Optimizing Queue Management in Healthcare Settings: Enhancing Patient Satisfaction through Strategic Approaches

Abstract

This study aims to investigate the interplay between queue management aspects (service quality, waiting time, waiting environment, queue discipline), and patient satisfaction within the healthcare context, while also assessing the impact of these factors on patient satisfaction levels. Employing a deductive approach, hypotheses were formulated and tested based on empirical data collected through a survey conducted in five hospitals across the Ampara district of Sri Lanka. A quantitative research design was adopted, utilizing a self-administered questionnaire distributed among 392 patients. Statistical analyses, including Pearson correlation and regression analysis, were conducted using SPSS 22nd version. The findings reveal significant correlations between queue management aspects and patient satisfaction, with service quality, waiting time, waiting environment, and queue discipline playing crucial roles. These insights contribute to a comprehensive understanding of factors influencing patient satisfaction in healthcare settings, informing targeted interventions for improving service delivery and patient experiences.

Keywords: Queue Management, Service Quality, Waiting Time, Waiting Environment, Queue Discipline, Patient Satisfaction

1. Introduction

Queuing is a ubiquitous phenomenon encountered in various aspects of daily life, from waiting in line at the grocery store to navigating traffic congestion during rush hour. It is an essential aspect of service delivery in numerous industries, where the efficient management of queues can profoundly impact customer satisfaction and overall. In this context, queuing theory and practices have been extensively studied and applied to optimize processes and minimize wait times in diverse settings experience (Kalwar, Marri, Khan,& Khaskheli, 2021).

One domain where queuing plays a critical role is healthcare, where patients often experience waiting times at different stages of their care journey. In hospitals and clinics, queues form at registration desks, waiting rooms, triage areas, and during consultations with healthcare providers (Enyi, 2020). The management of these queues is not only crucial for operational efficiency but also for ensuring timely access to care and enhancing patient satisfaction (Yaduvanshi, Sharma, & More, 2019).

Unlike queues in commercial settings, where customers may tolerate short delays, patient queuing in healthcare settings carries higher stakes. Patients seeking medical attention are often experiencing discomfort, anxiety, or pain, making their perception of time and service

quality particularly sensitive (Mokgoko, 2013). Therefore, optimizing queuing systems in healthcare requires a patient-centric approach that prioritizes not only efficiency but also empathy and understanding of patients' unique needs and circumstances (Prakitsuwan, &Promsit, 2022).

Patient satisfaction is a key performance indicator for healthcare providers, reflecting the quality of care and overall patient experience (Bleich, Özaltin, & Murray, 2009). Research has consistently shown a strong correlation between waiting times and patient satisfaction levels. Prolonged waits can lead to dissatisfaction, frustration, and negative perceptions of care quality, even if the actual medical treatment is satisfactory (Soremekun, Takayesu, & Bohan, 2011). Moreover, dissatisfied patients are more likely to express their discontent through complaints, negative reviews, or by seeking care elsewhere, impacting the reputation and financial performance of healthcare institutions (Muhondwa, Leshabari, Mwangu, Mbembati, & Ezekiel, 2008).

Therefore, queuing in healthcare settings is a complex yet critical aspect of service delivery, with profound implications for patient satisfaction and overall healthcare outcomes. By understanding the dynamics of patient queuing and implementing strategies to minimize wait times and optimize the queuing experience, healthcare providers can enhance patient satisfaction, improve care quality, and ultimately achieve better health outcomes for their patients.

While queuing theory and its applications have received considerable attention globally, there exists a notable empirical research gap in understanding queuing management and its impact on patient satisfaction, particularly in the context of Sri Lanka. Prior studies have primarily focused on theoretical models or limited empirical investigations in other geographical contexts. Thus, there is a significant need for empirical research to fill this gap and provide evidence-based insights into queuing management practices and their implications for patient satisfaction.

Furthermore, the lack of studies specifically addressing queuing management in the Sri Lankan healthcare context highlights a population-based research gap. Sri Lanka's unique sociocultural, economic, and infrastructural characteristics, coupled with its distinct healthcare system, necessitate a tailored examination of queuing dynamics and their effects on patient satisfaction. Understanding these factors is essential for developing contextually relevant strategies to improve queuing experiences and enhance healthcare delivery in Sri Lanka.

