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Patient Satisfaction with the Healthcare Quality of Upazila Health Complexes in Bangladesh during COVID-19 Pandemic

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ABSTRACT

Background: During COVID-19 pandemic, Bangladesh tried to combat the crisis with its limited capability and resources at different tiers of health systems. This study aimed to assess patient satisfaction with the healthcare quality of Madhupur Upazila Health complex (MUHC) during COVID-19 pandemic.

Methods: This study followed a cross-sectional quantitative design. Using a structured questionnaire, developed based on a modified SERVQUAL model, data were collected during December 2021–March 2022 from systematically (every fourth attendee) chosen 120 patients (N=120) of the MUHC of Tangail, Dhaka, Bangladesh. Descriptive statistics summarized the socio-demographic characteristics and patient satisfaction levels. Pearson's correlation analysis examined the relationships among variables, while multiple regression analysis identified factors associated with patient satisfaction.

Results: The study identified a moderate level of patient satisfaction (2.95 ± .829) with overall healthcare services of the MUHC. The SERVQUAL factors, accessibility (3.07 ± .904), reliability (3.18 ± .888), tangibility (3.05 ± .721), responsiveness (3.08 ± .857), and empathy (3.08 ± .834) received moderate patient satisfaction. Pearson's correlation analysis indicated that all variables, except accessibility, were significantly correlated ($p<.01$). A hierarchical regression analysis showed that only reliability and responsiveness are significantly associated with patient satisfaction ($p<.01$) in model 1 ($R^2 = .731$, $F(5, 114) = 62.102$, $P < .001$, F change $P<.001$) and model 2 ($R^2 = .744$, $F(4, 110) = 35.558$, $P < .001$, F Change $P>.001$). Note that, the inclusion of socio-demographic variables (age, sex, education, and income) in Model 2 did not significantly improve the model's predictive power, nor were these variables significantly associated with patient satisfaction.

Conclusion: The MUHC's healthcare the quality did not meet the adequate level of patient satisfaction, specifically during COVID-19 pandemic. Immediate policy interventions are required to enhance the quality of health services across all service quality dimensions.

INTRODUCTION

Health is a fundamental indicator to improve the quality of our life (Parag et al., 2024). And, the effectiveness of a healthcare system depends on the availability and accessibility of services in terms of the people's ability to understand, accept and utilize (Khandakar, 2014). In this regard, the World Health Organization (WHO) defines patient satisfaction as the extent to which a patient's expectations about the healthcare services are met (Dijk et al., 2003). It is a multifaceted concept that is impacted by a number of variables, such as the standard of care, interactions with the medical professionals, and

the overall healthcare experience. Moreover, it is critical to comprehend patient satisfaction since it is associated with a number of favorable outcomes, including better adherence to treatment plans, stronger patient-provider relationships, and higher healthcare utilization (Burgard & Lin, 2013; Mehari et al., 2021). However, providing healthcare services to rural areas continues to be an uphill battle in many low- and middle-income nations, including Bangladesh (A. Islam, 2014). Geographical obstacles, inadequate healthcare infrastructure, a lack of qualified healthcare workers, financial limitations, and inadequate healthcare awareness and education are some of the major obstacles in this issue (Ashraf et al., 1982; Rahman et al., 2018). However, the role of upazila health complexes is not explored widely, especially in COVID-19 context. This study aimed to assess patient satisfaction with the healthcare quality of the Upazila Health complexes (UHCs) in the context of COVID-19 pandemic, with a specific focus on the Madhupur Upazila Health Complex (MUHC) of Tangail, Dhaka, Bangladesh.

