Optimizing Hospital Operations- A case study of Patients' Experience with different modes of payments

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Introduction

In an era where healthcare systems are increasingly patient-centric, operational efficiency in hospitals has emerged as a critical determinant of both service quality and financial sustainability. Hospital operations encompass a broad range of services including registration, diagnostics, consultations, pharmacy, billing, and discharge. Efficient operations lead to reduced waiting times, better staff productivity, and improved patient satisfaction. Efficient hospital operations not only enhance patient satisfaction but also ensure better resource utilization and faster service delivery **(Verma & Dash, 2020).** Among various operational touchpoints, **the payment process plays a pivotal role** in shaping the overall patient experience, especially at the end of a treatment cycle when stress levels are high and expectations for seamless service are paramount.

In a study from Times of India (2025), Sector 48 Hospital in Chandigarh introduced Ayushman Bharat kiosks and POS machines to facilitate smoother claim processing and cashless billing—especially beneficial for cancer patients. The initiative addressed travel burdens and improved patients' operational experience with payment modes. Studies note that integrating digital payments often introduces delays during initial rollouts, especially when hospitals implement pre-authorization workflows or manage multiple payment gateways, indicating a need for robust operational planning

While these choices offer flexibility, they also present unique challenges in terms of transaction speed, security, reconciliation and system integration with hospital management systems. The convenience and satisfaction associated with different modes of payment can affect patient loyalty and their willingness to return or recommend a hospital. The delays in card machine availability, confusion over insurance paperwork, or failure of UPI transactions can frustrate patients and disrupt workflow at discharge counters **(Sharma et al., 2023).**

Healthcare services in India have improved a lot over the years, especially in private hospitals like Apollo Hospitals. Outpatient departments (OPDs) are one of the most important parts of a hospital because they are often the first point of contact between the patient and the hospital. Many researchers have studied how patients feel about the services they receive, and most agree that patient satisfaction is a key measure of hospital quality.

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A report from TrustCommerce(2025) revealed that 2024–25 global industry report highlighted that 96% of providers accept credit/debit cards and 69% offer flexible payment plans. Patient satisfaction significantly improved when hospitals offered digital wallets, mobile payments, and payment plans aligned with retail-level expectations.

Literature Review

The quality of care depends on the structure of the hospital, the way services are given, and the outcomes of those services **(Donabedian, 1988)**. In earlier studies, it has been found that patients feel more satisfied when the hospital staff are polite, when the environment is clean, and when the overall process is well-managed. The patients in Indian hospitals said they were happiest with the treatment when all these factors worked well together. Especially in busy hospitals, making sure that patients are treated quickly and with respect is very important. (**Kumar & Thomas, 2006).** A tertiary public hospital in Chandigarh and found growing awareness of digital payment options like UPI and cards has found that patients still preferred cash for transactions under INR 1,000 due to distrust or unfamiliarity with online platforms. (Maiyammai et al., 2024).

Patient experience is a key performance indicator in modern healthcare delivery, with factors like payment convenience increasingly influencing perceived quality of service **(Mishra & Raj, 2022).** With the digitization of financial services, healthcare institutions have adopted various modes of payment such as cash, card, UPI, digital wallets, and insurance. Studies have shown that **payment mode impacts patient satisfaction and throughput efficiency.** The digital payments reduce queue lengths and administrative costs but may alienate patients who are digitally excluded. **(Singh & Mehta, 2021)**

Recent comparative studies have analyzed cash vs. digital payments in healthcare. Cash transactions in hospitals are often slower, require manual receipt generation, and are prone to errors. Conversely, digital payments offer speed and traceability but depend heavily on infrastructure and patient digital literacy. (**Sharma et al., 2023).** Integration of payment systems with Hospital Information Systems (HIS) enhances billing accuracy and patient flow. The seamless payment experiences contribute to overall hospital efficiency, especially in high-volume urban centres (**Jain & Kumar, 2019)**.

