

# Healthcare Cost and Patient Satisfaction: A Comparative Analysis Between Public and Private Hospitals in Bangladesh

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## Research

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# Abstract

**Background and objective:** Patient satisfaction and its relation with healthcare cost in Bangladesh remains unknown. The objective of the study was to perform a comparative analysis of satisfaction of patients in relation with healthcare cost in public and private healthcare settings in Bangladesh.

**Methods:** This cross-sectional study was conducted at two public and two private hospitals in Dhaka city, Bangladesh. A total of 1120 respondents were included by purposive sampling. Data collection was performed with a semi-structured questionnaire. The level of satisfaction was assessed by a 5-point Likert scale. Expenditure details during hospital stay were also recorded. Informed consent was obtained, and study procedures were conducted according to the Declaration of Helsinki. SPSS 23 was used for statistical test.

**Results:** The mean age of the respondents was  $50.10 \pm 21.13$  (SD) years, with a male-female ratio of 1.14:1. The majority were from urban areas. The average health-care cost of patients in both the conservative and operative groups was statistically significantly higher in private hospitals than in public hospitals ( $p < 0.001$ ). The overall satisfaction level was higher among the patients who received care from private settings than the public ( $p < 0.001$ ). However, taking health care in private hospitals rather than public hospitals was independently associated with patient satisfaction when adjusted for other factors (age, sex, economic status, treatment type, duration of hospital stays, treatment outcome, and total expense).

**Conclusion:** Despite higher expenses, the overall satisfaction level was significantly better in private health-care facilities. These findings need to be explored in further large multicenter studies.

## Introduction

Patient satisfaction is an intricate and multifaceted paradigm of modern medicine. It represents the extent to which a patient's actual healthcare experience matches one's subjective standards [1]. As patients are one of the key stakeholders in the continually evolving world of medicine, recognition and evaluation of patient concerns are essential for improvement, greater utilization of health services and reformation of policies [2]. A review suggested that higher satisfaction is associated with increased loyalty to physicians and treatment adherence [3]. Evidently, patient satisfaction scales have gained popularity as an important quality metric of health services [4].

Several dimensions of patient satisfaction have been highlighted. It ranges from provider attributes (staff competency, responsiveness, interpersonal skills, communication behavior) to facility features (physical environment, type, and level of the facility, availability of technical instruments, institutional reputation) and patient-related factors (gender, age, race, socioeconomic condition, health status, trust, perception about the institution and expectation regarding services) [5–7]. Another unique yet controversial element in health outcome and patient satisfaction is healthcare expenditure, which includes cost of investigation, medicine, transport, seat rent, surgery, service charge, and any other spending for the treatment of the patient [8]. With a change in the global health economy, an upward trend in domestic spending is being observed, including out-of-pocket expenditure (OOP) [9]. While developed countries are moving swiftly in progress, low- and middle-income countries are lagging behind. With only ten years away from the Sustainable Development Goals (SDGs) deadline, there is a lot of 'picking up' to do by the global community. It will minimize the inequities in the struggling countries of their commitment to achieving universal health coverage (UHC) by 2030 [10].

Bangladesh is a South Asian population that strives to meet global healthcare standards with minimal resources. The country has a multilateral health service delivery system consisting of four key mediators: public, for-profit-private sector, not-for-profit private sector (mainly involving nongovernment organizations [NGOs], and various international development organizations [11]. Public healthcare setups include super specialized postgraduate teaching institutions, tertiary medical college hospitals, and community clinics (CCs) to deliver primary health care up to grassroots levels. Private healthcare facilities range from super specialized hospitals and clinics to pharmacies at the community level. In 2018, there were 2258 government-run facilities in the public sector and 5054 privately run health centers to accommodate 52,807 and 90,587 inpatients at a time, respectively [12].

Despite limited seating capacity, public hospitals have a huge daily turnover of patients who are mostly poor and dependent on government-subsidized services. Interestingly, users still have to pay out of pocket to consume services such as medicine, tests, meals, and patient transportation that are supposed to be 'free of cost' [13, 14]. In the process, they often have to sell assets and borrow money to bear the expenses in fear of delayed or abandoned treatment [15]. Private hospitals tend to attract upper-class societies to opt for hassle-free healthcare with better management, quality services, hospitality, and privacy than public hospitals [16, 17]. Nonetheless, lower-income people face financial hardship to keep up with increasing healthcare costs despite government subsidies [18, 19].

Effective financial risk protection is an unforeseeable issue for many developing countries, especially in Bangladesh, which has underfunded health financing (2.37% of gross domestic product (GDP) in 2016, in fact, the lowest in South Asia [20, 21]. Increasing or instigating user fees has been found to pose a negative impact on the utilization of public health services, urging client-oriented affordable cost control with limited resources [22, 23, 24, 25]. In an aggressive consumer-based global healthcare market, client satisfaction is receiving attention, particularly in developed countries, as an important indicator of healthcare quality and patient-centered care [26]. Following this trend, studies looking into different dimensions of patient satisfaction in low- and middle-income countries are on the rise [27–30]. In Bangladesh, patient satisfaction studies have mainly focused on various modes of health facilities [31] and healthcare delivery [32], while some have occasionally investigated specific diseases [33]; however, no study has yet considered consumer satisfaction in relation to healthcare cost. A better understanding of patients' satisfaction relating to healthcare costs across different levels of healthcare facilities will help stakeholders develop and implement public health programs tailored to patients' expectations and needs. In this paper, we aimed to perform a comparative analysis of level of satisfaction of patients in relation with healthcare cost in public and private healthcare settings in Bangladesh.

