Intake***

  The theory mainly stressed the frequency and consistency of patients utilizing healthcare services offered by Karachi public hospitals[14].

- ***Health Outcome Satisfaction***

  This theory relies on patients' satisfaction levels with treatment effectiveness, improvements in health conditions, and overall contentment with healthcare outcomes in public hospitals[15-16].

- ***Empathy and Understanding***

  The theory relates to the patient's perceptions of healthcare providers' empathetic communication, personalized care, and sense of being understood and involved in treatment decisions within this hospitals[17-18].

Research Framework

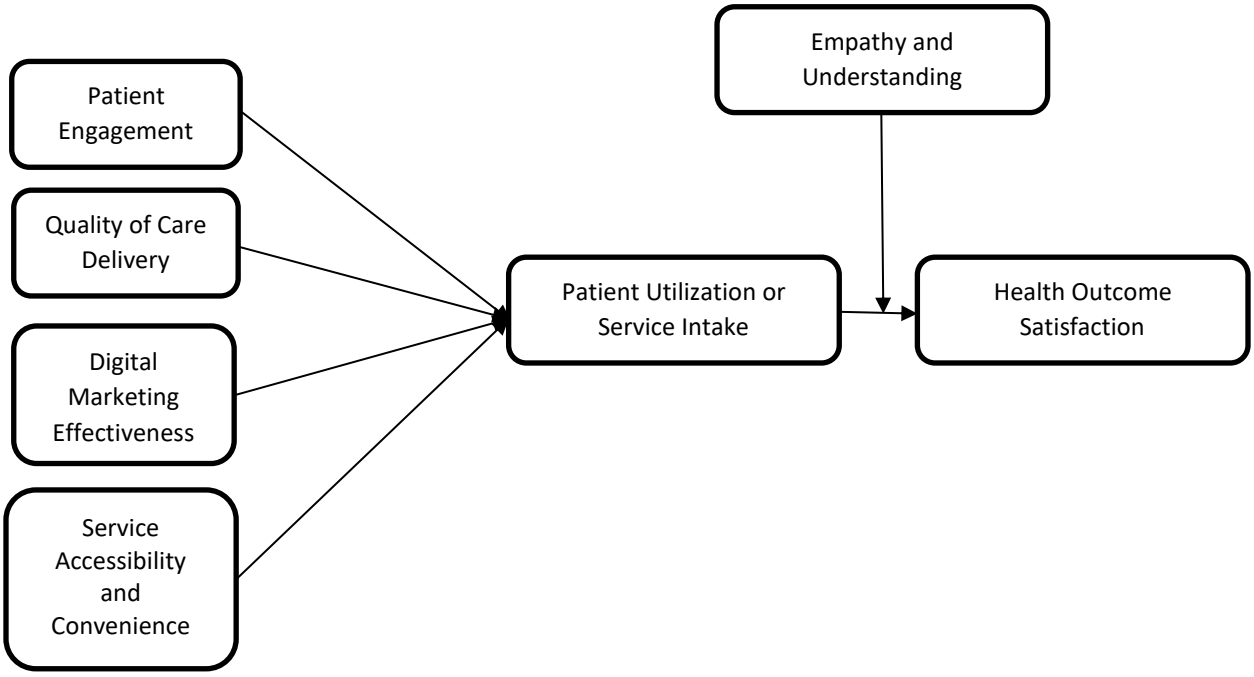

Figure-1 Framework of factors affecting service utilization

Methodology

Study Design and Setting

This cross-sectional survey was conducted within major public hospitals such as Jinnah Postgraduate Medical Centre (JPMC) and Civil Hospital Karachi, Pakistan. It provided insights into the current status of patient engagement, care quality, digital marketing effectiveness, service accessibility, utilization, and health outcomes.

Sampling Technique

A stratified random sampling technique was employed to ensure representation from different departments or specialties within each hospital. Patients / attendants from these hospitals chosen to collect the data. Stratification helped capture diverse perspectives across various healthcare services these public hospitals offer.