While offering multiple payment options increases flexibility, it can also increase operational complexity. The reconciling payments from various gateways delayed financial closing and added to backend workload. Hospitals must balance payment variety with backend standardization for optimization. **(Goel, 2020).** The adoption of **self-service kiosks, QR-code billing,** and **real-time insurance processing** have been associated with improved patient experiences **(Kanchan & Sinha, 2023).** These innovations shift the control to patients and free staff to focus on care delivery.

Understanding patient experience across different payment channels provides valuable insights into **bottlenecks in hospital operations**, especially in high-volume outpatient departments and emergency wards. Hospitals that optimize this aspect of the service cycle are better positioned to enhance operational agility and patient satisfaction simultaneously.

Methodology

Present study has been conducted from a reputed private hospital and a valid random sample of 5309 has been considered for the purpose of analysis. Sample comprises age group considering 0 (new born babies) to 80 years, including both male and female. Responses have been given mostly by the

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patients, but in some cases the patients' attendant has provided the responses. Cronbach's Alpha of the responses is found to be ($\alpha = 0.7412$). As there are 3 modes of payment for the treatment in the present research, the analysis is focussed on the satisfaction level of the patients in different perspectives with respect to the payment mode (i.e. Cash, Credit and Insurance). Satisfaction of patients has been tested with in the aspect of Doctor, Treatment. Inpatient process, Nursing and Billing. The same analysis is done with respect to the gender of the patients and the above mentioned variables. The Hypotheses have been tested at 0.05 significance level.

Statement of the problem

In GMCH-32, patients reported forced cash payments due to non-functional POS systems. The lack of digital options led to overcharging, longer wait times, and dissatisfaction, highlighting operational inefficiencies in billing counters. As the patients are making the bill payment in different modes, hospitals are trying their best to understand which mode of payment is more comfortable for the patients, also in some cases, gender wise satisfaction level is also varying. Hence there is a need to understand the influence of gender and payment mode towards satisfaction

Objectives of the study

To understand the impact of payment mode towards the satisfaction level

To understand the difference in the level of satisfaction with respect to the gender of the patients

Hypotheses definition

H_0: There is no difference in the satisfaction level of patients towards Doctor with respect to the mode of payment

H_a: There is significant difference in the satisfaction level of patients towards Doctor with respect to the mode of payment

H_0: There is no difference in the satisfaction level of patients towards Billing with respect to the gender of the patients

H_a: There is significant difference in the satisfaction level of patients towards Billing with respect to the gender of the patients

Analysis and Discussion

Table 1 shows the demographic analysis of the data collected, out of 5309, the number of female are 2807(52.87%) and male are 2502(47.13%). In terms of payment mode, 1651 has done through Cash (31.10%), 1173 with Credit (22.09%) and 2485 with Insurance (46.81%), it is clearly evident that most of the patients made payment with the Insurance mode (both male and female)

Table 1: Demographic analysis of the data

Payment mode	Female	Percentage	Male	Percentage	Grand Total	Percentage
Cash	860	16.20%	791	14.90%	1651	31.10%
Credit	623	11.73%	550	10.36%	1173	22.09%
Insurance	1324	24.94%	1161	21.87%	2485	46.81%
Grand Total	**2807**	52.87%	**2502**	47.13%	**5309**	**5309**

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Table 2 Gender-wise data of the patient and reason for visiting the hospital and Table 3 contains the data of patients with payment mode and the reason for visiting the hospital, which shows that Stabilization is the first reason, followed by Road accidents and Angio cases. It is evident that male has joined with more number of Angio cases, whereas more female joined with stabilization and road accident cases.