To address these research gaps, this study seeks to conduct a comprehensive investigation into queuing management and patient satisfaction in Sri Lankan healthcare settings. By employing empirical research methods, this study aims to:

- Identify the relationship between Queue Management (Service Quality, Waiting Time, Waiting Environment and Queue Discipline) and Patient Satisfaction

- Examine the impact of Queue Management (Service Quality, Waiting Time, Waiting Environment and Queue Discipline) on Patient Satisfaction

By undertaking this research, this research aims to contribute to the existing body of knowledge on queuing theory and its application in healthcare while addressing the specific needs and challenges of the Sri Lankan context. The findings of this study will not only fill research gaps but also inform policy and practice to improve queuing management and enhance patient satisfaction in Sri Lankan healthcare settings.

2. Literature Review

2.1 Queue Management

Queue management is a fundamental aspect of service delivery across various industries, aimed at optimizing consumer flow and enhancing the queuing experience (Burodo, Suleiman, & Yusuf, 2021). It encompasses a set of guidelines designed to address the often disruptive nature of waiting, which is universally recognized as a significant challenge in service industries. Employing queue theory, organizations have developed strategies to make the waiting experience more pleasant and enjoyable for customers, underscoring its vital role in business profitability and sustainability (Berry, Seiders, & Grewal, 2002).

Chase et al. (2001) outline key factors in queue system management, including the number and length of lines, as well as queue discipline. These factors play a crucial role in determining service efficiency and customer satisfaction. Queue management has been identified as a persistent challenge across various sectors, necessitating continuous improvement efforts (Gosha, 2007). Technological advancements have facilitated the collection of queue statistics, enabling organizations to anticipate trends and address potential issues proactively.

In this study, queue management practices will be examined in the context of service quality, waiting time, waiting environment conditions, and queue discipline, with a focus on their impact on patient satisfaction. By investigating these variables, this research aims to contribute to a deeper understanding of effective queue management strategies and their implications for enhancing customer satisfaction in service environments.

2.1.1 Service Quality

Service quality in queue management encompasses multiple dimensions, including staff responsiveness, reliability of service delivery, and patient-centered care (Parasuraman, Zeithaml, & Berry, 1991). These dimensions are fundamental in ensuring seamless and satisfactory patient experiences during the queueing process. For instance, attentive staff members who communicate effectively with patients can mitigate frustrations associated with waiting times and contribute to overall satisfaction (Chase et al., 2001).

Extensive research highlights a strong association between service quality and patient satisfaction in queue management contexts (Anderson et al., 2007). Patients perceive service quality as a critical factor influencing their satisfaction levels while waiting for services (Burodo et al., 2021). Positive interactions with healthcare staff, clear information dissemination, and efficient queue management procedures contribute significantly to heightened levels of patient satisfaction (Parasuraman et al., 1991).

Furthermore, studies have shown that improvements in service quality lead to higher patient loyalty and positive word-of-mouth, further emphasizing its importance in queue management (Kang & James, 2004). Patient satisfaction with queue management processes has been linked to overall perceptions of healthcare quality and organizational reputation, highlighting the broader implications of service quality in healthcare settings (Dawkins & Reichheld, 1990). Effective queue management practices, characterized by service quality enhancements, can positively impact patient perceptions of wait times and reduce perceived wait durations, thereby enhancing overall satisfaction (Parasuraman et al., 1991). These findings underscore the critical role of service quality in shaping patient experiences during the queuing process and highlight the significance of implementing effective queue management strategies within healthcare settings.

Based on the literature reviewed, the following hypothesis is formulated:

H1: There is a relationship between service quality and patient satisfaction within healthcare settings.

2.1.2 Waiting Time

Waiting time in queue management is a critical factor that significantly impacts patient satisfaction and overall service experience. Brahma (2013) highlighted the importance of managing both actual waiting time and patient perceptions of the queuing experience, as patient satisfaction tends to decrease as waiting time increases. This inverse relationship between waiting time and satisfaction has been consistently observed in various studies (Yusuf et al., 2015). Hospitals recognize waiting time as a key predictor of patient satisfaction and invest efforts to minimize it (Davis & Heineke, 1998).

