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Factors Influencing Discharge Turnaround Time in Avenue Hospitals, Kenya

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Abstract

Purpose: This study evaluated Avenue Hospitals' discharge process, identified key factors that impact discharge turnaround time (TAT), and offered evidence-based recommendations for improving the entire procedure. The main study objective was to determine the factors that influence discharge turnaround time in three Avenue Hospitals based in Thika, Kisumu, and Parklands.

Methodology: This research utilized quantitative approach, which covers the plan for collecting, measuring, and analyzing the data. The study deployed stratified random sampling to select participants from the target population. The sample size was 210 participants. Self-administered Google Forms questionnaire and discharge TAT time logs were used as sources of data. Descriptive analysis, linear regression, time series analysis, and control run charts were conducted and the results were presented in tables and graphs.

Findings: Factors that significantly impacted discharge process include delayed completion of discharge paperwork, billing errors, discharge planning with reconciliation of medications, poor communication among healthcare workers, and availability of dedicated billing personnel ($p<0.01$). In the lean six-sigma (LSS) analysis, the discharge process is generally not in control. The pediatrics and medical-surgical units have higher variability than maternity and psychiatry in the discharge TAT

Unique contribution to theory, practice, and policy: This study provides empirical evidence on the utility of LSS and DMAIC (Define, Measure, Analyze, Improve, and Control) models in identifying discharge bottlenecks and implementing quality improvements in hospital systems. It also emphasizes the need for institutional reforms, such as streaming staffing and discharge planning protocols to enhance patient flow and satisfaction.

Keywords: *Discharge Turnaround Time, Discharge Process, Delayed Discharge, Lean Six-Sigma Approach, DMAIC*

1. INTRODUCTION

The World Health Organization (WHO) promotes a health systems framework with six

building blocks to strengthen healthcare systems, emphasizing service delivery and leadership and governance. Discharge turnaround time (TAT) is a critical indicator of these components, as it reflects the quality, timeliness, and coordination of care (Manyazewal, 2017). Improving discharge TAT through effective governance and structured service delivery supports continuous quality improvement (CQI), enhances patient satisfaction, and ensures sustainability by aligning with the WHO's framework (Manyazewal, 2017).

The patient discharge procedure is a critical hospital process that significantly impacts client experience (Teixeira et al., 2023). Globally, it is considered complex due to the involvement of multiple departments, requiring strong coordination to avoid delays (Rahmani et al., 2020). While the WHO emphasizes early, individualized, and multidisciplinary discharge planning without setting a specific TAT, the NABH recommends a standard of 180 minutes, whereas Avenue Healthcare sets a stricter target of 120 minutes.

1.1 Problem Statement

Discharging patients is a complex, multi-stakeholder process that significantly influences patient experience and satisfaction worldwide (Kumar, 2022). As the final stage of a hospital stay, discharge leaves a lasting impression on patients and their families, who are often eager to leave, and incurring any delays is a major source of frustration (Patel et al., 2019). Studies show that discharge delays are one of the leading causes of patient dissatisfaction, even among those who were otherwise calm during their hospital stay.

Delayed discharge is very costly for the hospitals because it results in inappropriate use of beds, which in turn leads to revenue loss. Most of the hospitals experience delayed discharge rate ranging between 13.5% and 62% (Hisham et al., 2020). In Avenue Hospitals, 30% of patients' complaints were due to long discharge TAT, which ranged from 4 to 5 hours. Such can lead to delays in other hospital operations that can result in possible loss of reputation, consequently leading to opportunity loss (Micallef et al., 2022). Active identification of the bottlenecks and the factors that contribute to the prolonged discharge TAT can form a basis for quality improvement initiatives and projects geared towards reducing the duration of the process. To address these issues, this study aimed to identify the patient, healthcare, and institutional factors that affect discharge TAT at Avenue Hospitals. Furthermore, it utilized the LSS methodology to assess current discharge trends and inform quality improvement initiatives aimed at reducing discharge delays.

