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## Assessing Relationship between Patient Safety and Satisfaction in Teaching Hospitals using Online Survey during Covid-19 Pandemic



**Abstract:** - Background: The coronavirus disease (COVID-19) pandemic has accelerated the adoption of online data-collection methods in healthcare, including patient satisfaction and safety assessments. This study assessed the relationship between patient safety experiences and satisfaction following hospitalization in a teaching hospital during the pandemic. Methods: This cross-sectional study employed a convenience sample of inpatients from the general medical and surgical wards at two teaching hospitals. Participants completed a validated online questionnaire by scanning a Quick Response (QR) code that combined the Patient Safety Experience Questionnaire (6-item) and the Patient Satisfaction Questionnaire (PSQ-18) at discharge. One-way ANOVA was used to examine the relationship between the patient safety experience domains and satisfaction scores. Results: In total, 240 patients completed an online questionnaire. Most respondents were male, aged >65 years, and had secondary education. "Communication" and "Responsiveness" were the safety domains with the highest perceived "safe" experience, while "delay" had the highest "unsafe" perception. Regarding satisfaction, "interpersonal manner" scored highest, while "time spent with the doctor" scored lowest. Significant relationships were found between specific patient safety domains (delays, communication, falls, and medication) and various satisfaction domains except for financial aspect satisfaction domain. Conclusions: This study highlights the feasibility of using online questionnaires to assess patient safety experiences and satisfaction during a pandemic. These findings also underscore the significant link between patient safety experiences and satisfaction levels, emphasizing the need for targeted safety initiatives. Further research should explore the long-term implications of online data collection on patient engagement and healthcare quality.

**Keywords:** Patient safety, Patient satisfaction, Online questionnaire, Teaching hospital.

### I. INTRODUCTION

The COVID-19 pandemic has significantly affected healthcare systems worldwide, posing unique challenges for patient care and data collection. [1] It is common knowledge that patient safety and satisfaction are crucial indicators of health care quality. Assessing these factors can provide valuable insights for improving patient-centered care. Examining the relationship between patient safety and satisfaction is crucial for improving healthcare quality and patient-centered care. Previous studies have found that positive safety culture is associated with better patient outcomes. However, the effect of the Covid-19 pandemic on these factors remains largely unknown. Undeniably, the pandemic has disrupted traditional methods of in-person data collection, necessitating the adoption of remote assessment tools such as online questionnaires. Existing research has explored the effects of the Covid-19 pandemic on various aspects of healthcare, including the implementation of online assessments and data collection methods in various research fields. [4] These studies have highlighted the logistical and technological challenges faced by institutions in transitioning to remote assessment practices as well as their impact on perceptions and outcomes. Similarly, the pandemic has prompted healthcare organizations to adapt their practices, including the use of virtual consultations and remote data collection. [1]

Prior research has also explored patient safety culture [2] and the factors associated with patient satisfaction in healthcare settings. [3] These studies have highlighted the importance of a positive safety culture, effective communication, and responsive care in enhancing patient experience. However, the impact of the Covid-19 pandemic on these relationships remains underexplored, especially when using online data-collection tools. Our study addressed this gap by investigating the association between patient safety experiences and satisfaction levels during hospitalization in a teaching hospital using online data collection methods during the pandemic.

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## II. METHODOLOGY

A cross-sectional study was conducted at two major teaching hospitals in Malaysia during Covid-19 pandemic period. The first teaching hospital was Hospital Canselor Tuanku Mukhriz (HCTM) with 850-beds while the second was Hospital Al-Sultan Abdullah (HASA) with 400-beds. Both hospitals were located in the Klang Valley, Malaysia.

The study participants were adult patients admitted to the general medical and surgical wards of both hospitals, with a minimum hospital stay of two nights, able to understand Malay and English language, and able to complete the online questionnaire via mobile phone or other electronic devices. Convenience sampling was used to select the participants from the study site.