## Methodology

### *Study design, study settings, and population*

This cross-sectional study was conducted from October 2018 to September 2019. Two leading public hospitals in Dhaka city with long experiences in patient management, Dhaka Medical College Hospital (DMCH) and Mitford Hospital (MH), were chosen purposively due to their age of establishment, highest patient turnover in the whole country and reputation in patient handling in line with various health problems. Both of these hospitals are public, and usually middle-income and low-income populations getting their health treatment with few exceptions. Two other reputed private hospitals [Ibn Sina Hospital (ISH) and Crescent Gastro Liver Ltd. Hospital (CGLH)] were also purposively chosen based on their hospital bed capacity, availability of medical and surgical care, accessibility to care and skilled manpower. Although both hospitals are privates, people from all economic classes can use those settings.

All of the hospitals were equipped to deal with both conservative and operative procedures with proper diagnostics amenities. Patients-to-be-discharged were chosen from both operative and conservative wards purposively. Following brief details of the study, consent was ensured from each participant. Patients who were unwilling to participate in the study, had a nonconsenting legal guardian, were aged <1 year, or had an inpatient hospital stay of less than 24 hours were excluded. A total of 1173 patients and/or their attendants were approached for data collection. Twenty-three of them did not agree to cooperate or answer the questionnaire, 9 were insecure about disclosing their information, and 21 had incomplete information. Finally, a total of 1120 samples (112 from DMCH, 98 from Mitford Hospital, 523 from ISH, 387 from CGLH) were included in the study.

### *Data collection tool and data collection*

A semi-structured questionnaire was developed and pretested. Pretesting was performed in both public (DMCH) and private hospitals (ISH) with 10 samples each, and those 40 samples were excluded from the main analysis. However, piloting data were cleaned and analyzed to check internal consistency to revise the questionnaire accordingly. Insights from the piloting were incorporated while preparing the final version of the questionnaire. The questionnaire consists of four parts:

**(A) Demographic details:** i.e., age, sex, occupation, educational status, monthly income, socioeconomic status, marital status, etc. Monthly income was calculated by adding the income from wages and nonwages of all the earning members of a family who are staying together and shared in same kitchen. The classification of poor, lower-middle, middle and rich was performed as follows: i)

Poor: Monthly family income of the respondent <15000 BDT (<176.5 US\$); ii) Lower-middle: Monthly family income of the respondent from ≥15000 BDT (≥176.5 US\$) to <30000 BDT (<352.9 US\$); iii) Middle class: Monthly family income of the respondent from ≥30000 BDT (≥352.9 US\$) to <60000 BDT (<705.9 US\$); and iv) Rich/solvent: Monthly family income of the respondent ≥60000 BDT (≥705.9 US\$).

**(B) Details about hospitalization and cost:** i.e., patients managed operatively or conservatively, department of admission. Cost was defined as total spending at the hospital (out-of-pocket expenditure managed by the patients or his/her caregivers) for the purpose of diagnosis, treatment and care of the patient. In-hospital expenditures were categorized into the following subsections:

- a. Admission fees (one-time token money for admitting the patient in the hospital) and registration fees (one-time token money for registering the patient in hospital database);
- b. Accommodation expenses (the amount charged per night stay in the ward/cabin in the hospital),
- c. Diagnostic expenses (all charges spent performing and reporting laboratory investigations). Costs include instruments, reagents, machines used during blood tests, serology, radiology and printing and reporting of the test results),
- d. Instrumental charges (expenses of instruments used for patient management and monitoring, for instance, pulse oximeter, catheter, cannula, feeding tube, suction jars, oxygen masks, bedpan, thermometer, syringe, infusion sets, etc.),
- e. Drug expenses (oral/intravenous/per rectal/topical/inhalational medication costs incurred by the patient),
- f. Canteen expenses (amount spent for daily meals and snacks bought from hospital canteen for the patient),
- g. Operative expenses (operative/preoperative/postoperative/recovery room rent, surgeon fees, OT team charges, etc.),
- h. Intervention expenses (endoscopy, colonoscopy, Endoscopic retrograde cholangiopancreatography (ERCP), angiogram, Percutaneous Coronary Intervention (PCI), stenting, device closure of septal defects, etc.);
- i. Procedural fees (amount charged for performing procedures on patient such as catheterization, cannulation, feeding tube insertion),
- j. **Consultation** fees (amount incurred for daily inpatient ward round visits by the consultants/surgeons), etc. The total cost of treatment (**Tk or BDT**) was noted by adding up the micro-costs or from hospital bills when and as available.

**Data relevant for cost were collected in the form of Bangladeshi taka (BDT) and later transformed into United States dollars (US\$) with an exchange rate of 85 taka [34].**

**(C) Outcome of treatment:** defined as cured, improved health status since admission, not improved since admission, deteriorated health condition and death. In addition, the duration of hospital stays (days) was also included.

**(D) Level of satisfaction:** A customized five-point Likert scale was used to measure the level of satisfaction in this study to allow the individual to express how much they agree or disagree with a particular statement. Here, 1= highly dissatisfied, 2= dissatisfied, 3= neutral, 4= satisfied, and 5=highly satisfied. We used this scale because it is easily understood by respondents and ensures impartiality by allowing the existence of negatively worded questions.

Primary data were collected only from those respondents by face-to-face interviews who had been admitted as inpatients in hospitals. Patients were selected from both conservative (medicine and its branches) and operative (surgery and its branches) wards. Informed written consent was ensured before participation. Details of the individual variables and their definitions used in this study are described in **Supplementary Table 1**.

### **Statistical analysis**

Data analysis was performed with Statistical Package for Social Science (SPSS v-23.0). Mean±standard deviation (SD) was used to express continuous data, while categorical data were expressed as percentages. Independent samples t-tests and chi-square tests were used whenever appropriate. Logistic regression analysis was performed to explore the factors influencing patient satisfaction. The level of significance was set at 5%, and  $P < 0.05$  was considered statistically significant.