2. SUMMARY OF RESEARCH GAP

Patient discharge is a critical hospital process that significantly impacts operational efficiency, resource utilization, and patient satisfaction (Teixeira et al., 2023; Patel et al., 2019). Despite

growing recognition of discharge TAT as a key performance indicator, substantial variability in discharge duration persists globally. With the exception of National Accreditation Board for Hospitals & Healthcare Providers (NABH) that recommends discharge TAT of 180 minutes, many institutions do not have a standard discharge TAT due to limited evidence (Kumar, 2022). Nevertheless, discharge delays are common with rates as high as 62% in some hospitals (Hisham et al., 2020; Micallef et al., 2022).

Much of the literature focuses on high-income settings or public health institutions, with limited empirical evidence from private hospitals in low- and middle-income countries (LMICs), where discharge inefficiencies may be compounded by unique institutional, systemic, and socio-economic challenges (Rahmani et al., 2020; Modas et al., 2019). Although LSS has shown promise in streamlining discharge processes (Arafeh et al., 2018; Zimmermann & Bohomol, 2023), its application remains under-exploited in sub-Saharan African (SSA) settings like Kenya, and particularly within private healthcare institutions, such as Avenue Hospitals. There is also a lack of integrated analysis examining the interaction of patient, healthcare worker, and institutional factors influencing discharge TAT. Existing studies tend to treat these variables in isolation, limiting the holistic understanding needed to drive targeted, system-wide improvements (Edirimanne et al., 2010; Ibrahim et al., 2022; Ayuso-Fernandez et al., 2021). Thus, there is a clear research gap in applying structured methodologies like LSS to investigate and address discharge delays in private hospitals in LMICs. This study seeks to fill this gap by identifying context-specific discharge bottlenecks at Avenue Hospitals and applying the LSS model to enhance efficiency, reduce TAT, and improve patient outcomes.