Research has examined different aspects of waiting time and their effects on patient satisfaction using various measurement methods (Barlow, 2002; Bielen & Demoulin, 2007; Smidts& Pruyn, 1998). Regardless of the approach, studies unanimously emphasize the significant relationship between waiting time and patient satisfaction. This relationship holds particular importance in outpatient settings, where efficiency and reduced waiting times contribute to improved satisfaction (Chung et al., 1999).

Empirical evidence consistently demonstrates that longer waiting times correlate with decreased patient satisfaction (Anderson, Camacho, &Balkrishnan, 2007). Studies conducted in Saudi Arabia and at King Abdulaziz University further support this notion, with patients

expressing dissatisfaction when subjected to extended waiting periods (Alnemer et al., 2015; Alahmari, Aljasser, & Sasidhar, 2015).

Burodo et al. (2021) suggested a negative relationship between waiting time and patient satisfaction, reinforcing previous findings. Waiting time emerges as a significant determinant of patient satisfaction, underscoring the need for effective queue management strategies to minimize wait times and enhance overall service quality.

Based on the literature reviewed, the following hypothesis is formulated:

H2: There is a relationship between waiting time and patient satisfaction within healthcare settings.

2.1.3 Waiting Environment

The waiting environment in queue management plays a crucial role in shaping patient satisfaction and overall service experience. Polar et al. (2018) highlighted the importance of a well-designed waiting environment, including factors such as architecture, layout, lighting, and amenities like reading materials and TV screens, in creating a positive atmosphere for customers. Studies have shown that a comfortable and pleasant waiting environment directly contributes to patient satisfaction (Polar et al., 2018).

Bielen and Demoulin (2007) emphasized the positive relationship between the waiting environment and patient satisfaction, suggesting that service managers should prioritize creating comfortable environments to influence customers' perceptions of time. Baker and Cameron (1996) further supported this notion, emphasizing the need for service providers to enhance the waiting environment to positively impact customer perceptions of waiting time.

Consistent with previous research, Burodo et al. (2021) suggested a positive relationship between the waiting environment and patient satisfaction. Their findings underscored the significant association between the quality of the waiting environment and patients' overall satisfaction with the service experience.

Based on the literature reviewed, the following hypothesis is formulated:

H3: There is a relationship between the waiting environment and patient satisfaction within healthcare settings.

2.1.4 Queue Discipline

Queue discipline, as a fundamental aspect of queue management, governs the order in which customers are served in a queue, thereby influencing overall service efficiency and customer satisfaction. Atkinson (2000) emphasized that the queue discipline adopted by an

organization can significantly impact its performance metrics, such as the number of customers in the queueing system, average waiting time, and service facility efficacy.

The choice of queue discipline, whether it be first-in-first-out (FIFO) or prioritization based on customer classes, has implications for patient satisfaction and overall service quality in healthcare settings (Oliver, 2014). Siddharthan et al. (1996) found that implementing priority disciplines can lead to reductions in average waiting times, particularly for higher-priority patients, albeit at the expense of increased waiting times for lower-priority patients.

Moreover, queue discipline encompasses various phenomena such as balking, reneging, and jockeying, which reflect customer behaviors in response to queue length and perceived service efficiency (Maister, 2005). Maintaining fairness and adhering to the principle of first-come-first-served (FCFS) is essential for ensuring customer satisfaction during the waiting process (Larson, 1987).

Consistent with previous research, Burodo et al. (2021) suggested a positive relationship between queue discipline and patient satisfaction. Their findings underscored the significant association between the effectiveness of queue discipline and patients' overall satisfaction with the service experience.

Based on the literature reviewed, the following hypothesis is formulated:

H4: There is a relationship between queue discipline and patient satisfaction within healthcare settings.

2.2 Patient Satisfaction

Patient satisfaction, a critical component of healthcare quality assessment, is influenced by various factors, including the overall healthcare experience, service quality, waiting time, waiting environment, and queue discipline. Brennan (1995) defines patient satisfaction as the degree to which an individual's actual healthcare experience aligns with their expectations, impacting retention, clinical outcomes, and medical malpractice cases.