Gender	Angio Case	Cardiac Arrest	Cradle Bed	Fever	Neuro Problems	Observation	PCI Case	Pregnancy	Psychiatry Problems	Road Accident	Stabilization	Grand Total
Female	405	130	116	241	73	60	281	216	94	518	673	2807
Male	429	124	102	213	71	88	298	0	83	485	609	2502
Grand Total	**834**	**254**	**218**	**454**	**144**	**148**	**579**	**216**	**177**	**1003**	**1282**	**5309**

Table 2: Gender wise reason for visiting the hospital

Row Labels	Angio Case	Cardiac Arrest	Cradle Bed	Fever	Neuro Problems	Observation	PCI Case	Pregnancy	Psychiatry Problems	Road Accident	Stabilization	Grand Total
Cash	246	76	69	139	41	148	160	59	47	284	382	1651
Credit	202	66	51	101	25	0	129	54	40	218	287	1173
Insurance	386	112	98	214	78	0	290	103	90	501	613	2485
Grand Total	**834**	**254**	**218**	**454**	**144**	**148**	**579**	**216**	**177**	**1003**	**1282**	**5309**

Table 3: Payment mode and reason for visiting the hospital

Table 4 contains the data related to satisfaction level of the patients (payment mode wise) with respect to the doctor and it shows most of the patients are satisfied whose payment mode is credit (within)

Payment Mode	Neutral Satisfaction	Not Satisfied	Satisfied	Very Much Dissatisfied	Very Much Satisfied	Grand Total
Cash	451(8.50)	174(3.28)	535(10.08)	82(1.54)	409(7.70)	1651(31.10)
Credit	319(6.01)	90(1.70)	420(7.91)	48(0.90)	296(5.58)	1173(22.09)
Insurance	631(11.89)	224(4.22)	874(16.46)	149(2.81)	607(11.43)	2485(46.81)
Grand Total	**1401(26.39)**	**488(9.19)**	**1829(34.45)**	**279(5.26)**	**1312(24.71)**	**5309(100)**

Table 4: Payment mode wise – satisfaction level with respect to the doctor

Hypothesis has been tested at 0.05 and found that

Variable	DOF	p-value	χ^2 statistic	Table value at 0.05	Result
Payment wise-Satisfaction with respect to the doctor	8	**0.028***	17.15	15.51	**Reject the H_0**
Payment wise-Satisfaction with respect to the treatment	8	0.613	6.31	15.51	Fail to reject H_0
Payment wise-Satisfaction with respect to the billing	8	0.458	7.74	15.51	Fail to reject H_0
Payment wise-Satisfaction with respect to the IP admission process	8	0.458	7.74	15.51	Fail to reject H_0
Payment wise-Satisfaction with respect to services of Nursing Staff	8	0.745	5.11	15.51	Fail to reject H_0

Table 5: χ^2 analysis with respect to Payment mode and satisfaction level

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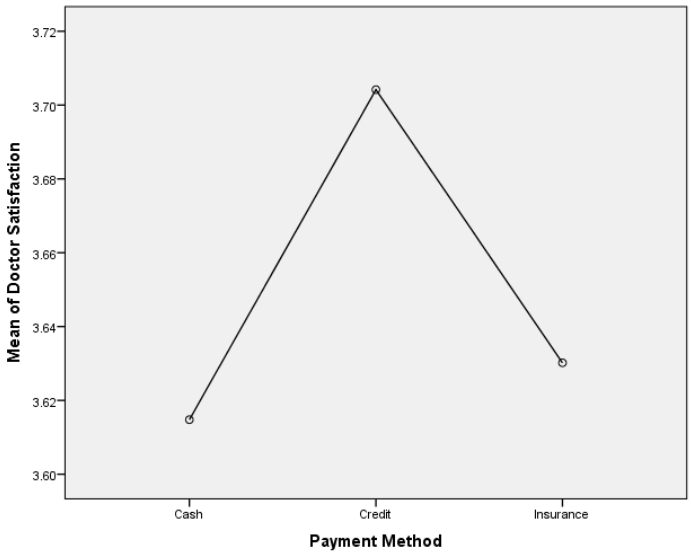

Table 5 shows the analysis of satisfaction of the customers with respect to the Payment mode and it is found that only in the case of satisfaction level with respect to the doctor is significantly different with value of 0.028, in rest of the cases such as Treatment, Billing, Inpatient admission process and Nursing staff, there is no significant difference in the satisfaction level of the patients. But the people who are paying through credit cards are more satisfied when compared to cash and insurance payments.