COVID-19, a fatal disease caused by SARS-CoV-2 emerged in late 2019, was declared by the World Health Organization (WHO) as a Public Health Emergency of International Concern (PHEIC) on 30 January 2020, and a global pandemic on 11 March of the same year (Tang et al., 2022). The pandemic, infecting 775,364,261 people and causing 7,046,320 deaths globally by May 2024, has starkly exposed the weaknesses of global healthcare systems (Begun & Jiang, 2020; Lal et al., 2021; Liu et al., 2020; WHO, 2024). Developed Countries like the USA (United States of America), the UK (United Kingdom), Italy, and Spain were severely affected (Paintsil, 2020). The US healthcare system grappled with structural challenges, including deficiencies in PPEs (Personal Protection Equipment), infection control protocols, information sharing, workforce, medication supply, guidance and preparedness measures, testing capacities, and data repositories (Slavitt, 2020). Fear of infection among the health workers led to healthcare delays and reduced in-person care in the USA ((Kendzerska et al., 2021). Canada observed disruptions of medical appointments due to COVID-19, while the factors like age, disability, and fear of infection contributed to delays in seeking healthcare (Frank, 2022). European countries also showed their inefficiency of their health systems during the pandemic (Lupu & Tiganasu, 2022; Tuczyńska et al., 2022). Compared to the developed countries, the burden of COVID-19 was higher for developing countries (Levin et al., 2022). African developing countries' healthcare facility management plans fell short of fighting the pandemic due to lack in facility management (Amos et al., 2021). The Syrian private hospitals' healthcare was better than public ones, but both received low patient satisfaction scores due to crowdedness, limited staff, low salaries, and pricing policies (Allahham et al., 2022). Moreover, both Pakistan and India faced healthcare challenges during COVID-19, including protocol maintenance issue, shortages of doctors, poor medical care, inadequate hospital beds, lockdown violations, limited test facilities, poor healthcare capacity, and low security for healthcare professionals (Khalid & Ali, 2020; A. Kumar et al., 2020).

Bangladesh detected COVID-19 on 8 March 2020, with three cases for the first time (S. Islam et al., 2020; Nokrek et al., 2022; Uddin et al., 2022). The pandemic spread rapidly across the country and by May 2024, caused 29494 people's deaths due to inadequate well-equipped hospitals and testing facilities, lack of knowledge and awareness, poor attitude and practice of COVID-19 protocols, poverty, and precarious employment (DGHS, 2024; S. Islam et al., 2020). Among health professionals, 190 doctors died, while 3182 doctors, 2370 nurses, and 4139 other staff were seriously affected COVID-19 and other health issues (BMA, 2022, 2023; Das et al., 2023). The country's poor healthcare facilities and unpreparedness of health system accelerated the COVID-19 fatalities (Rashid et al., 2023). Studies showed that, hospitals in Bangladesh generally lack patient satisfaction in

different aspects, but urban hospitals tend to receive higher satisfaction. Dhaka's pubic hospitals received 3.93 score in patient satisfaction, higher than the private ones with 3.49, while foreign hospitals exceeded both by receiving 4.60 out of 5.00. This study notes that, doctors' service orientation including competence, empathy and communication was the strongest predictors of patient satisfaction (Andaleeb et al., 2007). Another study on both public and private hospitals found 65% overall patient satisfaction (51% public hospitals and 75% private hospitals), which was positively associated with conservative management, private hospitals, perceived improvement after treatment, and shorter hospital stays, while accommodation on the floor and high healthcare costs were associated with dissatisfaction across both public and private hospitals (Begum et al., 2022). However, the country tried to combat COVID-19 according to its National Preparedness and Response Plan (NPRP) covering urban and rural areas with limited capacity (MHFW, 2020). Due to the demographic characteristics and unequal health facilities compared to urban areas, the rural people, 68.49% of the total population, were more vulnerable to COVID-19 (Alam et al., 2022; BBS, 2024), where 80.3 % reported dissatisfaction with the healthcare treatment (Siddique et al., 2024). The UHCs delivered healthcare services in rural areas during COVID-19, including tests, vaccination, and other regular healthcare services (MHFW, 2020). A study on two UHCs before COVID-19 revealed that patient satisfaction score with the UHCs' healthcare quality was 2.75 on a 5-point Likert scale, demonstrating poor quality of healthcare services in the UHCs (Rumi et al., 2021). Thus, the country's public healthcare facilities lack quality of healthcare services for patients' satisfaction (Ferdousi, 2015; Mahejabin et al., 2016).

These findings explored the issues with patient satisfaction in Bangladeshi hospitals' healthcare services. While there are a few studies on the healthcare quality of the UHCs in Bangladesh, few studies have been conducted to investigate the healthcare quality of these rural public hospitals focusing on the context of the COVID-19 pandemic. This study, therefore, was conducted to measure the patient satisfaction with the MUHC's healthcare quality during COVID-19 and identify the service quality factors associated with their satisfaction level. The findings of the study are anticipated to guide evidence-based policy recommendations and interventions, promoting a more patient-centered and inclusive healthcare system for the rural people in Bangladesh.

METHODS AND MATERIALS

Study Design

This research followed a cross-sectional quantitative study design to measure patient satisfaction with the healthcare quality of the UHC and identify factors influencing their satisfaction level. This design was selected as our study were conducted in a limited period. Researchers opined that this study design is better suited to conducting social research in a limited period (Setia, 2016).