Sample Size

A sample size was calculated using a sample-to-variable ratio proposed by Hair et al.[19]. According to a minimum of 15:1 preferred ratio for responses and constructs, the researcher used 30 constructs in this study, which resulted in a total of n=450 sample size.

Data Analysis

The data was analyzed using Smart PLS (Partial Least Square) regression and correlation techniques. The analysis of relationships between independent and dependent variables allows for a comprehensive assessment of how patient engagement, care quality, marketing effectiveness, and service accessibility influence patient utilization and health outcome satisfaction. The variables' associations and interrelations were examined by interpreting the correlations.

Ethical Considerations

The study encompassed obtaining informed consent, ensuring confidentiality, and respecting participant autonomy. Measures were taken to protect privacy, minimize harm, and comply with institutional ethical guidelines. Transparent reporting of findings was prioritized, upholding integrity and accuracy in the study's conduct and outcomes.

Results

410 participants participated in this study; 40 responses were excluded due to incomplete and incompleteness. The sample comprised 59.75% female and 40.24%, with the highest response acquired from the age distribution of 18-30, comprising 29.26% participants, followed by 26.58% aged 44–56 from three major public hospitals. The details are depicted in Table-1.

Table-1 Demographic Characteristics

Constructs	n (%)
Gender	
Male	165 (40.24%)
Female	245 (59.75%)
Age (Years)	
18 – 30	120 (29.26%)
31 – 43	87 (21.21%)
44 – 56	109 (26.58%)
>57	94 (22.92%)
Public Hospitals	
JPMC	161 (39.26%)
Abbasi Shaheed Hospital	114 (27.80%)
Lyari General Hospital	135 (32.92%)

The Table-2 revealed the results of various constructs' factor analysis. Within a healthcare experience, each construct consisted of multifarious items denoted by subscripts. For Patient Engagement (PE), the items (PE1 to PE7) illustrated robust factor loadings, representing the items' strong association with the overarching construct. The internal consistency, as measured by its Cronbach's Alpha (0.835), of PE was also commendable, which enhanced the reliability of the PE construct. Further, the Composite Reliability (CR) was 0.861, surpassing the recommended threshold, confirming the reliability of the construct. The Average Variance Extracted (AVE) for PE was 0.687, which signified that Patient Engagement explained 68.7% of the variance between the items.

These patterns were repeated across constructs. Most items featured strong factor loadings for quality-of-care delivery (QCD). This construct also showed strong internal consistency and reliability; its Cronbach's Alpha was 0.843, and its CR was 0.865; however, its AVE was 0.619. The same was the case for Digital Marketing Effectiveness (DME), Service Accessibility and Convenience (SAC), Patient Utilization or Service Intake (PUS), Healthcare Outcome Satisfaction (HOS), and Empathy and Understanding (EU). These, too, had exemplary factor loadings, internal consistency, and reliability, as indicated by their Cronbach's Alpha, CR, and AVE. The constructs' AVE values, a reflection of convergent validity, usually met the recommended threshold of 0.5, indicating that the constructs captured the underlying dimensions of the specified healthcare experiences well. In sum, this factor loading table provided a thorough examination of the measurement model's reliability and validity[20-21], asserting that the items indeed effectively represented the distinct facets of patient engagement, care quality, digital marketing's impacts, service accessibility and convenience, patient utilization or service intake, healthcare outcome satisfaction and empathy within the studied healthcare context.