The study instrument was an online questionnaire printed as a Quick Response (QR) code. The first page that will appear to the patients will be the informed consent form. Patients could only proceed to the questionnaire page if they consented to participate. The online questionnaire was divided into 3 parts. Part 1 included demographic data, and Part 2 assessed the patient safety experience adopted from the validated Patient Safety Experience Questionnaire by Scott et al. [5], comprising six items that covered the domains of communication, responsiveness, delays, falls, medication, and hygiene. Part 3 assessed patient satisfaction using the validated bilingual version (Malay/English) Patient Satisfaction Questionnaire (PSQ-18) [6], which calculates scores for seven domains or subscales of satisfaction: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and access convenience.

The online questionnaires were distributed by the selected research team members to the patients by requesting them to scan the printed Quick Response (QR) code prepared by the research team using their personal smartphones or electronic devices. These methods reduce the interactions between assigned research team members and intended participants to ensure prompt implementation of the Standard Operating Procedure (SOP) to control the spread of Covid-19. The utilization of an online format for data collection was also a strategic decision in the context of the pandemic, as it enabled the efficient and contactless gathering of information from patients while adhering to the necessary safety protocols and restrictions imposed by the public health crisis.

Data analysis was conducted to determine the relationship between demographics, patient safety experiences, and patient satisfaction. Statistical analyses were performed using the IBM SPSS Statistics version 27. Descriptive statistics were used to summarize demographic data in the form of frequencies and proportions for categorical data and means and standard deviations for continuous data. A one-way ANOVA test was used to assess any significant relationships between demographic characteristics and patient safety experiences as categorical independent variables, with patient satisfaction as the continuous outcome domain, with a p-value of less than 0.05, taken as the level of significance.

## III. RESULT

A total of 240 patients participated in this study. The majority were male (51%), age group—45-64 years old (35%) and had a secondary level of education. Table 1. summarized the demographic characteristics of the participants.

**Table 1:** Demographic characteristics

Variable	HASA (n=64)		HCTM (n=176)		Total (N=240)	
	n	%	n	%	n	%
Age Group						
18 to 25 years old	3	4.7	9	5.1	12	5
26 to 35 years old	7	10.9	10	5.7	17	7.1
36 to 45 years old	8	12.5	28	15.9	36	15
46 to 55 years old	6	9.4	38	21.6	44	18.3
56 to 65 years old	18	28.1	44	25	62	25.8
66 years old and above	22	34.4	47	26.7	69	28.7
Gender						
Male	26	40.6	96	54.5	122	50.8
Female	38	59.4	80	45.5	118	49.2

Variable	HASA (n=64)		HCTM (n=176)		Total (N=240)	
	n	%	n	%	n	%
Marital Status						
Married	55	85.9	140	79.5	195	81.3
Divorced or widowed	6	9.4	23	13.1	29	12.1
Single	3	4.7	13	7.4	16	6.7
Ethnicity						
Malay	56	87.5	103	58.5	159	66.3
Chinese	2	3.1	46	26.1	48	20
Indian	6	9.4	26	14.8	32	13.3
Others	0	0	1	0.6	1	0.4
Education Level						
Primary	12	18.8	28	15.9	40	16.7
Secondary	27	42.2	87	49.4	114	47.5
Tertiary	25	39.1	61	34.7	86	35.8

The highest safe perception was observed in two domains: communication (98.8%) and responsiveness (98.8%). The highest unsafe perception was observed in the delay domain. Additionally, a high safe perception was found in the medication domain (98.3%). The proportions for each domain are listed in Table 2.

**Table 2:** Proportion of Safety Perception in the 6 domains

Domain		PSE Perception		
		Unsafe	Neutral	Safe
Communication	n	1	2	237
	%	0.4	0.8	98.8
Responsiveness	n	0	3	237
	%	0	1.3	98.8
Delay	n	22	40	178
	%	9.2	16.7	74.2
Fall	n	0	13	227
	%	0	5.4	94.6
Medication	n	0	4	236
	%	0	1.7	98.3
Hygiene	n	3	11	226
	%	1.3	4.6	94.2

Regarding patient satisfaction, the highest mean score was observed in the interpersonal manner domain (mean =4.5, SD=0.5), with the lowest score in the time spent with the doctor domain (mean =3.7, SD=0.4), as shown in Table 3.