## **Results**

We included 210 patients from two public hospitals and 910 patients from two private hospitals. The mean ages of the patients receiving care from public and private hospitals were  $50.10 \pm 21.13$  and  $44.58 \pm 19.70$  years (SD), respectively, and the difference was significant ( $p < 0.001$ ) (**Table 1**). A significantly higher male proportion was noted in public hospitals than in private settings ( $P < 0.001$ ). Patients from public hospitals more commonly came from villages and suburbs. On the other hand, a majority of the patients residing in urban areas attended private hospitals. Diverse occupation was reported. People from poor and low-middle-class hospitals commonly used public hospitals for their health care, while middle-class and rich predominantly used private hospitals for their health needs ( $P < 0.001$ ). More than fifty-five percent of patients were managed conservatively (medically) in both types of hospitals, although a significant difference existed across the hospital settings.

Of all, 933 patients were cured and discharged (44.3% in public vs 92.3% in private), 32.4% of patients admitted to public hospitals showed improvements in their health status from the time of admission, and 11.0% and 10.5% of patients in public hospitals showed no improvements and deteriorated, respectively. Differences in treatment outcomes varied significantly across public and private settings ( $p < 0.05$ ). Sociodemographic details and admission characteristics, treatment modalities, and outcomes are also described in **Table 1**.

The average expense of adults and elderly persons was greater than that of people aged  $< 18$  years, and in both age groups, treatment in private hospitals was significantly more expensive than that in public hospitals ( $p < 0.001$  for both cases). The mean duration of hospital stay was significantly lower in private hospitals; however, the latter cost was significantly higher irrespective of management type (conservative or operative;  $p < .001$ ) (**Table 2**).

Treatment costs for both sexes and all age groups were found to be significantly higher in private hospitals than in public hospitals (**Table 3**).

Private medicals unveiled significantly higher costs (as low as 1.5-fold to an overwhelming 20-fold increased cost) in all modes of direct medical expenses than public medicals ( $p < 0.05$ ). **Public hospitals did not charge for surgery, intervention, consultation or procedures, whereas private hospitals cost the most for interventions and surgeries. Despite higher costs in different areas, satisfaction levels were significantly higher in all areas of expenditures in private hospitals. Details are illustrated in Table 4.**

The highest number of patients were admitted to the Department of Neurology in both public hospitals ( $n=55$ ) and private hospitals ( $n=131$ ). Admitting departments in private hospitals had a 1.5-6-fold higher mean cost than public facilities. **The mean expenditure was higher among the patients admitted to the surgery faculty (Public- 252.47 US\$ vs private- 744.80 US\$;  $p < 0.001$ ) than medicine faculty (Public- 139.59 US\$ vs private- 719.34 US\$;  $p < 0.001$ ). The overall satisfaction score was higher among the patients admitted both in medicine (public-  $2.85 \pm 0.89$  vs private-  $4.00 \pm 0.81$ ;  $p < 0.001$ ) and surgery faculty (public-  $2.80 \pm 0.78$  vs private-  $3.96 \pm 0.83$ ;  $p < 0.001$ ).** Average expenditure according to admitting departments, level of satisfaction and difference in terms of hospital settings are described in **Table 4**.

Most of the respondents from private hospitals were more reasonably satisfied with services and costs than public healthcare seekers. Mitford Hospital and ISH earned significantly greater patient satisfaction scores across all domains from public and private perspectives, respectively (**Figure 1**).

The mean satisfaction score was significantly higher in private hospitals ( $3.98 \pm 0.82$ ) than in public hospitals ( $2.84 \pm 0.86$ ). Private hospitals demonstrated a significantly higher level of satisfaction despite a substantially higher mean cost of treatment than public hospitals. However, a lowered mean expense was found to provide better satisfaction scores in the private facilities. On the other hand, satisfaction was significantly better with a lengthy hospital stay ( $10.22 \pm 6.3$  days) in public hospitals than with a shorter ( $5.11 \pm 4.27$  days) stay in private hospitals (**Table 5**).

A logistic regression model was built to explore the factors associated with participant satisfaction using healthcare services (**Table 6**). For the model, satisfaction was defined as having a 'satisfied' or 'highly satisfied' response on a 5-point Likert scale. After adjustment for age, sex, economic status, treatment type, duration of hospital stay, treatment outcome, and total expense, only hospital type was found to be statistically significantly associated with satisfaction. Patients were 8.177 times more likely (95% CI 5.082 – 13.158) to be satisfied with health care from private hospitals than public hospitals.

## Discussion

Satisfaction and quality are interdependent, as with quality and expenditure, although the relationship between cost and satisfaction is not that simple [35]. Patient satisfaction has gained popularity over the past few years as an indicator of service quality aimed at improving health and health-care delivery [36,37]. Quality at a reasonable cost may meet patients' expectations, which may attain higher satisfaction. In Bangladesh, an underfinanced public health sector and an overpriced private health sector coupled with an insufficient health workforce against an **overbearing** patient turnover have dragged healthcare quality below international standards. This study was intended to explore and compare healthcare costs and levels of satisfaction in both public-private healthcare facilities.