2.1 Conceptual Framework

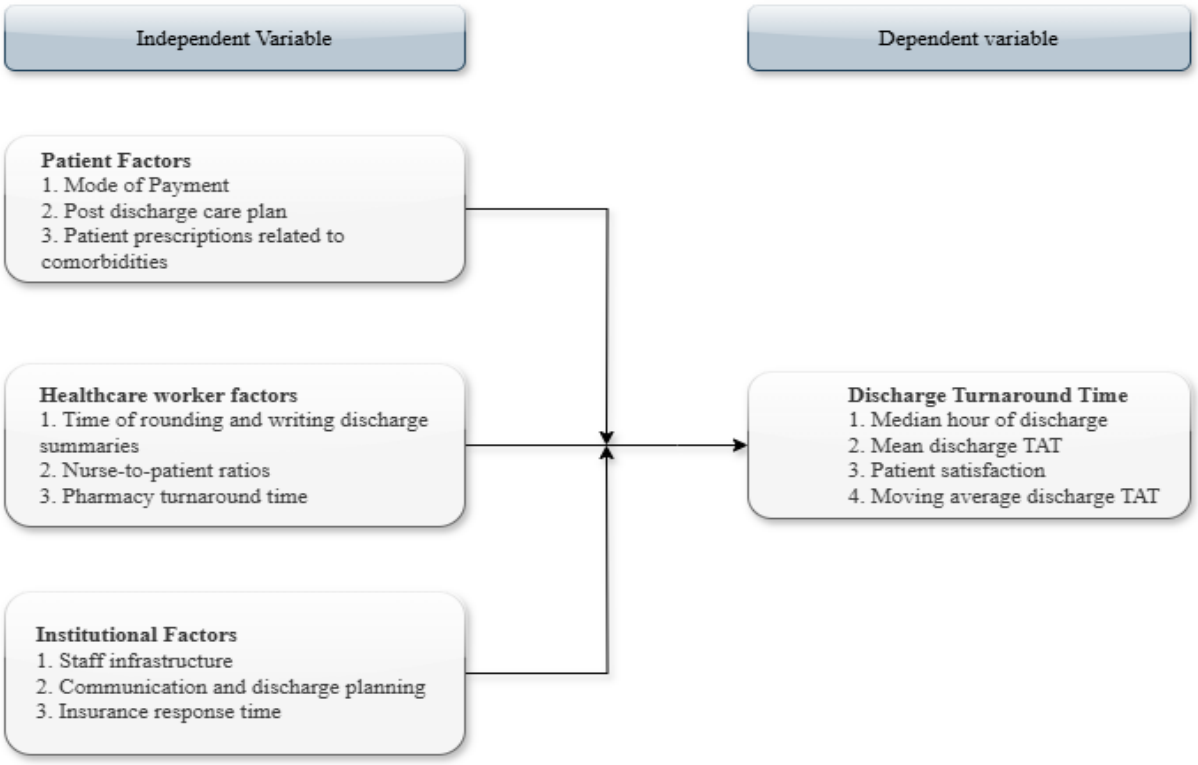

Figure 1: Conceptual Framework

3. MATERIAL AND METHODS

The study employed a cross-sectional design with a quantitative research methodology to examine discharge TAT and the factors influencing it at Avenue Hospitals. The research was conducted across three Avenue Hospitals located in Thika, Parklands, and Kisumu. The targeted population consisted of key stakeholders involved in the discharge process, specifically nurses, doctors, and client experience representatives, representing all cadres contributing to the client experience during discharge.

A stratified random sampling method was employed, with nurses, doctors, and client experience representatives forming the strata within each hospital. The number of participants selected from each stratum was proportional to their representation in the total population. Using Fischer's formula, a sample size of 210 participants was calculated. From every 14 nurses and doctors in each ward, three respondents were randomly selected to participate, while from the client experience department of 20 members per hospital, five representatives were chosen randomly.

Eligibility criteria included nurses, doctors, and customer experience team members working

in the medical-surgical, pediatrics, and maternity postnatal wards who consented to participate. Staff from intensive care, labor, and neonatal units were excluded, as were those on leave or night shifts during data collection.

Data were collected using two instruments. The first was an online self-administered questionnaire distributed through Google Forms and accessible via any internet-enabled devices, such as phones, tablets, or laptops. The second instrument was a discharge TAT time log, which contained nine months of historical data capturing time spent at each discharge touchpoint, including doctors, nurses, ward clerks, pharmacy, cash office, credit control, and discharge nurses.

A pilot study was conducted at Nairobi Women's Hospital, which was selected because of its similar healthcare structure and accreditation as Avenue Hospitals. The pretest involved 21 participants and assessed the internal consistency of the questionnaire using Cronbach's alpha. The decision thresholds were $r > 0.6$ (doubtful), $r > 0.7$ (acceptable), $r > 0.8$ (good), and $r > 0.9$ (excellent). All study variables showed alpha values above 0.8, indicating good reliability. The estimated questionnaire completion time was 10 to 15 minutes, which was found to be acceptable.

Data analysis was performed in SPSS version 27. Descriptive statistics such as means, frequencies, standard deviations, and percentages were used to summarize the data. Multiple linear regression was applied to examine the influence of patient-related, healthcare worker, and institutional factors on discharge TAT. Analysis of the discharge TAT time log included descriptive statistics to understand patterns, while LSS control charts, specifically individual and moving range (I-MR) charts, were used to assess the stability and control of the discharge process.

Ethical approval for the study was obtained from the National Commission for Science, Technology, and Innovation (NACOSTI/P/24/36686) and the Kenya Methodist University Institutional Scientific Ethical Review Committee (KeMU/ISERC/HSM/13/2024). Participants provided informed consent, and confidentiality was maintained throughout the research process to ensure research integrity.

4. RESULTS AND DISCUSSION

4.1 Discharge Outcomes

The mean discharge TAT for Avenue Healthcare is 353.57 ($s = 201.52$). Thika hospital has the lowest mean discharge TAT ($\bar{x} = 302.69, s = 140.4$), while Parklands Hospital ($\bar{x} = 380.55, s = 215.9$) and Kisumu Hospital ($\bar{x} = 384.13, s = 235.1$) have relatively longer TAT. Most discharges begin between 8.00am and 10.00am as shown in *Figure 4.1*, with a median hour of discharge at 9.00am. However, time discharges end is highly variable with multiple peaks between

12.00pm and 7.00pm. Accordingly, the time when the discharge starts is more predictable than when the discharge ends. Kisumu Hospital has the earliest median time when discharge begins (9.00am), while both Thika Hospital and Parklands Hospital have median time of discharge of 10.00am.