**Table 3:** Score distribution in 7 domains of Patient Satisfaction (N=240)

PSQ-18 Domain	Score				
	Min	Max	Mean	SD	95%CI
General Satisfaction	2	5	4.2	0.5	4.1,4.3
Technical quality	3.3	5	4.3	0.5	4.2,4.4
Interpersonal manner	3	5	4.5	0.5	4.4,4.5
Communication	3.5	5	4.4	0.4	4.4,4.5
Financial aspects	2.5	5	4.1	0.6	4.1,4.2

Time spends with the doctor	2.5	5	3.7	0.4	3.7,3.9
Access convenience	2	5	4.1	0.4	4.0,4.1

With regards to demographic characteristics, gender was found to have significant relationship with the interpersonal manner domain  $F(1,238)= 6.0, p=0.02, \eta^2 =0.08$ , age group with domain of time spent with doctor  $F(5,234)3.1, p=0.01, \eta^2 =0.1$ , marital status with general satisfaction  $F(2,237)= 5.5, p=0.01, \eta^2 =0.1$  and communication domain  $F(2,237)= 5.4, p=0.01, \eta^2 =0.08$ , and education level with 3 domains of patient satisfaction which were general satisfaction  $F(2,237)= 5.4, p=0.01, \eta^2 =0.1$ , interpersonal manner  $F(2,237)=3.7, p=0.03, \eta^2 =0.08$  and financial aspects  $F(2,237)= 5.4, p=0.01, \eta^2 =0.1$ .

Table 4 summarizes the significant relationships between patient safety experience perception and patient satisfaction domain scores. All patients' experience domains were significantly associated with access and convenience satisfaction. However, no significant association was found between patient safety experience and financial satisfaction. A moderate effect size was observed in the responsiveness experience domain, accounting for 20% of the variance in access and convenience satisfaction.

**Table 4:** Relationship between patient safety experience perception and patient satisfaction domain scores.

PSQ-18 Domain (Dependent variable)	Significant PSE domain	One-way ANOVA			
		F(df)	df	P-value	Eta squared ( $\eta^2$ )
General Satisfaction	Communication	14.9		<0.05	0.02
	Responsiveness	12.6		<0.05	0.1
	Fall	6.7		0.01	0.08
	Medication	15.5		<0.05	0.1
	Hygiene	4.2		0.01	0.1
Technical quality	Communication	3.2		0.04	0.1
	Responsiveness	6.2		0.01	0.08
	Fall	8.2		<0.05	0.08
Interpersonal manner	Communication	5.9		<0.05	0.05
	Fall	7.2	(2,23	<0.05	0.08
	Medication	6.2	7)	0.01	0.08
Communication	Fall	9.4		<0.05	0.1
Financial aspects	None	0		0	0
Time spends with the doctor	Medication	4.1		0.04	0.06
	Hygiene	3.4		0.04	0.08
Access & convenience	Communication	14.6		<0.05	0.1
	Responsiveness	23.1		<0.05	0.2
	Delay	33.8		<0.05	0.05
	Fall	7.7		<0.05	0.1
	Medication	12.8		<0.05	0.1
	Hygiene	4.0		0.02	0.08

#### IV. DISCUSSION

The study revealed that the demographic characteristics of the patients were significantly associated with specific domains of patient satisfaction in terms of gender, age group, marital status, and education level. Regarding the patient safety experience, it was revealed that a minority of patients perceived their experience as unsafe in relation to delays in care during their hospital stay. These findings support those of previous studies that have found similar effects in other countries. [7]-[8]