Table-2 Factor Loadings, Cronbach's Alpha, CR, and AVE among Variables

Constructs		Loadings	Cronbach's Alpha	CR	AVE
PE	PE1	0.743	0.835	0.861	0.687
	PE2	0.758			
	PE3	0.864			
	PE4	0.715			
	PE5	0.914			
	PE6	0.939			
	PE7	0.953			
QCD	QCD1	0.815	0.843	0.865	0.619
	QCD2	0.788			
	QCD3	0.721			
	QCD4	0.678			
	QCD5	0.909			

DME	DME1	0.919	0.745	0.790	0.625
	DME2	0.786			
	DME3	0.850			
SAC	SAC1	0.768	0.841	0.846	0.677
	SAC2	0.853			
	SAC3	0.804			
	SAC4	0.864			
PUS	PUS1	0.695	0.854	0.877	0.582
	PUS2	0.793			
	PUS3	0.682			
	PUS4	0.911			
	PUS5	0.790			
HOS	HOS1	0.908	0.735	0.776	0.656
	HOS2	0.692			
	HOS3	0.815			
EU	EU1	0.789	0.778	0.771	0.780
	EU2	0.881			
	EU3	0.765			
	EU4	0.773			

The Fornell and Larcker Criterion (Table-3) was a critical tool in assessing discriminant validity in a factor analysis or structural equation modelling framework[22]. The discriminant validity ensured that each construct had to be distinct. This criterion compared the square root of the AVE for each construct with the correlations between that construct and all others. The diagonal elements in the table are the square roots of AVE, which represent the percentage of variance in each of a construct's indicators explained by that construct. The off-diagonal elements in the table are correlations between pairs of constructs. Generally, the results showed that a construct correlates more significantly with its indicators than those from another construct and provided evidence that the constructs were unique and supported discriminant validity. It was important for researchers to note situations where the square root of AVE is close to or less than the correlation of that construct with other constructs. This type of situation may lead to questions of discriminant validity. In summary, the Fornell and Larcker criterion provides researchers with a more systematic approach to evaluating the distinctiveness of the constructs included in their measurement model. This criteria is essential to developing and validating a measurement model, which should produce accurate and reliable results.

Table-3 The Fornell and Larcker Criterion							
Constructs	PE	QCD	DME	SAC	PUS	HOS	ES
PE	0.826						
QCD	0.463	0.786					
DME	0.420	0.675	0.778				
SAC	0.481	0.546	0.756	0.823			
PUS	0.414	0.537	0.651	0.800	0.763		
HOS	0.425	0.512	0.533	0.704	0.702	0.810	
ES	0.566	0.453	0.411	0.432	0.564	0.543	0.807

In factor analysis, cross-loadings indicated how individual items correlate with more than one latent construct in the measurement model[22-23]. In Table-4, each cell presented the relationship between a specific item and different constructs. For instance, PE1 had cross-loadings of 0.742 on Patient Engagement (PE), 0.234 on Quality-of-Care Delivery (QCD), 0.458 on Digital Marketing Effectiveness (DME), 0.403 on Service Accessibility and Convenience (SAC), 0.464 on Patient Utilization or Service Intake (PUS), 0.409 on Healthcare Outcome Satisfaction (HCS), and 0.425 on Empathy and Understanding (EU). The interpretation of these values involved assessing the magnitude of the cross-loadings. Higher values indicated a stronger relationship between the item and the corresponding construct. Each item was expected to have a dominant loading on its designated construct. Lower cross-loadings on other constructs suggested that the item was doing what it was intended to do. In the case of PE1, the high loading on PE (0.742) indicated a strong relationship to the construct of Patient Engagement. In contrast, the lower cross-loadings on other constructs suggest some specificity in measurement. Similar to this, each construct showed relations with its specific items.

Table-4 Cross Loadings							
Constructs	PE	QCD	DME	SAC	PUS	HOS	EU
PE1	**0.742**	0.234	0.458	0.403	0.464	0.409	0.425
PE2	**0.758**	0.432	0.360	0.323	0.371	0.341	0.330
PE3	**0.864**	0.541	0.334	0.348	0.366	0.290	0.328
PE4	**0.526**	0.210	0.293	0.200	0.282	0.255	0.233
PE5	**0.914**	0.299	0.391	0.378	0.415	0.355	0.370
PE6	**0.939**	0.431	0.402	0.373	0.423	0.349	0.371
PE7	**0.953**	0.319	0.399	0.351	0.413	0.358	0.355
QCD1	0.313	**0.815**	0.112	0.479	0.368	0.598	0.570