The middle-aged population outweighed other age groups in this study in both public and private domains of healthcare. The majority of people attending public hospitals in this study belonged to poor and lower middle socioeconomic conditions. Moreover, most of these public hospital attendees hailed from rural areas and were unemployed (senior citizens, homemakers, and students). They do not have any alternative to availing health services from government-subsidized public health facilities. The main obstacle for such patients to access care at private hospitals seems to be a comparatively higher cost of private healthcare. The variability of prices in different private hospitals, hidden costs, and itemized billing compel unprivileged people of this country to choose affordable costs over higher service quality. For similar reasons, patients in public healthcare facilities in this study were noted to mostly choose hospital floors and general wards for accommodation to save for treatment and other expenses during their hospital stay, whereas in private facilities, 60% patients chose air conditioned or specialized cabins for a comfortable stay at the hospital adorned with privacy. Non-operative cases prevailed over operative cases in this study. Both public and private hospitals admitted conservative cases in the majority, whereas significant differences were observed in the number of operative cases admitted to private hospitals compared to public hospitals. The mean total cost for operative treatment at private hospitals was three-fold higher than that at public hospitals. **Conservative cases were five times more expensive in the private sector than in the public sector.** A major contributing factor to this difference in treatment modalities in public and private hospitals may be increased costs associated with surgeries. However, it was interesting to note that private medicals attended more operative cases than public hospitals despite high expenses in operative private healthcare. The conundrum may be attributed to a perceived sense of better chance for survival from private hospitals regardless of associated expenses when invasive procedures such as surgeries are to be performed. Treatment in a private hospital has been reported to significantly influence survival outcomes [38]. Moreover, patients at private hospitals have been noted to receive a higher level of health care services, and patients are willing to pay more if there are increased chances of recovery [16,39].

Evidently, no deaths were recorded in private hospitals, whereas public hospitals registered 4 deaths and quite a few health deteriorations and lack of improvement. Additionally, private hospitals in this study had a relatively higher cure rate than public hospitals (92.3% vs 44.3%). Public hospitals are the usual go-to facilities for the referred and unstable patients across the country. High patient turnovers within the limited-capacity public hospitals could mean disaster. A review study in Europe reported a tendency of public hospitals to tend toward elderly patients with lower socioeconomic conditions, riskier lifestyles, and higher levels of comorbidity and complications than patients treated in private hospitals [40]. In the backdrop of all the reported shortcomings, the reported health outcomes for public hospitals cannot but be expected.

The mean total cost of services was much higher in a private hospital than in a public hospital. The 2019 WHO report on global health expenditure stated that financing of healthcare in developing countries is shared mostly by the profit-extracting private sector [41]. Cost of treatment is therefore expected to be higher in private healthcare facilities. The average treatment cost for adults, particularly the elderly population (>60 years) this study had cost the highest among all groups. Elderly patients in. The findings are supported by reports that observed medical expenditure-age profiles to follow an upward trend and a likelihood to spend more on elderly members of the family [42]. Moreover, cases admitted in late adulthood present with more comorbidities and treatment complications and altogether cost more than other age groups [43]. Mean expenditure on treatment of male participants was higher across both healthcare platforms. This finding agrees with studies that have noted similar gender disparities in food and health care expenditures [44].

Surgical departments were more expensive across both domains of healthcare in this study. Mean total expenditure was highest for hepatobiliary pancreatic surgeries in public hospitals and cardiac surgeries in private hospitals. Surgical site infection and

consequent complications require episodic payments for corrective procedures that cost substantially higher in inpatient surgical patients worldwide, as previous studies suggested [45]. On the contrary, early routine postoperative discharge after major inpatient surgery has been associated with lowered surgical payments [42,43]. Strict quality control of surgical site antisepsis and pre-, peri- and postoperative sterilization may culminate in an early discharge, which may lower hospital stay and thereby reduce the overall cost of surgeries.

Patients were mainly satisfied with private health facilities despite facing higher healthcare costs. Satisfaction scores were higher in all aspects of expenditure for private hospitals when compared with public hospitals. Overall, higher satisfaction with private healthcare facilities noted in this study resonates with the findings of other studies around the world [46,47]. Moreover, in a public-private comparison, absolute satisfaction came at a mean expense of 180.30 US\$ for public (4.3% patients) vs 766.16 US\$ for private hospitals (30.2% patients). In private hospitals, most patients (40.5%) were satisfied at a mean expense (707.03 US\$) which stood lowest among other subgroups. However, in public hospitals most remained neutral (43.8%) despite incurring significantly lower mean expenses (162.73 US\$). Furthermore, the lowest mean expense (116.71 US\$) recorded across both platforms meant dissatisfaction for 5 patients attending public hospitals. Public healthcare centers receive most of the patients in severe health derangements, which reportedly triggers willingness to pay to get the best possible care [48]. Increased affordability can attain satisfaction, though it can be influenced by multiple factors, one of which is duration of hospital stay [49]. Highly satisfied patients in this study had a shorter stay in private hospitals. Incentive-driven private facilities are more likely to take preventive measures against hospital-acquired infections to improve service quality and health outcomes, which subsequently ensures early discharge and reduced hospital stay [50,51]. This could eventually decrease total health expenses and guarantee higher patient satisfaction [52–54].

However, controlling for the effects of variables such as, age, sex, economic status, treatment type, duration of hospital stay, treatment outcome, and total expense, satisfaction levels were not found to have a significant relationship with other variables except for the type of hospital chosen for healthcare. Patients were eight times more likely to be satisfied if treated at private hospitals than public hospitals despite differences in treatment cost. This may be attributed to subjective perceptions and expectations regarding care, privacy and comfort during hospital stay, managerial capacity of the facility, cleanliness, availability of equipment, nursing attention, physician service, attitude and counselling of patients [55].