In the healthcare sector, the disconfirmation theory suggests that satisfaction results from the comparison between actual experiences and expectations (Zeithaml & Bitner, 2000). Consequently, satisfaction is influenced by factors such as patient expectations, personal views, and the perceived quality of care received (Linder-Pelz, 1982). Understanding patient satisfaction is crucial for evaluating care quality, including aspects like waiting time and the waiting environment (Grogan et al., 2000).

Interpersonal relationships between patients and healthcare providers are identified as key determinants of patient satisfaction (Crowe et al., 2002). Studies emphasize the importance of patient-doctor relationships and the degree of compatibility in influencing satisfaction levels (Alhashem et al., 2011).

Moreover, patient satisfaction encompasses both cognitive and emotional dimensions, reflecting subjective perceptions of care quality (Urden, 2002). Esch et al. (2008) define

patient satisfaction as the assessment of whether care services meet patients' expectations in terms of technical competence and interpersonal interactions.

Given the multifaceted nature of patient satisfaction, it serves as a critical indicator of healthcare service quality and influences patient decisions regarding future care-seeking behavior. Thus, hospitals' consistent provision of satisfactory experiences plays a vital role in maintaining patient satisfaction levels.

In the context of queue management, patient satisfaction serves as the ultimate measure of the effectiveness of queue management practices. Understanding the factors influencing patient satisfaction, including service quality, waiting time, waiting environment, and queue discipline, is essential for developing strategies to enhance overall patient experiences in healthcare settings.

3. Conceptual Model

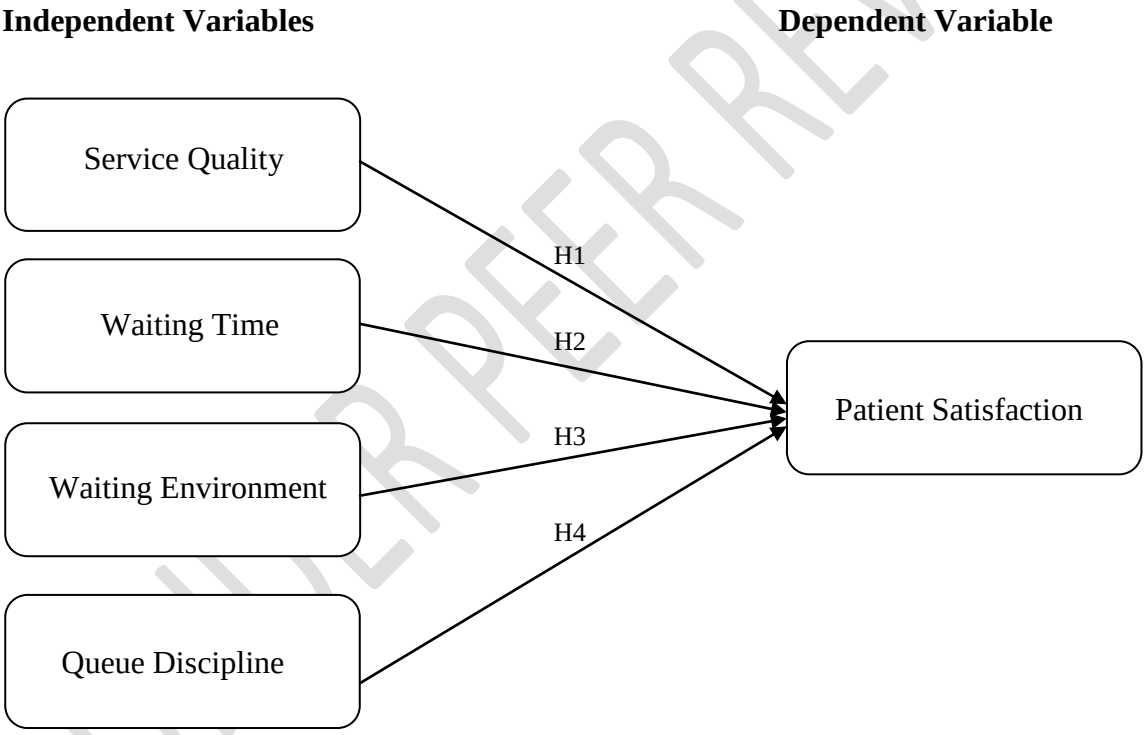

Figure 1: Conceptual Framework

(Source: Burodo et al.,2021; Grace wambui kamay,2012)