Across the three hospitals, on average, patients are more satisfied with discharge process with a rating score of 3.5 out of 5 (s=1.18) compared to discharge TAT at 3.4 out of 5(s=1.20). In the respondents' view, patients in Kisumu Hospital are more satisfied with discharge TAT with a score of 3.8 (s=1.18), compared to Parklands and Thika Hospital with a score of 3.4 and 3.0, respectively. Similarly, patients in Kisumu are more satisfied with the discharge process with a rating score of 3.8 compared to Thika and Parklands with rating scores of 3.5 and 3.2, respectively. Despite Thika having the lowest and least variable mean discharge TAT, the patients are generally dissatisfied with both discharge process and discharge TAT. Consequently, having a short discharge TAT does not necessarily translate to higher satisfaction with the process.

4.2 Patient Factors Affecting Discharge TAT

Table 1: Patient factors affecting Discharge TAT in Avenue Healthcare

	Strongly Disagree n (%)	**Disagree** n (%)	**Neutral** n (%)	**Agree** n (%)	**Strongly Agree** n (%)
Older patients with multiple illnesses increase TAT	35 (20.7)	40 (23.7)	43 (25.4)	37(20.9)	14 (8.3)
Length of hospital stay increases TAT	20 (11.8)	34 (20.1)	18 (10.7)	62 (36.7)	35 (20.7)
Payment using insurance takes longer than out-of-pocket	3 (1.8)	4 (2.4)	11 (6.5)	58 (34.3)	93 (55.0)
Availability of caregiver and transport speeds discharge	20 (11.8)	39 (23.1)	50 (29.6)	44 (26.0)	16 (9.5)
Financial deprivation and poverty lengthen discharge TAT	7 (4.1)	1 (0.6)	6 (3.6)	62 (36.7)	93 (55.0)
Patient's comprehension of instructions speeds discharge process	8 (4.7)	35 (20.7)	21 (12.4)	80 (40.7)	25 (14.8)

Table 1 shows that most respondents (57.4%) agree longer hospital stays increase discharge TAT, with 10.7% ambivalent. About 89.3% believe insurance payments delay discharge more than

out-of-pocket payments, and 91.7% agree financial hardship prolongs discharge process. While 55.5% think understanding discharge instructions speeds the process, over 65% disagree that caregiver and transport availability facilitate faster discharge. Around 70% of respondents do not consider age or multiple illnesses as factors increasing discharge TAT.

4.3 Healthcare Worker Factors

Table 2: Healthcare provider factors affecting discharge TAT

	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Incomplete diagnosis on admission increases TAT	9 (5.3)	7 (4.1)	13 (7.7)	83 (49.1)	57 (33.7)
Late rounding by doctors increases TAT	7 (4.1)	3 (1.8)	12 (7.1)	69 (40.8)	78 (46.2)
Delayed completion in discharge paperwork increases TAT	6 (3.6)	4 (2.4)	14 (8.3)	84 (49.7)	61 (36.1)
Delayed writing of discharge summary increases TAT	5 (3.0)	12 (7.1)	21 (12.4)	67 (39.6)	64 (37.9)
Early reconciliation of medications reduces TAT	4 (2.4)	17 (10.1)	20 (11.8)	72 (42.6)	56 (33.1)
Billing errors increases TAT	3 (1.8)	3 (1.8)	8 (4.7)	77 (45.6)	78 (46.2)
Late addition of investigations increases TAT	6 (3.6)	4 (2.4)	9 (5.3)	83 (49.1)	67 (39.6)
Not prioritizing discharge patients during rounding increases TAT	5 (3.0)	18 (10.7)	43 (25.4)	70 (40.1)	33 (19.5)
Poor communication among healthcare workers increases TAT	4 (2.4)	5 (3.0)	15 (8.9)	84 (49.7)	61 (36.1)