Meanwhile, the assessment of patient satisfaction showed high levels of overall satisfaction, with the highest mean score in the domain of interpersonal manner satisfaction. Significant relationships were observed between patient safety experiences and various satisfaction subscales, suggesting that an enhanced safety experience contributes to

greater patient satisfaction. [4] The findings also indicated a significant relationship between patient safety experiences and patient satisfaction, highlighting the importance of fostering a culture of safety in healthcare settings. This is aligned with previous studies that highlighted the fact that patient safety experience and patient satisfaction were closely intertwined, with improvements in safety often leading to enhanced satisfaction.[9]-[10] The communication and responsiveness domains were perceived as safe experiences by most patients in this study, which is consistent with the findings of recent studies. These findings underscore the importance of effective communication and timely responsiveness to foster positive patient experiences and perceptions of safety. Recent research has consistently shown that clear open communication between healthcare providers and patients as well as prompt responses to patient needs are critical factors in enhancing patient safety experience and satisfaction. [11]-[12] The high safe perception in these domains suggests that the teaching hospitals in this study successfully implemented strategies to maintain effective communication and responsiveness, even amidst the challenges posed by the Covid-19 pandemic. This achievement is particularly noteworthy given the potential barriers to communication introduced by personal protective equipment and social distancing measures. The alignment with other recent studies indicates a broader trend in healthcare towards prioritizing these aspects of patient care, recognizing their fundamental role in ensuring patient safety and overall satisfaction with healthcare services. The finding that satisfaction with financial aspects also echoed previous study findings that showed no significant association can be found between safety experience and financial satisfaction. [6] However, one study found that a good billing score experience could increase the hospital services' good rating. [3] Therefore, further studies are needed to explore this.

The utilization of online questionnaires for data collection during the pandemic has proven to be a feasible and effective approach. All patients who consented to participate in the study were able to access and complete the survey through their personal electronic devices, with no technical issues reported to the research team. The decision to strategically use the online format of data collection demonstrated the significant impact of the Covid-19 pandemic health research practices. Nonetheless, the online questionnaire format proved to be an effective and efficient method for assessing patient perceptions of safety and satisfaction during hospitalization at a teaching hospital. In the past, the effective use of online questionnaires has focused on nurses' perceptions. [13]-[14] Thus, the present study had contributed to the knowledge that it was an acceptable method to collect data among the patients as well. The use of online questionnaires to assess patient safety and satisfaction during hospitalization also offers a viable and effective solution in the context of the pandemic, when in-person data collection methods may not be feasible or desirable. While the online questionnaire format enabled efficient and contactless data collection during the pandemic, it also raised questions about potential disparities in access and digital literacy among the patient populations. [1], [15], [4] The results of this study also contribute significantly to support the potential of online questionnaires to investigate the relationship between patient safety experience and patient satisfaction during the pandemic. Nevertheless, the results should be interpreted with caution because of the limitations of convenience sampling. Convenience sampling, which is both practical and cost-effective, may not provide a representative sample of the patient population. In this study, participants were selected based on their availability and willingness to complete the online questionnaire, which could have led to overrepresentation of certain patient groups and underrepresentation of others. For instance, patients who are more comfortable with technology or have better access to electronic devices may have been more likely to participate, potentially skewing their results. Additionally, this sampling method may have excluded patients who were too ill to participate, or those with limited digital literacy, leading to a possible overestimation of positive experiences and satisfaction levels. The non-random nature of convenience sampling also limits the generalizability of the findings to a broader patient population as the sample may not accurately reflect the diverse characteristics and experiences of all patients in the teaching hospitals studied.

## V. CONCLUSION

This study demonstrated that online questionnaires could yield results comparable to those of traditional methods when examining the relationship between patient safety experiences and satisfaction. These findings align with recent literature, particularly in highlighting the positive safety perceptions of communication and responsiveness in healthcare settings. However, the identified delays in care emerge as a critical area of concern perceived by patients as an unsafe experience. This issue warrants immediate attention from policymakers and health care administrators. Future policies should focus on streamlining processes, optimizing resource allocation, and implementing innovative solutions to minimize delays in patient care. By addressing these concerns, healthcare

systems can enhance both patient safety experiences and satisfaction, ultimately improving the overall quality of care. Further research using diverse methodologies could provide additional insights into effective strategies for reducing delays and enhancing patient experiences across various healthcare contexts.

#### VI. ACKNOWLEDGEMENT

This study was funded by the Ministry of Higher Education (MOHE) Fundamental Research Grant Scheme (RACER/1/2019/SKK03/UITM//1).

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