4. Methodology

The primary objective of this study is to explore the interrelationships among service quality, waiting time, waiting environment, queue discipline, and patient satisfaction, while also investigating the impact of these factors on patient satisfaction. To achieve these objectives, a

deductive approach was employed, involving the formulation and testing of hypotheses based on collected data, and establishing causal relationships between the variables. Empirical data were gathered through a survey method targeting patients attending five hospitals in the Ampara district of Sri Lanka. A quantitative research design was adopted, with a self-administered questionnaire serving as the primary data collection tool, treating each patient as the unit of analysis. The survey questionnaires were distributed to a convenience sample of 392 patients. Pearson correlation and regression analyses were conducted using the Statistical Package for the Social Sciences (SPSS) 22nd version to analyze the collected data, with a 5-point Likert scale questionnaire utilized for data collection.

5. Results and Discussions

5.1 Demographic Profile of the Respondents

Table 1: Demographic Profile of the Respondents

Demographic Factor	Categorization	Number of Respondents	Percentage
Name of the Hospital	Hospital 1	83	21.1%
	Hospital 2	79	20.2%
	Hospital 3	76	19.4%
	Hospital 4	79	20.2%
	Hospital 5	75	19.1%
Total		**392**	**100%**
Gender	Male	204	52.1%
	Female	188	47.9%
Total		**392**	**100%**
Age	Below 30 years	105	26.8%
	31-40 years	82	20.9%
	41-50 years	116	29.6%
	Above 50 years	89	22.7%
Total		**392**	**100%**
Educational Qualification	Below Ordinary Level	105	26.8%
	Ordinary Level	128	32.7%
	Advanced Level	104	26.5%

	Above Advanced Level	55	14%
Total		**392**	**100%**
Marital Status	Single	148	37.8%
	Married	244	62.2%
Total		**392**	**100%**

(Source: Survey Data)

According to Table 1, the demographic analysis of the respondents reveals pertinent insights into various factors shaping the study population. Hospital distribution showcases an equitable representation across facilities, with Hospital 1 accounting for 21.1%, Hospital 2 accounting for 20.2% Hospital 3 accounting for 23.4%, Hospital 4 accounting for 20.2%, and Hospital 5 comprising 19.1% of the total 392 respondents. Gender distribution indicates a slight male majority, with 52.1% male respondents and 47.9% female respondents. Age distribution demonstrates diversity, with 26.8% below 30 years, 20.9% between 31-40 years, 29.6% between 41-50 years, and 22.7% above 50 years. Educational qualification highlights varied levels of attainment, with 26.8% below Ordinary Level, 32.7% Ordinary Level, 26.5% Advanced Level, and 14% Above Advanced Level. Marital status indicates a majority of married respondents (62.2%) compared to single respondents (37.8%).

5.2 Correlation Analysis

To address the primary objective, the researcher utilized Pearson correlation analysis. This statistical method quantifies the strength of the linear association between two variables. The Pearson correlation coefficient, ranging from -1 to 1, indicates the degree of linear relationship between variables. A value of -1 suggests a perfect negative linear correlation, 0 denotes no correlation, and +1 indicates a perfect positive correlation.

Table 2: Correlation Analysis

Relationships	Pearson Correlation Values	Significance Value	Decision Attributes
Service Quality and Patient Satisfaction	0.674	0.000	Strong Positive
Waiting Time and Patient Satisfaction	- 0.576	0.000	Strong Negative
Waiting Environment and Patient Satisfaction	0.534	0.000	Strong Positive
Queue Discipline and Patient Satisfaction	0.586	0.000	Strong Positive

Source: Survey Data

Table 2 presents compelling evidence regarding the relationships between various factors and patient satisfaction levels.

Firstly, the correlation (r) between service quality and patient satisfaction stands at 0.674, which is statistically significant at the 0.01 level (2-tailed). This robust correlation suggests a strong positive relationship between service quality and patient satisfaction. This finding resonates with previous research by Burodo et al. (2021) and Chen, Chen, & Lee (2013), affirming that service quality positively impacts patient satisfaction.