According to *Table 2*, most participants agreed that incomplete diagnosis on admission (82%) and late doctor rounding (over 87%) increase discharge TAT. Delays in completing discharge paperwork (85.8%) and writing discharge summaries (77%) were also seen as major contributors to longer TAT. Respondents indicated that early medication reconciliation was noted to reduce

discharge time by 75.7%, while billing errors (91.8%), additional investigations during discharge (88.7%), low prioritization of discharge patients during rounding (59.6%), and poor communication among the multidisciplinary team (85.8%) further extended discharge TAT

4.4 Institutional Factors Affecting Discharge TAT

Table 3: Institutional factors affecting discharge TAT at Avenue Healthcare

	Strongly Disagree n (%)	**Disagree** n (%)	**Neutral** n (%)	**Agree** n (%)	**Strongly Agree** n (%)
Delays in pharmacy dispensing increases TAT	0 (0.0)	9 (5.3)	14 (8.3)	77 (45.6)	69 (40.8)
High healthcare worker to patient ratio will reduce TAT	3 (1.8)	5 (3.0)	25 (14.8)	75 (44.4)	61 (36.1)
Discharge planning on admission will improve TAT	5 (3.0)	13 (7.7)	40 (20.3)	76 (45.0)	35 (20.7)
Daily billing updates will improve TAT	2 (1.2)	0 (0.0)	10 (5.9)	78 (46.2)	79 (46.7)
Creation of discharge SOP will improve TAT	1 (0.6)	2 (1.2)	13 (7.7)	73 (43.2)	80 (47.3)
Close collaboration with insurance providers reduces TAT	0 (0.0)	2 (1.2)	4 (2.4)	76 (45.0)	87 (51.5)
Placement of discharge clerk in each ward will improve TAT	2 (1.2)	4 (2.4)	12 (7.1)	71 (42.0)	80 (47.3)
Improved collaboration with next of kin on discharge day will improve TAT	3 (1.8)	12 (7.1)	25 (14.8)	79 (46.7)	50 (29.6)
Deployment of dedicated billing person will reduce TAT	0 (0.0)	1 (0.6)	9 (5.3)	70 (41.4)	89 (52.7)

Table 3 shows that over 86% of respondents agreed that pharmacy delays in dispensing discharge medications increase discharge turnaround time (TAT). Additionally, 80.5% noted that a

high healthcare worker-to-patient ratio reduces discharge TAT, while only 5.7% saw discharge planning upon admission as beneficial. Most participants supported daily billing updates (92.9%), establishing a discharge standard operating procedure (90.5%), strong hospital-insurance collaboration (96.5%), placing a discharge clerk in each ward (89.3%), involving patients' next of kin (76.3%), and recruiting dedicated billing personnel (94.1%) as effective strategies to improve discharge TAT.

4.5 Measures of Association for Factors Affecting Discharge TAT

Table 4: Regression Analysis of Factors Affecting Discharge on Discharge TAT

Dependent Variable: Discharge TAT (Survey)	**Unstandardized Coefficients**	**Std. Error**	**Standardized Coefficients**	**t**	**p**
(Constant)	638.263	125.065		5.103	<0.001
Delayed Completion of Discharge Paperwork	-43.505	18.222	-0.199	-2.388	0.018
Billing Errors	54.062	21.724	0.214	2.489	0.014
Discharge Planning with Reconciliation of Medications	41.055	15.131	0.211	2.713	0.007
Poor Communication Among Healthcare Workers	-43.288	18.516	-0.188	-2.338	0.021
Dedicated Billing Focal Person	-72.083	25.159	-0.224	-2.865	0.005

From the model obtained in *Table 4* by backward elimination, delayed completion of discharge paperwork was demonstrated to have a strong association with discharge TAT (t=-2.388, p=0.018). Similarly, billing errors (t=2.389, p=0.014) and poor communication among healthcare workers (t=-2.338, p=0.021) were also found to significantly affect discharge TAT among healthcare worker factors. For institutional factors, only discharge planning with reconciliation of medications (t=2.713, p=0.007) and recruitment of a dedicated billing person (t=-2.865, p=0.005) are significantly associated with discharge TAT. Overall, the model is statistically significant as demonstrated in Table 4.9 (F=5.86, p<0.001). However, as shown in the model summary (*Table*

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5), the included factors only account for about 12.6% of the variability in the discharge TAT. Importantly, no single patient factor was found to be significantly correlated with discharge TAT.