Population and Sample

The study population included all patients who visited Madhupur Upazila Health Complex (MUHC) of Tangail, Dhaka, Bangladesh, to receive healthcare services. This rural public hospital is meant for providing healthcare services to 296729 people living in Madhupur. To measure patient satisfaction of the MUHC, the researchers systematically selected 120 people who visited the MUHC to receive any type of healthcare services during the COVID-19 pandemic. For regression analysis with five independent variables (the five SERVQUAL dimensions), this sample size satisfies a common rule of thumb

provided by Green (1991), which recommend a minimum of 50 + 8m (number of variables) = 90 for testing the overall model and 104 + m = 109 for testing individual predictors, making 120 participants sufficient for reliable statistical analysis.

Data Collection

Using systematic sampling, respondents were selected at a fixed interval (every fourth patient) from those visited the complex for COVID-19 related services. After identifying the sampling interval (k = 4), data collectors approached every fourth patient in sequence and invited them to participate in the survey. The response rate was 100% and no one refused to participate in this study. This process continued in a cyclical manner until the required sample size (N=120) was achieved. A structured questionnaire, developed based on a modified SERVQUAL model, was utilized to collect data from 120 samples. Structured questionnaires are widely applied in social research (Croasmun & Ostrom, 2011). The questionnaire was first developed in English and then translated into Bengali by the researchers. Data collection involved three site visits to the MUHC, conducted between December 2021 and March 2022. To avoid repeat respondents, the researcher asked them whether they participated earlier in this survey. It is to be mentioned that a pilot study with 30 respondents was conducted prior to this, where Cronbach alpha was .700 and factor loadings were above .500, both are widely acceptable threshold.

Dependent and Independent Variables

The dependent variable was patient satisfaction, while independent variables were the service quality factors such as accessibility, reliability, tangibility, responsiveness, and empathy, based on a modified theoretical framework using the SERVQUAL model (Figure 1). This model is widely applied to measure consumer satisfaction with different services, including health and hospital services, in different studies (Al-Neyadi et al., 2018; AlOmari, 2021; Parasuraman et al., 1994). Accordingly, the model was applied and proved as a consistent and reliable model to assess healthcare quality in different countries, including the UAE, the KSA, Pakistan, and Bangladesh (Al-Borie & Damanhouri, 2013; Al-Neyadi et al., 2018; Rumi et al., 2021; Shaikh et al., 2008). However, its actual dimensions are tangibility (appearance of facilities, equipment, materials, and personnel), reliability (dependable and accurate service performance), responsiveness (willingness to assist and provide prompt service), assurance (knowledge and courtesy that convey trust), and empathy (individualized, caring attention to customers) (Ooi et al., 2011; Parasuraman et al., 1985). It was modified by replacing the assurance dimension with accessibility, easiness in accessing healthcare services (Gulzar, 1999), to match the rural context of Bangladesh, as done by another study on UHCs (Rumi et al., 2021). To be noted, in Exploratory Factor Analysis (EFA), accessibility also came out as a factor with 3 items having factor loadings above .500 (supplementary table 1).