Government-funded healthcare has been a focal point for welfare states where public hospitals have the best economic performance and have equal or more efficiency than private hospitals, whereas, developing countries mostly report higher quality of private healthcare than public in terms of nursing care, cleanliness of the hospital, availability and regular provision of utilities and drugs [56–58]. For Bangladesh, quality may ultimately triumph affordability when selecting private hospitals for treatment; as long as delivery of high quality of service, cleanliness, professional mannerism, good attitude and attention from staff are assured [59]. A population with low basic income relies heavily on public health sector mainly due to affordability even if the services are not satisfactory [60,61]. Lower levels of satisfaction have been linked with lowered patient retention, decreased compliance and reduced willingness to seek treatment [62]. The consequences of a malfunctioning, morbid nation could be overburdening for any country. Opting for private healthcare has been deemed as a more gratifying experience in this study and it could not be explained by cost, outcome or treatment modality. There may be some additional factors to satisfaction that need to be inquired into.

## Conclusion

Overall cost of care was significantly higher in private hospitals than in public hospitals irrespective of patient's demographics, type of treatment taken, department where treatment was sought and areas of expenditure. The level of satisfaction was negatively correlated with expenditure in a particular hospital and positively correlated with the duration of stay in a public hospital. However, attending private health facilities was associated with significant level of satisfaction. Finally, there may be other unexplored factors that may explain the extent of patient satisfaction in different health-care settings and warrant further exploration.

## Limitations

First and foremost, the most noticeable limitation of the study was the use of a customized 5-point Likert scale instead of other established scales or a 7-point satisfaction scale. This might have narrowed down the patients' response to satisfaction and made the results less comparable to other studies. There remained the possibility of recall bias during interviews with the patients. This study was conducted only in facilities located in the capital city of Bangladesh. Therefore, a picture of health-care costs and satisfaction levels in other cities or parts of the country could not be assessed and compared. Moreover, involvement of more centers with a larger sample size could increase the strength of the findings but was not possible due to unavailability of funds. In addition, we did not assess the mannerism and professionalism of health-care providers, which might influence treatment satisfaction among patients. Despite the limitations, the strength of the study is that it reports the level of satisfaction in both private and public health settings in Bangladesh for the first time. The study may aid policy dialogues in health budgeting and subsidizing allocations.

## Declarations

### **Ethical consideration and informed written consent:**

The researcher was duly concerned about the ethical issues related to the study. Formal ethical clearance was taken from the Ethical Review Committee (ERC) of the relevant institutions before conducting the study, and formal permission was taken from the participants. Confidentiality was maintained properly. Informed written consent was obtained from the subject informing the nature and purpose of the study, the procedure of the study, the right to refuse, accept and withdraw to participate in the study and the participants who did not gain financial benefit from this study.

**Consent of Publication:** Not applicable

**Availability of data and material:** Data and materials supporting our findings in the manuscript will be shared on request.

**Competing Interests:** The authors declare that there are no conflicts of interest regarding the publication of this paper.

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### **Author Contributions:**

FB conceived and developed the concept of the study. The conception and design of this research were made by FB, JS, SZH, MJH and NO. Data collection was performed by FB. FB and SZH wrote the first draft of the manuscript and JS and NO reviewed the draft. Data analysis was performed by FB and MJH. All authors read and revised the article, and FB works as a corresponding author.

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## Tables

**Table 1. Socioeconomic and admission characteristics of the Respondents**

	Public hospital (n= 210)	Private hospital (n=910)	P value	
<b>Mean age (SD)</b>	50.10 (21.13)	44.58 (19.70)	<.001*	
<b>Sex</b>				
Male (%) (n=596)	138 (65.7%)	458 (50.3%)	<.001**	
Female (%) (n=524)	72 (34.3%)	452 (49.7%)		
<b>Living location</b>				
Urban (%) (n=570)	96 (45.7%)	474 (52.1%)	.108	
Rural (%) (n=550)	114 (54.3%)	436 (47.9%)		
<b>Socioeconomic condition</b>				
Poor (n=144)	106 (50.5%)	38 (4.2%)	<.001**	
Lower middle class (n=293)	79 (37.6%)	214 (23.5%)		
Middle class (n=553)	23 (11.0%)	530 (58.2%)		
Rich (n=130)	2 (1.0%)	128 (14.1%)		
<b>Occupation</b>				
Student (n=192)	33 (15.7%)	159 (17.6%)	<.001**	
Private job (n=121)	20 (9.5%)	101 (11.2%)		
Government service (n=30)	9 (4.3%)	21 (2.3%)		
Business (n=123)	20 (9.5%)	103 (11.4%)		
Farmer (n=48)	18 (8.6%)	30 (3.3%)		
Teacher (n=46)	6 (2.9%)	40 (4.4%)		
Journalist (n=6)	2 (1.0%)	4 (0.4%)		
Doctor (n=15)	2 (1.0%)	13 (1.4%)		
Home maker (n=313)	39 (18.6%)	274 (30.4%)		
Self-employed (n=5)	1 (0.5%)	4 (0.4%)		
Senior citizen (n=128)	44 (21.0%)	84 (9.3%)		
Retired (n=68)	12 (5.7%)	56 (6.2%)		
Day laborer (n=5)	4 (1.9%)	1 (0.1%)		
Advocate (n=4)	0	4 (0.4%)		
Remittance worker (n=8)	0	8 (0.9%)		
<b>Allocated seat during hospital stays</b>				
Floor (n=48)	48 (22.9%)	0		<.001**
General ward (n=436)	115 (54.8%)	321 (35.3%)		
Paying bed/Non-AC cabin (n=71)	33 (15.7%)	38 (4.2%)		
AC/VIP cabin (n=560)	11 (5.2%)	549 (60.3%)		
HDU/ICU (n=5)	3 (1.4%)	2 (0.2%)		