Descriptives

Doctor Satisfaction

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
						Lower Bound	Upper Bound			
	Cash	1651	3.61	1.114	.027	3.56	3.67	1	5	
	Credit	1173	3.70	1.055	.031	3.64	3.76	1	5	
	Insurance	2485	3.63	1.123	.023	3.59	3.67	1	5	
	Total	5309	3.64	1.106	.015	3.61	3.67	1	5	
Model	Fixed Effects			1.106	.015	3.61	3.67			
	Random Effects				.025	3.53	3.75			.001

Table 6: ANOVA Patients satisfaction (Payment modes) with respect to Doctors

ANOVA

Doctor Satisfaction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.105	2	3.052	2.496	**.028**
Within Groups	6488.485	5306	1.223		
Total	6494.590	5308			

Table 7: ANOVA Results

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Table 6 and Table 7 are related to ANOVA results related to satisfaction of patients who made payment in different modes with respect to the doctors. Table 8 contains the data related to satisfaction level of the gender-wise patients with respect to the nursing staff and it shows most of the male patients are satisfied when compared to female patients (within).

Gender	Neutral Satisfaction	Not Satisfied	Satisfied	Very Much Dissatisfied	Very Much Satisfied	Grand Total
Female	683(12.26)	303(5.71)	952(17.94)	118(2.22)	751(14.15)	2807(52.87)
Male	647(12.19)	215(4.05)	899(16.93)	124(2.34)	617(11.62)	2502(47.13)
Grand Total	**1330(25.05)**	**518(9.76)**	**1851(34.87)**	**242(4.56)**	**1368(25.77)**	**5309(100)**

Table 8: Gender wise – satisfaction level with respect to the Nursing staff

Variable	DOF	p-value	χ^2 statistic	Table value at 0.05	Result
Gender wise- Satisfaction with respect to the doctor	4	0.491	3.41	9.48	Fail to reject H_0
Gender wise- Satisfaction with respect to the doctor	4	0.101	7.75	9.48	Fail to reject H_0
Gender wise- Satisfaction with respect to the Nursing Staff	4	**0.010***	13.23	9.48	**Reject the H_0**
Gender wise- Satisfaction with respect to IP admission process	4	0.070	8.65	9.48	Fail to reject H_0
Gender wise- Satisfaction with respect to Billing Satisfaction	4	0.302	4.86	9.48	Fail to reject H_0

Table 9: χ^2 analysis with respect to Gender and satisfaction level

Table 9 shows the analysis of satisfaction of the customers with respect to the gender and it is found that only in the case of satisfaction level with respect to the Nursing staff is significantly different with value of 0.010* in rest of the cases such as Treatment, Billing, Inpatient admission process and Doctor, there is no significant difference in the satisfaction level of the patients. But the male patients are more satisfied with Nursing staff.

Conclusion

Research suggests digital payment systems offer real-time, itemized billing, reducing disputes and administrative workload. Healthcare providers have saved average time and improved trust when patients see clear cost breakdowns at point of billing. Supporting to the above statements, from the present analysis, the Null Hypothesis is rejected (with p-value 0.028). So the hospitals have to take more care to understand the problems faced by the cash payment patients and insurance payment people so that their satisfaction level also increase. Similarly, in the case of Gender, the Null Hypothesis is rejected (with p-value 0.010) while measuring the satisfaction level with respect to the Nursing staff. The hospitals have to take care of the requirements of female patients as their satisfaction level is less when compared to male patients' satisfaction.

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