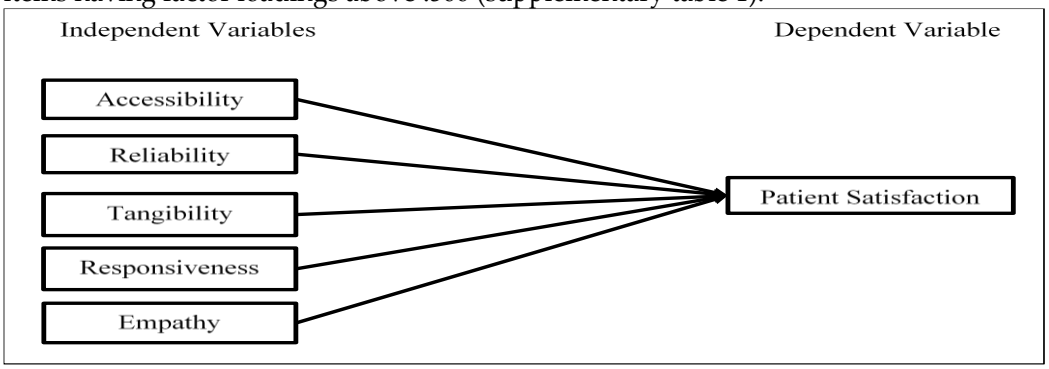

Figure 1: A Modified Theoretical Framework based on SERVQUAL Model

Inclusion and Exclusion Criteria

The study followed precisely defined inclusion and exclusion criteria to ensure that the respondents were appropriately aligned with the study objectives and have the requisite characteristics for valid and reliable data. The inclusion criteria were: (i) people who visited the MUHC for getting any healthcare services during COVID-19; (ii) Bangladeshi by birth and inhabitant of Madhupur Upazila of Tangail District, Dhaka; (iii) above 18 years old; and (iv) provided written consent, oral consent for illiterate respondents. The exclusion criteria were: (i) people who are not inhabitants of Madhupur Upazila and not Bangladeshi by birth or have dual citizenship; (ii) people who did not provide written and oral consent to participate in the survey.

Data Quality Control

Reliability test showed the constructs' internal consistency, with Cronbach's alpha values above the widely accepted threshold of .700 for responsiveness (.889), reliability (.852), accessibility (.762), and empathy (.717), while tangibility (.680) fell slightly below the .700 benchmark. However, we kept the variable as a value above .600 is considered acceptable for exploratory research (Hair et al., 2019). An Exploratory Factor Analysis (EFA) using Principal Axis Factoring and Promax rotation was conducted to determine the underlying dimensions of the modified SERVQUAL model. The analysis yielded a five-factor solution, where all items demonstrated strong primary factor loadings exceeding the .400 threshold (ranging from .407 to .961), indicating acceptable validity for each construct (Hair et al., 2019). The suitability of the data for factor analysis was confirmed with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, KMO = .884, and Bartlett's test of sphericity, χ^2 (190) = 1243.722, $p < .001$ (supplementary table 1). To ensure the statistical validity of the multiple linear regression model for the sample of 120 respondents, the fundamental assumptions were verified through diagnostic testing. Normality of residuals was confirmed by a histogram displaying a bell-shaped distribution (Mean = – 6.05E – 16, SD = .961) and a normal P-P plot where observed probabilities closely followed the 45-degree diagonal line. As for linearity and homoscedasticity, a scatterplot of standardized residuals against predicted values showed a random distribution free of systematic non-linear patterns or heteroscedasticity, though minor diagonal banding was noted as a common characteristic of the discrete Likert scale used to measure the dependent variable (Supplementary Figure 1). The absence of influential points was verified by a maximum Cook's Distance of .150, much lower than 1.0 threshold, which indicates that no individual outliers disproportionately biased the regression coefficients. A box plot analysis (N=120) of the single-item dependent variable revealed a centrally concentrated, non-skewed distribution with a median of 3 and an IQR of 2 to 4. The extreme responders at the polar ends (scores 1 and 5) represented only 2.5% (n=3) of the sample and were therefore retained (supplementary figure 2).

Scales of Measurement

The patient satisfaction score on the overall healthcare quality of the UHC was measured on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) by computing mean score for each SERVQUAL dimension. With these mean scores, to construct the interpretation categories of low, moderate and high levels of satisfaction for each dimension, the equal class interval approach was employed. For the study's 5-point Likert scale, the interval width is = (Max - Min)/(No. of Desired Categories)=(5-1)/3=1.33, by which the mean scores were categorized into low (1.00–2.33), moderate (2.34–3.67), and

high (3.68–5.00) levels of satisfaction. This technique ensures mathematically derived, non-arbitrary categorization and enhances methodological transparency in interpreting perception levels (Alkharusi, 2022). This calculation is being widely applied in perception-based social research (Alshowkan & Shdaifat, 2025; Fatokun et al., 2024; Kaufmann et al., 2024).

Statistical Analysis

Using SPSS 27.0, a descriptive analysis was conducted to summarize the respondents' socio-demographic information and mean satisfaction score of each dimension. Pearson's correlation analysis was conducted to identify the correlations among variables, while multiple regression analysis was conducted to test whether service quality factors, accessibility, reliability, tangibility, responsiveness, and empathy have significant association with patient satisfaction. The significance level of positive association of service quality factors with patient satisfaction was measured at $p < .01$ level. Cronbach's alpha, normality, linearity, homoscedasticity, and Cook's distance were also tested to confirm scale reliability and meet regression assumptions.