Secondly, the correlation (r) between waiting time and patient satisfaction is -0.576, also significant at the 0.01 level (2-tailed). This indicates a strong negative relationship between waiting time and patient satisfaction. Consistent with prior studies by Burodo et al. (2021), Anderson, Camacho, &Balkrishnan (2007), and Alahmari, Aljasser, & Sasidhar (2015), it is evident that prolonged waiting times adversely affect patient satisfaction levels.

Thirdly, the correlation (r) between waiting environment and patient satisfaction is 0.534, significant at the 0.01 level (2-tailed). This suggests a robust positive relationship between the waiting environment and patient satisfaction. Aligning with the findings of Burodo et al. (2021) and Bielen and Demoulin (2007), it indicates that an improved waiting environment correlates with higher levels of patient satisfaction.

Finally, the correlation (r) between queue discipline and patient satisfaction is 0.586, significant at the 0.01 level (2-tailed). This signifies a strong positive relationship between queue discipline and patient satisfaction. Consistent with prior research, this suggests that efficient queue management positively influences patient satisfaction, as highlighted by Burodo et al. (2021).

5.3 Simple Regression Analysis

To achieve the second objective, the researcher employed Simple Linear Regression analysis, a statistical technique designed to investigate the effects of an independent variable on a dependent variable.

Table 3: Simple Regression Analysis

Dependent Variable	Independent Variable	R^2	B	Sig.
Patient Satisfaction	Service Quality	0.360	0.743	0.000
Patient Satisfaction	Waiting Time	0.336	- 0.608	0.000
Patient Satisfaction	Waiting Environment	0.347	0.420	0.000
Patient Satisfaction	Queue Discipline	0.328	0.556	0.000

Source: Survey Data

Table 3 presents the results of the simple regression analysis, highlighting the impacts of various factors on patient satisfaction.

Service quality emerges as a significant predictor of patient satisfaction ($R^2 = 0.360$, $p < 0.05$, $B = 0.743$). This indicates that 36% of the variance in patient satisfaction can be attributed to service quality. Notably, a one-unit increase in service quality corresponds to a 0.743 unit increase in patient satisfaction. These findings underscore the critical role of service quality in shaping patient experiences and perceptions.

Conversely, waiting time exhibits a negative relationship with patient satisfaction ($R^2 = 0.336$, $p < 0.05$, $B = -0.608$). Approximately 33.6% of the variance in patient satisfaction is explained by waiting time. A one-unit increase in waiting time is associated with a 0.608 unit decrease in patient satisfaction. This emphasizes the detrimental impact of prolonged waiting times on patient satisfaction levels.

Additionally, the waiting environment significantly influences patient satisfaction ($R^2 = 0.347$, $p < 0.05$, $B = 0.420$). Around 34.7% of the variance in patient satisfaction is attributable to the quality of the waiting environment. An increase of one unit in the waiting environment corresponds to a 0.420 unit increase in patient satisfaction. These findings highlight the importance of creating a conducive and comfortable waiting environment to enhance patient satisfaction.

Moreover, queue discipline positively contributes to patient satisfaction ($R^2 = 0.328$, $p < 0.05$, $B = 0.556$). Approximately 32.8% of the variance in patient satisfaction is explained by

queue discipline. A one-unit increase in queue discipline leads to a 0.556-unit increase in patient satisfaction. This underscores the significance of efficient queue management practices in fostering positive patient experiences.

6. Conclusion

In conclusion, the findings from the analysis underscore the critical importance of various factors in shaping patient satisfaction within healthcare settings. Service quality emerges as a significant determinant, with higher levels associated with increased patient satisfaction. Conversely, prolonged waiting times have a detrimental effect on patient satisfaction levels, emphasizing the need for efficient management strategies. Moreover, the quality of the waiting environment and adherence to queue discipline also significantly influence patient satisfaction, highlighting the holistic approach required to optimize patient experiences.

These insights provide valuable guidance for healthcare providers seeking to enhance patient satisfaction and overall quality of care. By prioritizing service quality, minimizing waiting times, improving the waiting environment, and implementing effective queue management practices, healthcare organizations can create positive experiences for patients and foster lasting relationships. Furthermore, the identification of these key factors enables targeted interventions and resource allocation to areas where improvements are most needed, ultimately contributing to better patient outcomes and satisfaction. Moving forward, continued research and implementation of evidence-based practices will be essential in further advancing patient-centered care and ensuring the delivery of high-quality healthcare services.

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