4.6 Lean Six-Sigma Analysis

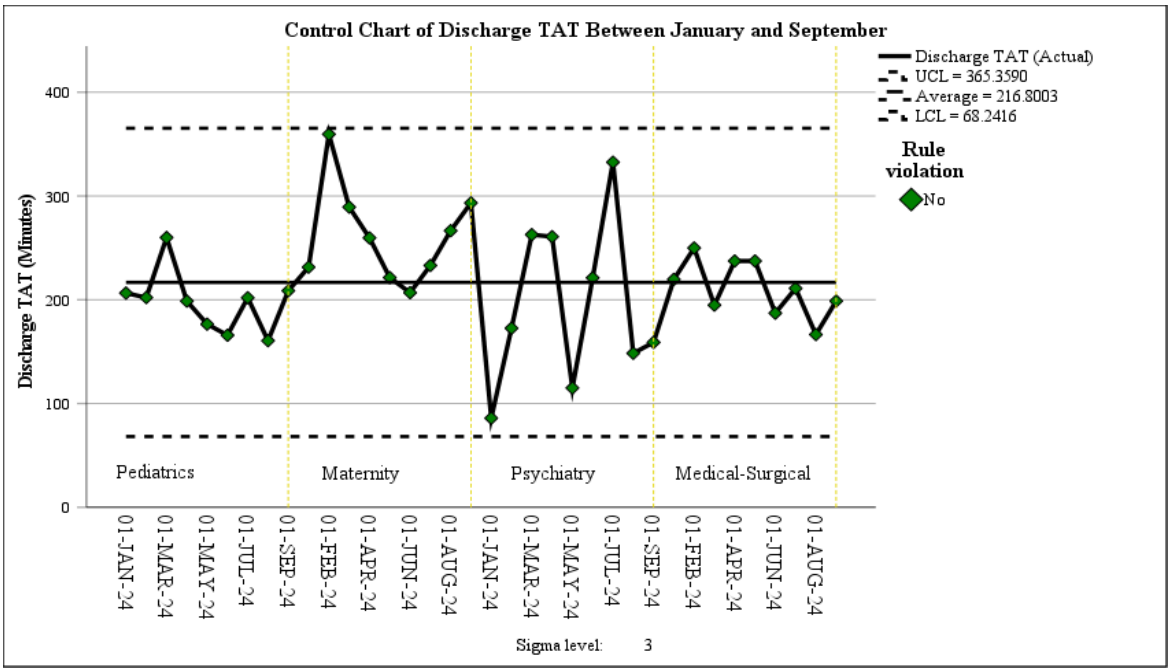

Figure 2: Individual control chart showing the center of the discharge TAT across the units