Ethical Considerations

This study was conducted in accordance with the principles of the Declaration of Helsinki (2013 revision) and was formally reviewed and approved as a Research Monograph by the Department of Public Administration, University of Dhaka (Date: 10.12.2022). The department facilitated the researchers with technical and supervisory support to conduct this study, at all stages of preparing the proposal, questionnaire, data collection, data entry, data analysis and final report. To ensure the highest standards of participant protection, an anonymous data collection protocol was employed. No personally identifiable information (PII), medical record numbers, or digital identifiers (e.g., phone numbers, identification numbers, or IP addresses) were collected or stored, thereby minimizing potential confidentiality risks. Written informed consent was obtained from all participants prior to data collection through a consent acknowledgment (tick-box) after providing a comprehensive explanation of the study objectives and the voluntary nature of participation. Moreover, the MUHC permitted to collect data from the MUHC visitors. As the study focused on assessing healthcare service quality through SERVQUAL dimensions rather than clinical interventions, participation involved no foreseeable risk to patients' current or future medical care.

RESULTS

Socio-demographic Information of the Respondents

In this study, more male respondents (58.3%) participated than female respondents (41.7%). Most respondents were above 35 years old (60.8%), whereas only 39.2% of respondents were below 35 years, indicating young people accessed the MUHC healthcare services less than adults. Only 23.3% respondents accessed higher education, indicating that highly educated people have less tendency to visit MUHC to access healthcare services. As for income level, the majority of respondents belong to the middle (39.2%), lower-middle (31.7%), and lower-class people (21.7%), where only 7.5% belong to the upper middle class, showing that rich people also have less tendency to visit MUHC to get COVID-19 Healthcare services (table 1).

Table 1: Socio-demographic Information of the Respondents

		Frequency	*Percentage*
Sex			
	Male	70	58.3%
	Female	50	41.7%
Age			
	18 -25	17	14.2%
	26-35	30	25.0%
	36-45	31	25.8%
	>45	42	35.0%
Education			
	Illiterate	11	09.3%
	Primary	21	17.5%
	Secondary	30	25.0%
	Higher Secondary	30	25.0%
	Higher Education	28	23.3%
Income			
	Lower Class	26	21.7%
	Lower Middle Class	38	31.7%
	Middle Class	47	39.2%
	Upper Middle Class	8	7.5%

N= 120, Valid = 120, Missing = 0

Patient Satisfaction with the Healthcare Quality of the MUHC

Patient satisfaction with the MUHC's overall healthcare quality during the COVID-19 pandemic was moderate (2.95 ± .829). Factor-based assessment of patient satisfaction showed that accessibility (3.07 ± .904), reliability (3.20 ± .853), tangibility (3.08 ± .871), responsiveness (3.04 ± .839), and empathy (3.22 ± .950) also received a moderate level of patient satisfaction (table 2).

Table-2: Patient satisfaction with the healthcare Quality of the MUHC

Variable Type	Dimensions	No. of Items	Mean ± SD	Cronbach's Alpha
Independent variables	Accessibility	3	3.07 ± .904	.762
	Reliability	5	3.20 ± .853	.852
	Tangibility	2	3.08 ± .871	.680
	Responsiveness	6	3.04 ± .839	.889
	Empathy	2	3.22 ± .950	.717
Dependent Variable	Patient Satisfaction	1	2.95 ± .829	N/A

N= 120, Valid = 120, Missing = 0; 5-point (1-5) Likert scale.

Correlation among Variables

Pearson's correlation analysis showed that patient satisfaction and service quality factors have positive correlations but vary in their levels of strength and statistical significance. The correlations of patients' perceived accessibility with reliability (r = .024, p > .01), tangibility (r = .020, p > .01), responsiveness (r = .024, p > .01), empathy (r = .016, p > .01), and satisfaction (r = .125, p > .01) are the weakest ones and, notably, are not statistically significant (p > .01).

In contrast, all other variables have significant correlations among themselves (p < .01). A moderate level of correlation exists in the correlations of tangibility with reliability (r = .304, p < .01), empathy (r = .326, p < .01), and satisfaction (r = .466, p < .01). A strong correlation was found between responsiveness and reliability (r = .725, p < .01), as well as between empathy and responsiveness (r = .657, p < .01). Moreover, the correlations of overall patient satisfaction with reliability (r = .704, p < .01), responsiveness (r = .817, p < .01), and empathy (r = .644, p < .01) are also strong. As for the strongest and the weakest correlations, responsiveness and satisfaction (r = .817, p < .01) have the strongest correlation. In contrast, the correlation of accessibility with empathy (r = .016, p > .01) is the weakest (table 3).