QCD2	0.561	**0.788**	0.368	0.472	0.453	0.269	0.134
QCD3	0.431	**0.721**	0.426	0.360	0.591	0.444	0.457
QCD4	0.349	**0.878**	0.018	0.436	0.537	0.491	0.519
QCD5	0.437	**0.909**	0.199	0.512	0.554	0.432	0.630
DME1	0.440	0.449	**0.659**	0.109	0.512	0.241	0.356
DME2	0.512	0.259	**0.772**	0.378	0.344	0.232	0.529
DME3	0.439	0.253	**0.767**	0.250	0.641	0.559	0.450
SAC1	0.412	0.292	0.114	**0.768**	0.201	0.198	0.570
SAC2	0.387	0.470	0.088	**0.853**	0.453	0.369	0.187
SAC3	0.281	0.221	0.320	**0.668**	0.204	0.411	0.154
SAC4	0.432	0.397	0.196	**0.739**	0.604	0.510	0.249
PUS1	0.191	0.447	0.466	0.410	**0.714**	0.400	0.525
PUS2	0.186	0.260	0.270	0.188	**0.713**	0.293	0.554
PUS3	0.521	0.194	0.224	0.206	**0.787**	0.382	0.374
PUS4	0.428	0.231	0.232	0.417	**0.793**	0.378	0.462
PUS5	0.491	0.283	0.240	0.408	**0.827**	0.411	0.555
HOS1	0.511	0.195	0.629	0.560	0.690	**0.790**	0.506
HOS2	0.518	0.470	0.488	0.172	0.253	**0.769**	0.208
HOS3	0.310	0.341	0.398	0.567	0.479	**0.868**	0.492
EU1	0.131	0.221	0.320	0.268	0.104	0.241	**0.815**
EU2	0.109	0.431	0.431	0.331	0.471	0.549	**0.887**
EU3	0.110	0.542	0.341	0.547	0.537	0.521	**0.901**
EU4	0.111	0.321	0.481	0.642	0.432	0.221	**0.876**

In the structural equation model, hypothesis testing results revealed the complex interrelations of its primary constructs. Each of the initial hypotheses (H1-H4) is evidence for a positive correlation between Patient Involvement (PI), Delivery of Service Quality (DSQ), the effectiveness of Digital Marketing (DM), Service Accessibility and Convenience (SAC), and Patient Service Utilization (PSU). Exemplifying the patient's behaviour, these highly significant path coefficients and p-values ($p<0.001$) indicate how vital the constructs are. In particular, the strong correlation between SAC and PSU points out the vast difference that increased service accessibility and convenience can make to patient involvement.

The next set of hypothesis revealed more intriguing statistics. H5, implying a direct correlation between PSU and Healthcare Outcome Satisfaction (HOS), received minuscule support from our data ($p>0.05$). Conversely, H6 sets up a moderating construct, i.e. Empathy and Understanding

(EU) between PSU and HOS: this was proven by statistics, significant path coefficient (d), and a small p-value. The results of the model provided a thorough view of how patient engagement, service quality, digital marketing efficiency, convenience, and use of facilities all interact to determine total healthcare satisfaction. The results underlined that human compassion, feeling valued or understood by others, can have varying effects on whether patients are satisfied with their health care.