<b>Type of treatment</b>			
Conservative (n=658)	155 (73.8%)	503 (55.3%)	<.001**
Operative (n= 452)	55 (26.2%)	407 (44.7%)	
<b>Outcome of treatment</b>			
Cured and discharged (n=933)	93 (44.3%)	840 (92.3%)	<.001*
Improved (n=135)	68 (32.4%)	67 (7.4%)	
No improvement (n=25)	23 (11.0%)	2 (0.2%)	
Deteriorated (n=23)	22 (10.5%)	1 (0.1%)	
Death (n=4)	4 (1.9%)	0	

Note: 1US\$=85 BDT as in May 2020

\*Independent sample t test and \*\*Chi-square test was used for calculating level of significance

**Table 2. Average cost of treatment by age category, treatment modality and length of stay, BDT (US \$)**

<b>Mean total expenses</b>	<b>Public hospital (n= 210) BDT (US\$)</b>	<b>Private hospital (n=910) BDT (US\$)</b>	<b>P value</b>
<b>Mean total expenses by age category</b>			
Children and young adolescents (1 to <18yrs)	11840.58 (139.30\$)	41544.62 (488.76\$)	<.001*
Adults and elderly (≥18yrs)	14338.57 (168.69\$)	63852.88 (751.21\$)	<.001*
<b>Mean total expenses by type of treatment</b>			
Conservative (n=658)	11405.56 (134.18\$)	57252.60 (673.56\$)	<.001*
Operative (n=452)	22059.29 (259.52\$)	68118.38 (801.39\$)	<.001*
<b>Mean duration of stay in days by type of treatment</b>			
Conservative (n=658)	7.75 ± 5.99	5.54 ± 4.24	<.001*
Operative (n=452)	11.87 ± 6.62	4.30 ± 4.39	<.001*
Total	8.83 ± 6.40	4.99 ± 4.35	<.001*

Note: 1US\$=85 BDT as in May 2020

\*Independent sample t test was used for calculating level of significance

**Table 3. Average total cost of treatment by age group and gender, BDT (US\$)**

	Public hospital (n=210)		Private hospital (n=910)		P value
	n	Average total cost BDT (US\$)	n	Average total cost BDT (US\$)	
<b>Age group (Years)</b>					
1 to 12	4	12817.50 (150.79\$)	32	40095.50 (471.71\$)	<.001*
12 to 23	25	10220.48 (120.24\$)	103	45178.62 (531.51\$)	<.001*
24 to 35	33	13812.97 (162.51\$)	211	56852.23 (668.85\$)	<.001*
36 to 47	24	14443.88 (169.93\$)	146	57793.44 (679.92\$)	<.001*
48 to 59	39	14640.56 (172.24\$)	159	68329.38 (803.88\$)	<.001*
60 to 71	48	16179.92 (190.35\$)	172	62055.40 (730.06\$)	<.001*
72 plus	37	14168.70 (166.70\$)	87	99014.03 (1164.87\$)	<.001*
<b>Gender</b>					
Male	38	14470.78 (170.24\$)	458	67092.34 (789.32\$)	<.001*
Female	72	13668.83 (160.81\$)	452	57066.25 (671.37\$)	<.001*

Note: 1US\$=85 BDT as in May 2020

\*Independent sample t test was used for calculating level of significance

**Table 4 Cost-satisfaction comparison between public and private hospitals on areas of expenditure and by admitting departments, BDT (US\$)**

Area of expenditure	Public hospital (n=210)		Private hospital (n=910)		P value	Public hospital (n=210)		Private hospital (n=910)		P value
	n	Mean expenditure	n	Mean expenditure		n	Mean satisfaction score	n	Mean satisfaction score	
		BDT (US\$)		BDT (US\$)			Mean ± SD		Mean ± SD	
Admission and registration fees	210	30.67 (0.36\$)	910	621.32 (7.31\$)	<.001*	210	3.80 ± 0.97	910	4.16 ± 0.83	<.001*
Accommodation expenses	210	2237.64 (26.33\$)	910	16722.64 (196.74\$)	<.001*	210	3.21 ± 1.22	910	3.57 ± 1.16	<.001*
Diagnostic expenses	210	5204.05 (61.22\$)	893	10063.88 (118.40\$)	<.001*	210	2.60 ± 1.25	893	4.34 ± 0.95	<.001*
Instrumental charges	197	1414.60 (16.64\$)	858	5117.10 (60.20\$)	<.001*	197	2.63 ± 0.97	858	3.94 ± 0.94	<.001*
Drug expenses	210	4436.44 (52.19\$)	901	7731.91 (90.96\$)	<.001*	210	2.24 ± 0.78	901	4.23 ± 0.92	<.001*
Canteen expenses	199	496.43 (5.84\$)	506	746.69 (8.78\$)	<.001*	199	2.53 ± 0.87	506	4.12 ± 0.90	<.001*
Operative charges	0	n/a	396	31153.97 (366.52\$)	n/a	0	n/a	396	3.61 ± 1.16	n/a
Intervention charges	0	n/a	174	32521.79 (382.61\$)	n/a	0	n/a	174	3.43 ± 1.12	n/a
Procedural fees	0	n/a	69	1789.86 (21.06\$)	n/a	0	n/a	69	3.93 ± 0.98	n/a
Consultation fees	0	n/a	901	13044.82 (153.47\$)	n/a	0	n/a	901	3.85 ± 0.96	n/a
<b>Department of admission</b>	<b>n</b>	<b>Mean expenditure</b>	<b>n</b>	<b>Mean expenditure</b>		<b>n</b>	<b>Mean satisfaction score</b>	<b>n</b>	<b>Mean satisfaction score</b>	
		<b>BDT (US\$)</b>		<b>BDT (US\$)</b>			<b>Mean ± SD</b>		<b>Mean ± SD</b>	
Internal medicine	38	9731 (114.48\$)	49	45802 (538.85\$)	.000*	38	2.97 ± 0.97	49	4.08 ± 0.79	.000*
Obstetrics and Gynaecology	2	25810 (303.65\$)	83	66483 (782.15\$)	.086	2	3.00 ± 1.41	83	4.20 ± 0.75	.029*
Cardiology	22	13890 (163.41\$)	66	74201 (872.95\$)	.000*	22	3.05 ± 0.72	66	3.88 ± 0.80	.000*
Neurology	55	12058 (141.86\$)	131	82700 (972.94\$)	.000*	55	2.65 ± 0.87	131	4.03 ± 0.80	.000*
ENT	4	19640 (231.06\$)	68	29381 (345.66\$)	.003*	4	2.50 ± 0.58	68	3.82 ± 0.81	.002*
Orthopedics	12	23781 (279.78\$)	33	107828 (1268.57\$)	.000*	12	2.67 ± 0.65	33	4.12 ± 0.93	.000*
Urology	6	15175 (178.53\$)	28	73488 (864.56\$)	.000*	6	2.53 ± 0.87	28	2.53 ± 0.87	.010*
Hepatobiliary pancreatic surgery	1	26896 (316.42\$)	31	70455 (828.88\$)	.385	1	4.00 ± 0.00	31	3.97 ± 0.84	.970