Table-3: Pearson's Correlation Analysis

		1	2	3	4	5	6
1	Accessibility	--					
2	Reliability	.024	--				
3	Tangibility	.020	.304**	--			
4	Responsiveness	.024	.725**	.429**	--		
5	Empathy	.016	.580**	.326**	.657**	--	
6	Satisfaction	.125	.704**	.466**	.817**	.644**	--

*** Correlation is significant at the P=.01 level (2-tailed)*

Regression Analysis Measuring the Impact of Service Quality Factors on Patient Satisfaction

A hierarchical multiple regression was conducted to determine the predictors of patient satisfaction with healthcare quality during the COVID-19 pandemic. The analysis was performed in two stages (Model 1 and 2) to evaluate the unique contribution of service quality dimensions while controlling potential sociodemographic biases.

Model 1 with five SERVQUAL dimensions significantly predicts patient satisfaction (R^2 = .731, F (5,114) = 62.102, p < .001, F change P < .001), indicating the significant impact of these five factors on patient satisfaction. R^2 = .731 shows that this model with five service quality factors explains a 73.1% variance in patient satisfaction. Moreover, assessed coefficients proved that accessibility (B = .094, SE = .044, P > .01), tangibility (B = .128, SE = .051, P > .01), and empathy (B = .124, SE = .057, P > .01) are not significantly associated with patient satisfaction, while reliability (B = .200, SE = .070, P < .01) and responsiveness (B = .507, SE = .080, P < .01) have significant association with patient satisfaction.

Like model 1, model 2 which integrated demographic covariates (age, gender, education and income) to reduce omitted-variable bias with five SERVQUAL dimensions, presented nearly similar findings. This final model also significantly predicts patient satisfaction (R^2 = .744, F (4, 110) = 35.558, P < .001, F Change P>.001), which explains a 74.4% variance in patient satisfaction. Among SERVQUAL dimensions, reliability (B=.229, SE=.073, p<.01)

and responsiveness (B=.502, SE=.084, p<.001) have significant association with patient satisfaction, while the dimensions of accessibility (B=.080, SE=.045, P > .01), tangibility (B=.133, SE=.051, P > .01), and empathy (B=.123, SE=.058, p= P > .01) were found to be non-significant in the final model. While both models have similar significant and non-significant variables, none of the included socio-demographic covariates reached statistical significance at the p < .01 level. Specifically, sex (B=.090, SE=.086, p > .01), age (B=-.077, SE=.050, p > .01), education (B=−.075, SE=.042, p > .01), and income (B=.052, SE=.048, p > .01) did not independently predict patient satisfaction. It is to be noted that, F-change in model 2 is not significant (P>.001), which indicated that the addition of socio-demographic variables did not significantly improve the model's predictive ability beyond the SERVQUAL dimensions.

In both models, the multicollinearity diagnostics found VIF values between 1.001 and 3.115 and tolerance values between .321 and .999, which fall well within the academic thresholds of < 5.0 and > .10, respectively. These statistics confirm that no significant multicollinearity exists, ensuring the stability and reliability of the regression coefficients for subsequent analysis.

Table 4
Multiple Regression Analysis without and with Demographic Variables as Covariates

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	*P-Value*	95.0% CI for B		Collinearity Statistics	
		B	*SE*	*Beta*			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.316	.232		-1.361	.176	-.775	.144		
	Accessibility	.094	.044	.102	2.107	.037	.006	.182	.999	1.001
	Reliability	.200	.070	.206	2.857	.005**	.061	.338	.455	2.197
	Tangibility	.128	.051	.135	2.499	.014	.027	.229	.812	1.232
	Responsiveness	.507	.080	.514	6.379	.000**	.350	.665	.363	2.755
	Empathy	.124	.057	.142	2.162	.033	.010	.238	.544	1.840
2	(Constant)	-.066	.369		-.179	.858	-.797	.665		
	Accessibility	.080	.045	.087	1.757	.082	-.010	.169	.952	1.051
	Reliability	.229	.073	.236	3.140	.002**	.084	.374	.412	2.425
	Tangibility	.133	.051	.140	2.601	.011	.032	.235	.803	1.246
	Responsiveness	.502	.084	.508	5.973	.000**	.335	.668	.321	3.115
	Empathy	.123	.058	.141	2.128	.036	.008	.238	.529	1.891
	Sex	.090	.086	.054	1.050	.296	-.080	.259	.891	1.123
	Age	-.077	.050	-.100	-1.536	.127	-.177	.022	.554	1.805
	Education	-.075	.042	-.114	-1.766	.080	-.158	.009	.556	1.800
	Income	.052	.048	.056	1.077	.284	-.043	.146	.861	1.161