Table-5 Summary of Hypothesis Testing Results

Hypothesis	Path Coefficient	Standard Error	T - Value	P - Value	Study Results
H1: PE – PUS	0.72	0.038	2.578	0.023	**Supported**
H2: QCD - PUS	0.67	0.188	5.67	0.0002	**Supported**
H3: DME - PUS	0.81	0.046	5.43	0.01	**Supported**
H4: SAC - PUS	0.95	0.007	10.41	0.0001	**Supported**
H5: PUS - HOS	0.66	0.04	0.453	0.453	**Not Supported**

A lower SRMR value was typically desired, and a better fit was suggested for the data. In this case, the Saturated Model (0.091) had a slightly lower SRMR than the Estimated Model (0.10)[24]. While this difference is relatively small, the Saturated Model, which included every possible relationship among the data, fitted slightly better than the Estimated Model, which included some restrictions or omissions in the relationships. Statisticians generally interpreted SRMR values closer to zero as signs of a good fit. Values around or under 0.08 were often considered to indicate an acceptable fit. Still, the exact threshold for considering SRMR to be a good fit may vary depending upon the context and disciplinary conventions in the particular field of study. Considering other fit indices and contextual factors was essential when concluding the model's overall fit[25].

Discussion

The results of the hypothesis testing within the structural equation model provided valuable insight into the intricate interplay of the various constructs within the healthcare context. The first set of hypotheses (H1-H4) demonstrated the importance of Patient Engagement (PE), Quality of Care Delivery (QCD), Digital Marketing Effectiveness (DME), and Service Accessibility and Convenience (SAC) as antecedents of Patient Utilization or Service Intake (PUS), congruent with the cited investigations by Granados-Santiago[14], Okoli[15], Zaid[16] and Carini[17], health outcomes of the patients with more involvement in goal attainment, appropriate and timely information and services with a focus on the quality being provided have significantly more satisfactory consequences. The statistically significant path coefficients and low p-values ($p<0.001$) supported these factors' critical role in driving patient behaviour. Remarkably. Among these was the strong positive relationship between SAC and PUS, demonstrating the profound effect of improved service accessibility and convenience on patient engagement. However, more nuanced findings were negotiated in the subsequent set of hypotheses. The non-

significant path coefficient (Beta=0.02) and high p-value (p=0.6905) in the hypothesis examining the direct relationship between PUS and Healthcare Outcome Satisfaction (HOS) (H5) did not provide evidence of a direct relationship.

On the contrary, the following hypothesis did not assume an association, yet a subsequent hypothesis predicted a moderation relationship via the Empathy and Understanding construct: H6. The statistical analysis proved this moderation hypothesis due to the resulting significant path coefficient (Beta=0.60) and very low p-value (p<.0001), which in turn could be compared with the study by Nguyen et al.[4] that success of patient satisfaction is attributed to empathy on the part of practitioners. At the same time, an absence of understanding reduces patient satisfaction. In total, such findings could be more precise when deconstructing. They once again proved the importance of such moderating variables as empathy and understanding when investigating patient engagement, quality of service, the success of digital marketing, accessibility, utilization, and, as an outcome, satisfaction from healthcare outcomes[26-27]. All these constructs represented a singular model tightly connected. The findings meant a lot for policymakers and healthcare providers[28].

Managerial Implications

Several critical managerial implications for practice emerged from the present study:

- Healthcare organizations should prioritize efforts toward enhancing the accessibility and convenience of their services, complemented with investments in effective digital marketing strategies to drive patient utilization and engagement. Even with such a strategy, on-premises services will require special consideration.
- They should emphasize patient engagement and quality care delivery to inform the design of every interaction and better align the organization's cultural values with patients' descriptions and delivery.
- The role of empathy and understanding as a moderator to patient satisfaction argued for the training of healthcare staff in enhanced communication strategies and how to demonstratively express concern for patient well-being.
- The requirement for partial tailoring and the implementation of continuous monitoring and evaluation mechanisms are essential to realizing the full potential of technologies in driving efficiencies in healthcare delivery as to experience and outcomes.