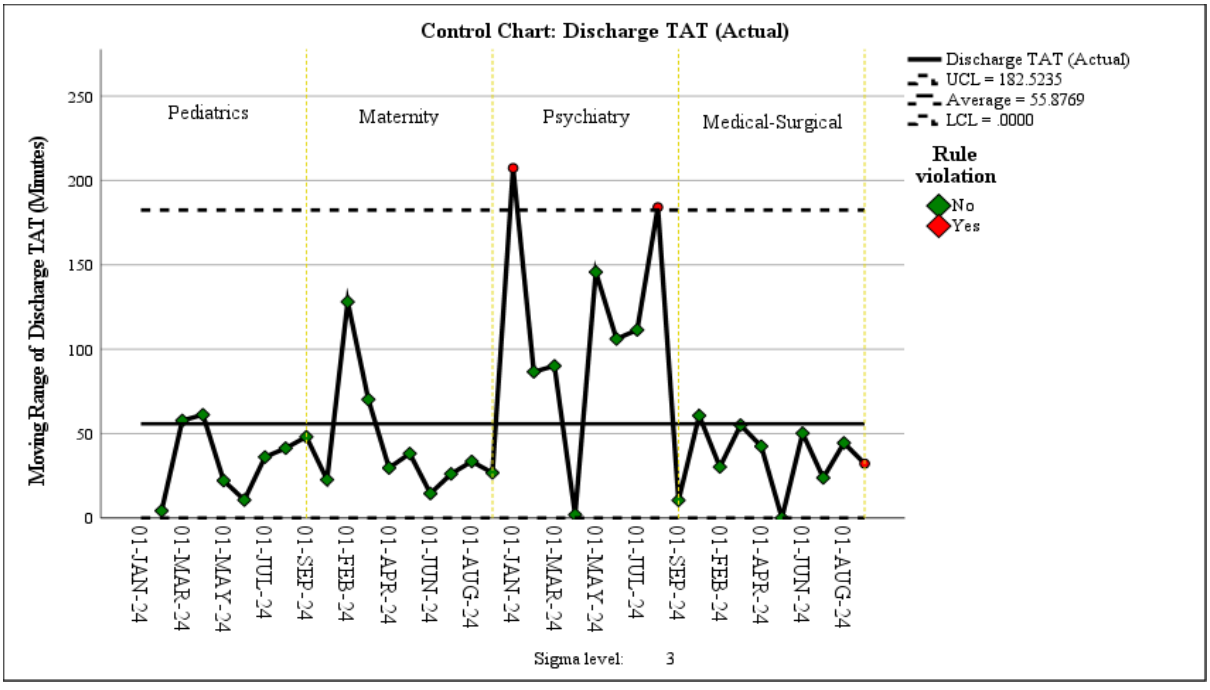

Figure 3: Moving range control charge showing the variation in the discharge TAT across the units.

To measure the stability of the discharge process, the discharge time log was analyzed using the LSS approach. In *Figure 1*, the center line shows average TAT (216.8 minutes), which acted as the reference line for determining if the discharge TAT for each unit is in control. The upper control limit is 365.4 minutes, while the lower control limit is 68.2 minutes. From this chart, pediatrics and medical-surgical (general ward) unit appear to have lower variability compared to maternity and psychiatry in the discharge TAT.

In the moving range average (*Figure 2*), the data points for pediatrics and medical-surgical units are very near to the center line, implying low variability. However, the maternity and psychiatry units show large variation from one data point to another with some data points beyond the control limits. Using formal tests of process control, the psychiatry unit violated two rules. Firstly, there are two data points that are beyond the upper control limit (+3 sigma), violating Test 1. Similarly, in the same unit, there are 4 out 5 data points that are above +1 sigma, violating Test 3 (*Table 5*). The medical-surgical unit violated rule 4 by having 8 consecutive points on the lower side of the center line.

Table 5: Rule violations for the moving range control chart

Unit	Violations for Points
Psychiatry	Greater than +3 sigma
Psychiatry	Greater than +3 sigma
Psychiatry	4 points out of the last 5 above +1 sigma
General Ward	8 consecutive points below the center line

4.7 Discussion

Both discharge TAT and discharge process are important in improving client experience. Having a short discharge TAT does not necessarily translate to higher satisfaction with the process as demonstrated in Thika Hospital having short TAT with poor client satisfaction rating. From the findings, patient factors can significantly affect the duration of discharge. When patient factors are favorable, the discharge duration reduces significantly, which also improves patient satisfaction and experience, as demonstrated by Krist et al. (2017). For patients with longer stay, discharge TAT can be prolonged as the pharmacists take longer time to conduct reconciliation and seek

clarification on unclear instructions. Moreover, the patient's ability to comprehend the discharge instructions speeds up the discharge process according to the findings of this study. Some discharge instructions involving the use of medical equipment, such as inhalers, oxygen concentrators, or ripple mattresses, and certain medication, might require special consideration.

Additionally, payor related issues are the major causes of delayed discharges. This study found out that patients paying out-of-pocket were cleared much faster than those paying using their insurance. These findings correspond to a study conducted by Hwabejire et al. (2013) that cited patients paying using out-of-pocket method had a shorter discharge TAT compared to their counterparts paying using insurance. However, these findings differ with Shilpa et al. (2016) study, which states that delayed discharge can occur regardless of the mode of payment. It was noted that paying via insurance had prolonged discharge TAT due to time taken to reconcile bills and obtain approval from the insurance provider.