*1. R^2 = .731, F (5, 114) = 62.102, P < .001, F change P<.001; 2. R^2 = .744, F (4, 110) = 35.558, P < .001, F Change P>.001 N=120, Dependent Variable: Patient Satisfaction, ** association of independent variables is significant at P < .01.*

DISCUSSION

The aim of this study was to measure patient satisfaction and investigate the factors influencing patient satisfaction regarding the healthcare quality of the MUHC during COVID-19 in Bangladesh. The study found that the patient satisfaction with the

healthcare quality was moderate during COVID-19, indicating healthcare service was not good enough to get a higher level of patient satisfaction. Moreover, the country's overall healthcare facilities lacked quality healthcare services during the pandemic for patient satisfaction, as found in the previous studies. While pre-pandemic studies of UHCs in the Meherpur and Dhaka districts reported low patient satisfaction (Mahejabin et al., 2016; Rumi et al., 2021), the current study found a moderate level of satisfaction. This suggests that despite the pressures of the COVID-19 pandemic, the quality of healthcare services at the MUHC remained relatively resilient. This might be for being the fifth-ranked nationally with receiving only 88.07 total score out of 300 in July 2025 (DGHS, 2025). However, receiving a moderate score by the country's fifth-ranked UHC reveals the very poor situation of healthcare service in rural public hospitals.

In this study, all SERVQUAL dimensions, such as accessibility, reliability, tangibility, responsiveness, and empathy have received moderate levels of patient satisfaction, indicating that condition of the healthcare quality per dimension was not much good at the MUHC. The existing studies on the UHCs' healthcare services marked poor situation in these aspects, as well as revealed the reasons for it. For instance, long distances and short appointment hours marked the less accessibility of the patients to healthcare services, while the lack of medical equipment and scarcity of health professionals revealed the poor situation of tangibility in Bangladeshi hospitals (Mohiuddin, 2020). It also mentioned that the healthcare service providers' callous attitudes, aggressive money-making behavior, and disregard for patients marked a poor level of empathy and responsiveness toward patients are responsible for low levels of patient satisfaction. Regarding tangibility factors, detailed reasons like limited number of healthcare providers, inadequate test kits, beds, intensive care units, ventilators, PPEs, standard masks, and hand gloves during COVID-19 pandemic (S. Islam et al., 2020). Studying the patients of COVID-19 dedicated hospital, Rashid et al., (2023) revealed that facilities in primary-tier hospitals, including UHCs, had less availability of protective gowns, disposable latex gloves, protective goggles, face shields, respirator masks, medical/surgical masks, PCR testing lab, and specimen collection system than secondary tier hospitals like District and maternal and childcare hospitals in Bangladesh. Patients' reliability and trust in treatment given by healthcare professionals are significant factors that can influence patients' motivation to visit a particular type of hospital to receive healthcare services. Importantly, some other studies identified the low level of reliability towards doctors, which was considered as a barrier to provide proper healthcare to the public (Al-Zaman, 2020; Andaleeb et al., 2007). It is to be noted that there are only moderate satisfaction levels across all five SERVQUAL dimensions. This might be for a 'quality plateau' where the existing healthcare facilities of the MUHC met basic functional needs but failed in attaining excellence for better patient satisfaction.

The correlation analysis of this study showed that all variables except accessibility, including the dependent variable 'patient satisfaction,' have significant correlations among themselves. In regression analysis, while the model indicated a strong fit, the analysis revealed that among five SERVQUAL dimensions, only reliability and responsiveness were found as significant predictors of patient satisfaction, while accessibility, tangibility and empathy remained non-significant. These findings suggest that, for patients at the MUHC, the patients' perceived trust and functional quality of care provided by medical staffs carries more weight than physical infrastructure or ease of access. The empathy factor's non-significance provides a different angle of understanding, suggesting that patients prioritized the functional quality of being treated quickly and correctly over the emotional care of the staffs. This indicates that while interpersonal care is a human-centric value, it is perceived as a 'luxury' compared to the