Limitations and Future Recommendations

While valuable insights were obtained, limitations need to be acknowledged. Using a particular structural equation model and reliance on self-reported data create potential biases, and we focused on a limited set of constructs that should be recognized. Longitudinal designs should be the focus of future research to incorporate a better understanding of behavior over time. A broader range of variables that may impact the constructs chosen for the model (e.g., perceived invasiveness, performance, and effort expectancy) should be considered in future studies. Additionally, emerging trends in healthcare technology (e.g., wearable technologies, telemedicine, and mobile health apps) and patient-centered care, which could influence patient

behavior and satisfaction in countless ways, have yet to be explored. Future research should comprehensively understand patient behavior and satisfaction in diverse healthcare contexts.

Conclusion

It asserted that patient-provider relationships and moderating mediators like empathy were critical in supporting positive patient outcomes and experiences. The authors added that the results of their study are a reminder of what is known as humanistic health care, tackling emotional and physical life aspects together. Health systems can do this by creating durable, empathetic bonds between patients and providers, which helps deliver more intimate and potent care. Ultimately, this model translates into better patient satisfaction and compliance with their health plans, which means more effective healthcare outcomes and calls for a natural move towards patient-centric care delivery.

Acknowledgments

We thank the Jinnah Postgraduate Medical Centre (JPMC), Lyari General Hospital and Civil Hospital Karachi, Pakistan employees for participating in the study.

Conflict of Interest

None.

Grant Support and Funding Disclosure

None.

References

1. Stellefson M, Paige SR, Chaney BH, Chaney JD. The evolving role of social media in health promotion: updated responsibilities for health education specialists. International journal of environmental research and public health. 2020 Feb;17(4):1153.
2. Tripathy M, Pradip D, Das K. Effectiveness of Digital Marketing: An Organizational Perspective [Internet]. 2020. Available from: https://www.nci.tmu.ac.in/conferenceproceeding/NCI25.pdf.
3. Manzoor F, Wei L, Hussain A, Asif M, Shah SI. Patient satisfaction with health care services; an application of physician's behaviour as a moderator. International journal of environmental research and public health. 2019 Sep;16(18):3318.
4. Nguyen NX, Tran K, Nguyen TA. Impact of service quality on in-patients' satisfaction, perceived value, and customer loyalty: A mixed-methods study from a developing country. Patient preference and adherence. 2021 Nov 17:2523-38.
5. Asnawi A, Awang Z, Afthanorhan A, Mohamad M, Karim FJ. The influence of hospital image and service quality on patients' satisfaction and loyalty. Management Science Letters. 2019;9(6):911-20.
6. Moudatsou M, Stavropoulou A, Philalithis A, Koukouli S. The role of empathy in health and social care professionals. Healthcare [Internet]. 2020 Jan 30;8(1):1–9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7151200/.