Gastroenterology	2	18239 (214.58\$)	87	41439 (487.52\$)	.011*	2	3.00 ± 0.00	87	4.06 ± 0.71	.095
Endocrinology	8	11693 (137.57\$)	5	52770 (620.82\$)	.046*	8	2.88 ± 1.13	5	4.00 ± 0.71	.073
Haematology	5	15866 (186.66\$)	15	68880 (810.35\$)	.003*	5	3.00 ± 0.71	15	3.80 ± 0.94	.100
Nephrology	9	11577 (136.20\$)	34	70095 (824.65\$)	.000*	9	3.00 ± 1.00	34	4.09 ± 0.71	.001
Hepatology	6	9526 (112.07\$)	85	40177 (472.67\$)	.000*	6	2.33 ± 0.52	85	3.99 ± 0.76	.000*
General surgery	12	17887 (210.44\$)	80	54541 (641.66\$)	.000*	12	2.58 ± 0.67	80	3.78 ± 0.90	.000*
Vascular surgery	2	16616 (195.48\$)	10	45170 (531.41\$)	.001*	2	3.00 ± 1.41	10	3.80 ± 0.79	.264
Colorectal surgery	2	24493 (288.15\$)	16	55744 (655.81\$)	.148	2	2.50 ± 0.71	16	3.81 ± 0.83	.050
Oncology	6	18937 (222.79\$)	8	35802 (421.20\$)	.171	6	3.00 ± 1.27	8	4.38 ± 0.74	.025*
Neuro surgery	10	26410 (310.71\$)	38	76636 (901.60\$)	.000*	10	3.20 ± 0.92	38	4.11 ± 0.76	.003*
Physical medicine	8	7963 (93.68\$)	4	69470 (817.29\$)	.170	8	3.00 ± 0.76	4	3.50 ± 0.58	.000*
Chest medicine	0	n/a	13	91630 (1078.0\$)	n/a	0	n/a	13	3.77 ± 0.83	.275
Pediatrics	0	n/a	6	54065 (636.06\$)	n/a	0	n/a	6	3.83 ± 1.17	n/a
Plastic surgery	0	n/a	5	82316 (968.42\$)	n/a	0	n/a	5	3.80 ± 0.84	n/a
Pediatric surgery	0	n/a	6	51530 (606.24\$)	n/a	0	n/a	4	4.25 ± 0.50	n/a
Spine surgery	0	n/a	3	44538 (523.98\$)	n/a	0	n/a	3	3.00 ± 0.00	n/a
Dental surgery	0	n/a	4	47075 (553.82\$)	n/a	0	n/a	4	4.50 ± 0.58	n/a
Cardiac surgery	0	n/a	4	222850 (2621.77\$)	n/a	0	n/a	4	4.00 ± 0.82	n/a
<b>Attending faculty</b>										
Medicine and branches	159	11865 (139.59\$)	503	61144 (719.34\$)	.000*	159	2.85 ± 0.89	503	4.00 ± 0.81	.000*
Surgery and allied	51	21460 (252.47\$)	407	63308 (744.80\$)	.000*	51	2.80 ± 0.78	407	3.96 ± 0.83	.000*

Note: 1US\$=85 BDT as in May 2020

\*Independent sample t test was used for calculating level of significance

**Table 5. Level of satisfaction and its relation with mean expenditure & duration of hospital (n=1120)**

	Public hospital (n=210)		Private hospital (n=910)		P value
<b>Mean satisfaction score (±SD)</b>	2.84±0.86		3.98±0.82		<.001*
	<b>n</b>	<b>Mean expenditure</b>	<b>n</b>	<b>Mean expenditure</b>	
		<b>BDT (US\$)</b>		<b>BDT (US\$)</b>	
<b>Level of Satisfaction</b>					<b>P value</b>
Highly dissatisfied	5	9920 (116.71\$)	0	n/a	n/a
Dissatisfied	73	14670.84 (172.60\$)	23	72639.65 (854.58\$)	<.001*
Neutral	92	13832.24 (162.73\$)	243	60766.77 (714.90\$)	<.001*
Satisfied	31	14518.13 (170.80\$)	369	60097.85 (707.03\$)	<.001*
Highly satisfied	9	15324.89 (180.30\$)	275	65123.98 (766.16\$)	<.001*
	<b>n</b>	<b>Duration of hospital stay</b>	<b>n</b>	<b>Duration of hospital stay</b>	
		<b>(Mean±SD)</b>		<b>(Mean±SD)</b>	
<b>Level of Satisfaction</b>					<b>P value</b>
Highly dissatisfied	5	6.80 ± 2.49	0	n/a	n/a
Dissatisfied	73	8.30 ± 5.80	23	5.35 ± 5.10	.031*
Neutral	92	9.29 ± 6.66	243	5.24 ± 4.92	<.001*
Satisfied	31	8.65 ± 7.52	369	4.72 ± 3.95	<.001*
Highly satisfied	9	10.22 ± 6.3	275	5.11 ± 4.27	<.001*