critical necessity of responsiveness and reliability in COVID-19 context. Consequently, the results imply that as long as the medical service is prompt and dependable, the absence of deep emotional support does not statistically diminish the patient's overall satisfaction. Unlike our study, a Malaysia-based study found that empathy factors, along with responsiveness and reliability, were significantly associated with patient satisfaction, while other two dimensions, accessibility and tangibility did not have significant association (Rahim et al., 2021; Rumi et al, 2021; Cui et al., 2025). A Korea-based study found that physicians' empathy towards patients significantly impacted their satisfaction levels in Korea (Kim et al., 2004), which is also dissimilar to the findings of the current study. The reasons for accessibility, tangibility and empathy being non-significant in our study can be explained by the patients' understanding of the resource-constrained context of MUHC during COVID-19 pandemic. Patients may have effectively 'normalized' modest infrastructure, logistical hurdles, and diminished emotional support, which notes a pragmatic public understanding of the systemic pressures and staffing shortages exacerbated by the COVID-19 pandemic. Notably, while tangibility and empathy exhibited significance in correlation analysis with patient satisfaction, they did not emerge as unique predictors in the regression model. This shift occurred maybe for the variance shared by these dimensions is absorbed by the more dominant predictors, reliability and responsiveness, when all factors are considered simultaneously. As the stronger factors win in multivariate 'competition' for significance, the stronger factors win. This suggest that, for patients at MUHC, the physical aspects of the hospital and interpersonal emotional support are often overlooked in the time of critical demands of service dependability and speed, especially in COVID-19 context.

For sustainable development of UHCs in healthcare service, the government must institutionalize systemic reforms. Activating digital dashboards and integrating real-time, QR-code-based patient-feedback loops at discharge will ensure institutional accountability. Given that the patient satisfaction column on the official health scoring website remains vacant (DGHS, 2025), the government should adopt the SERVQUAL model or similar frameworks to systematically measure healthcare quality and fill these critical data gaps. Strengthening reliability and responsiveness necessitates UHCs to implement standardized equipment readiness checklists with 24-hour buffer stocks alongside a three-tier triage patient-flow redesign to eliminate routine and emergency bottlenecks. Moreover, the government should enforce WHO-standard staffing norms of 1:1,000 doctor-population ratio (R. Kumar & Pal, 2018) and mandate 'Patient-Centered Communication' certifications to bridge the empathy gap and move beyond the 'quality plateau.' Addressing issues of tangibility and accessibility requires developing indoor and outdoor infrastructure, including the incorporation of modular 'Flex-Zoning' for the quick isolation of infectious units without disrupting routine maternal and child health services. Also, implementing performance-based incentive schemes will discourage callous attitudes and disregard for patients (Mohiuddin, 2020). Thus, functional quality of care aligns with both human-centric values and the physical requirements of the healthcare system will ensure better patient satisfaction.

LIMITATIONS OF THE STUDY

This study was conducted focusing on a rural public hospital namely Madhupur Upazila Health Complex (MUHC) of Tangail District, Dhaka, Bangladesh. Therefore, the generalization of the research may be applicable to only the people living in Madhupur Upazila. Another limitation is its small sample size. However, the researcher analyzed other studies conducted on healthcare quality in different UHCs while discussing the findings, which may increase the transferability of the research. Moreover, as this study

was conducted on patient satisfaction with the MUHC-provided healthcare quality during COVID-19 pandemic, satisfaction level and service quality factors' association with it may not be realized in different contexts.

CONCLUSIONS

The study measured the level of patient satisfaction with the MUHC-provided healthcare services during the COVID-19 pandemic and identified the associated service quality factors (reliability and responsiveness) impacting overall patient satisfaction using the SERVQUAL model. A moderate level of satisfaction of the patients on each aspect of the MUHC healthcare service quality, as well as on the quality of overall healthcare services. As the study evaluates healthcare quality of the MUHC in the COVID-19 context, it mainly evaluated how well the government's COVID-19 policy, National Preparedness and Response Plan (NPRP), actualized in the MUHC context from the patients' perspective by measuring their satisfaction. Factor-based analysis projected that all SERVQUAL aspects, as they received moderate level of satisfaction need to be improved with comprehensive government initiatives.

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CONFLICT OF INTEREST STATEMENT

Researchers declare no conflict of interests.

AUTHOR'S CONTRIBUTION DECLARATION

Md. Khalid Syfullah: Conceptualization, Methodology, Data Collection, Statistical Analysis, writing – Original Draft, writing – Review & Editing; **Farhana Jakia Tamanna:** Data Curation, Literature Review, writing – Original Draft; **Tawkir Ahmad:** Formal Analysis, Data Visualization, Validation, writing – Original Draft; **Nazmul Islam Fuad:** Literature Review, Data Curation, writing – Original Draft, writing – Review & Editing; **Md Abu Bakkar Siddik:** Final Revision, writing – Original Draft, Writing – Review & Editing.

DATA AVAILABILITY STATEMENT

The data will be provided upon reasonable request to the corresponding author.

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