7. Michael K, Dror MG, Karnieli-Miller O. Students' patient-centered-care attitudes: The contribution of self-efficacy, communication, and empathy. Patient Education and Counseling. 2019 Nov 1;102(11):2031-7.
8. Marzban S, Najafi M, Agolli A, Ashrafi E. Impact of patient engagement on healthcare quality: a scoping review. Journal of patient experience. 2022 Sep;9:23743735221125439.
9. Muli TD. Application of Quality Management Principles and Service Delivery at Kenyatta National hospital (Doctoral dissertation, University of Nairobi).
10. Al-Weshah GA, Kakeesh DF, Al-Ma'aitah NA. Digital marketing strategies and international patients' satisfaction: an empirical study in Jordanian health service industry. Studies of Applied Economics. 2021 Aug 16;39(7).
11. Liu L, Fang J. Study on potential factors of patient satisfaction: based on exploratory factor analysis. Patient preference and adherence. 2019 Nov 27:1983-94.
12. Chen Q, Beal EW, Okunrintemi V, Cerier E, Paredes A, Sun S, Olsen G, Pawlik TM. The association between patient satisfaction and patient-reported health outcomes. Journal of patient experience. 2019 Sep;6(3):201-9.
13. Wu Q, Jin Z, Wang P. The relationship between the physician-patient relationship, physician empathy, and patient trust. Journal of General Internal Medicine. 2022 May;37(6):1388-93.
14. Granados-Santiago M, Valenza MC, López-López L, Prados-Román E, Rodríguez-Torres J, Cabrera-Martos I. Shared decision-making and patient engagement program during acute exacerbation of COPD hospitalization: a randomized control trial. Patient Education and Counseling. 2020 Apr 1;103(4):702-8.
15. Okoli C, Brough G, Allan B, Castellanos E, Young B, Eremin A, Corbelli GM, Mc Britton M, Muchenje M, Van de Velde N, de Los Rios P. Shared decision making between patients and healthcare providers and its association with favorable health outcomes among people living with HIV. AIDS and Behavior. 2021 May;25:1384-95.
16. Zaid AA, Arqawi SM, Mwais RM, Al Shobaki MJ, Abu-Naser SS. The impact of Total quality management and perceived service quality on patient satisfaction and behavior intention in Palestinian healthcare organizations. Technology Reports of Kansai University. 2020 Apr 30;62(03):221-32.
17. Carini E, Villani L, Pezzullo AM, Gentili A, Barbara A, Ricciardi W, Boccia S. The impact of digital patient portals on health outcomes, system efficiency, and patient attitudes: updated systematic literature review. Journal of Medical Internet Research. 2021 Sep 8;23(9):e26189.
18. Mubita WM, Richardson C, Briggs M. Patient satisfaction with pain relief following major abdominal surgery is influenced by good communication, pain relief and empathic caring: a qualitative interview study. British journal of pain. 2020 Feb;14(1):14-22.
19. Sarstedt M, Ringle CM, Hair JF. Partial least squares structural equation modeling. In Handbook of market research 2021 Dec 3 (pp. 587-632). Cham: Springer International Publishing.
20. Shi D, Maydeu-Olivares A, Rosseel Y. Assessing fit in ordinal factor analysis models: SRMR vs. RMSEA. Structural Equation Modeling: A Multidisciplinary Journal. 2020 Jan 2;27(1):1-5.

21. Pavlov G, Maydeu-Olivares A, Shi D. Using the standardized root mean squared residual (SRMR) to assess exact fit in structural equation models. Educational and Psychological Measurement. 2021 Feb;81(1):110-30.
22. Steenkamp JB, Maydeu-Olivares A. Unrestricted factor analysis: A powerful alternative to confirmatory factor analysis. Journal of the Academy of Marketing Science. 2023 Jan;51(1):86-113.
23. Cheung GW, Cooper-Thomas HD, Lau RS, Wang LC. Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations. Asia Pacific Journal of Management. 2023 Jan 30:1-39.
24. Le MT, Tran TD, Holton S, Nguyen HT, Wolfe R, Fisher J. Reliability, convergent validity and factor structure of the DASS-21 in a sample of Vietnamese adolescents. PloS one. 2017 Jul 19;12(7):e0180557.
25. Williams TY, Boyd JC, Cascardi MA, Poythress N. Factor structure and convergent validity of the Aggression Questionnaire in an offender population. Psychological Assessment. 1996 Dec;8(4):398.
26. Ullah Z, Khan MZ. The impact of transactional and transformational leadership on job related outcomes in the nursing profession. Sarhad Journal of Management Sciences. 2020 Jun 30;6(1):143-60.
27. Reponen E, Rundall TG, Shortell SM, Blodgett JC, Juarez A, Jokela R, Mäkijärvi M, Torkki P. Benchmarking outcomes on multiple contextual levels in lean healthcare: a systematic review, development of a conceptual framework, and a research agenda. BMC health services research. 2021 Dec;21:1-8.
28. Ullah Z, Ahmad N. Study of dynamics of quality of healthcare services: The patient perspective. J. Xi'an Univ. Archit. Technol. 2020;12:3103.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Hasan Z, Zeerak S

Acquisition, Analysis or Interpretation of Data: Hasan Z, Zeerak S, Fatima H

Manuscript Writing & Approval: Hasan Z, Fatima H, Zubair T, Munir A

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.