Note: 1US\$=85 BDT as in May 2020

Results obtained by independent sample t test

**Table 6. Predictors<sup>a</sup> of satisfaction<sup>b</sup> among the study participants**

Factors	Crude OR	95% CI	Adjusted OR	95% CI
Age (years)				
≥ 50	1		1	
< 50	1.068	0.839 – 1.359	0.869	0.654 – 1.154
Sex				
Female	1		1	
Male	0.847	0.665 – 1.078	1.061	0.811 – 1.387
Economic Status				
Poor/Lower middle	1		1	
Middle/Rich	2.573*	2.006 – 3.300	1.205	0.844 – 1.722
Hospital type				
Public hospital	1		1	
Private hospital	10.289*	7.087 – 14.939	8.177*	5.082 – 13.158
Treatment type				
Conservative	1		1	
Operative	1.260	0.986 – 1.611	0.961	0.718 – 1.285
Duration of hospital stay (days)				
≥ 6	1		1	
< 6	1.642*	1.282 – 2.103	1.277	0.909 – 1.795
Outcome				
Not improved	1		1	
Improved	7.185*	3.565 – 14.479	1.223	0.547 – 2.733
Total expense				
< 50000 BDT (<588.24\$)	1		1	
≥ 50000 BDT (≥588.24\$)	2.005*	1.538 – 2.614	1.119	0.768 – 1.633

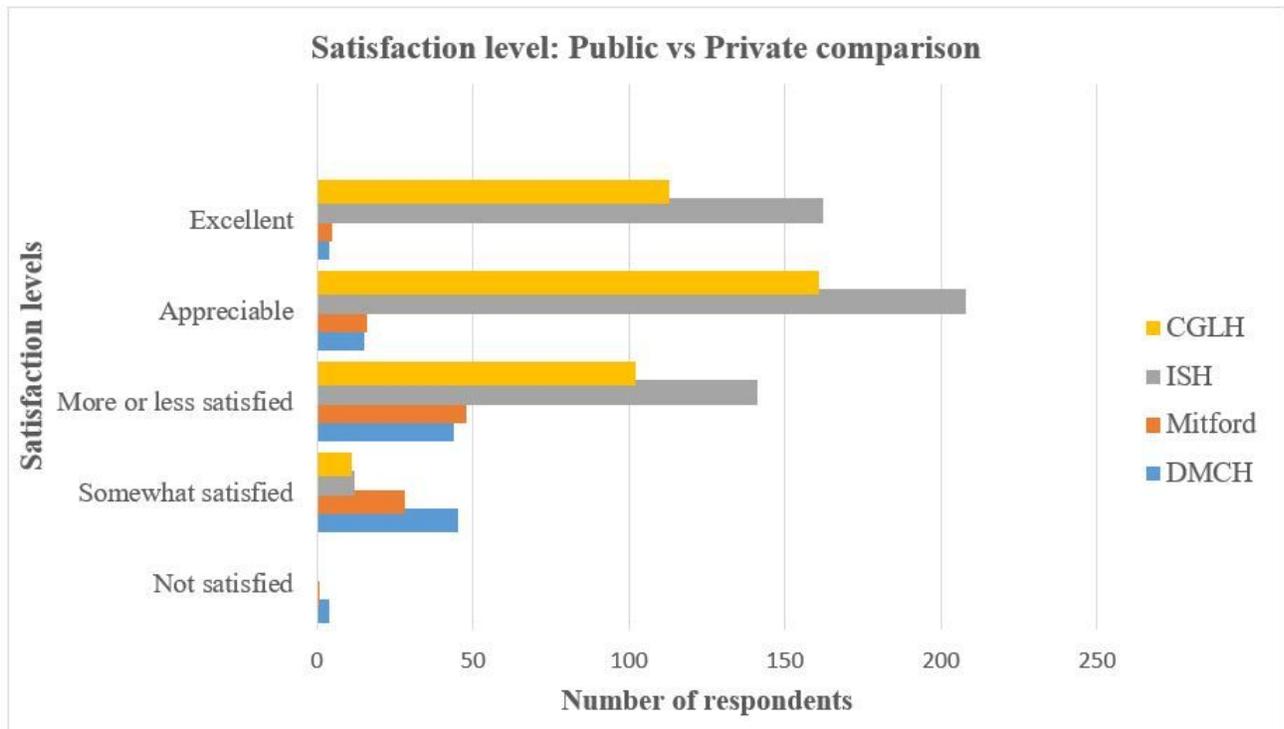
Notes:

<sup>a</sup>Multivariate logistic regression was done using ENTER method.

<sup>b</sup>Satisfaction is defined as having following response in the 5-point satisfaction scale- 'satisfied' and 'highly satisfied'.

\*Significant at p<0.05

## Figures



**Figure 1**

Comparative illustration of satisfaction levels between public and private hospitals CGLH= Crescent Gastroliver Ltd. Hospital ISH= Ibn Sina Hospital Mitford= Mitford Hospital DMCH= Dhaka Medical College Hospital

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [1091.SupplementaryfileV10.docx](#)