The study found out that incomplete diagnosis on admissions may increase the time taken during discharge, especially for the insured patients because the insurances might seek clarifications regarding the treatment given versus the initial diagnosis on admission. Further, incomplete diagnosis and incomplete paperwork may make the insurance to decline the undertaking, which may further increase the discharge TAT. These findings are supported by Lenert et al. (2014) who posited that incomplete discharge summaries result in longer TAT. Besides, late rounding by the consultants was found to increase the discharge TAT. The doctors initiate the discharge process and their delays in rounding consequently lead to delay in writing of the discharge summary. According to Kumar (2022), late rounding by consultants and corrections in the discharge summaries are the leading causes of the healthcare worker related factors that delay discharges.

Additionally, poor communication among the nurses, doctors, pharmacy, and other members of the multidisciplinary team is a significant impediment to discharge process. Poor communication results in delayed decision-making as demonstrated by Harun et al. (2017) that showed delayed decision-making by the doctors and waiting for tests and procedures contributes to 80% of the delayed discharges. Billing errors and poor reconciliation of medications that were not detected before the day of discharge may also increase the TAT since corrections in billing have to be made before the patient is released.

Delayed discharge leads to unnecessary bed occupancy with negative effects on the institution's finances, while delivering no added benefits to the patients. Delayed discharge contributes to crowding at the emergency department and therefore, implementing measures would ensure timely access to acute hospital beds for patients requiring urgent admissions. Healthcare

workers, such as nurses, play a pivotal role in the discharge process in medication counselling, keeping the patient informed on the process, and ensuring the patient is discharged to the right environment for recuperation. The institution plays a critical role in ensuring human resource is adequate for seamless and patient centered care. Yoon (2022) demonstrated adequate healthcare worker to patient ratio leads to reduced discharge time, length of stay, readmissions, and mortalities. Additionally, adequate staffing ensures individualized and focused care rather than the rush to complete tasks.

The hospital discharge process is complex and multifaceted and thus, there is an immense importance attached to efficient and effective communication. Therefore, having a discharge plan at the time of admission would speed up the process on the day of discharge. Further, patient and family preparation during the period of hospitalization, which may be in the form of verbal communication, updates on the new developments, as well as written policy documents, highlighting the steps of discharge, would speed up the process. The findings by Ratna (2019) demonstrated that discharge process should start on the day of admission and that advising the patients on their discharge date based on their condition and expected procedures in a handheld document would streamline the discharge process.

Using the LSS approach, it is possible to identify the pain points and constitute a process improvement plan. In addition, this approach can assist in continuous improvement and control of the discharge process to reduce discharge TAT. According to Zimmermann and Bohomol (2023) findings, utilization of the LSS methodology is effective in reducing discharge TAT by about 61%. Besides reducing TAT, LSS is also important in minimizing variability in the discharge process to ensure it is predictable and timebound depending on patient factors. Using the DMAIC model, it is possible to define, measure, and analyze the problem resulting in long discharge TAT and implement corrective actions.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study found that patients, healthcare workers, and institutional factors all contribute to delays in the discharge process. Key issues include financial hardship, poor communication, billing errors, and lack of coordination between hospitals and insurers, with credit control being the most significant contributor to increased discharge TAT. Analysis using DMAIC and LSS models revealed that the process is not well-controlled and requires CQI.

5.2 Recommendations

The hospital should implement an algorithm to flag common billing errors, such as missing

or duplicate charges. To improve collaboration and communication between healthcare providers, all inpatient unit managers should ensure roll-out and utilization of the SBAR (Situation, Background, Assessment, and Recommendation) tool for writing discharge summaries and day-to-day communication of patient condition. Since credit control causes the largest delay in the discharge process, the hospital management should design and implement a communication matrix that guides close collaboration between the department and insurance providers. Besides, the hospital should recruit a resolute billing clerk to ensure real-time reconciliation of all billable items and communication to the relatives and insurance providers. Next, the inpatient quality improvement team should audit all patient admission files in real-time to identify gaps in investigations and diagnostics and implement corrective action. Finally, hospital should design a discharge planning standard operating procedure that elaborates patient education on admission and discharge process.

Future studies should actively involve patients in the study population to capture their perspectives about the discharge process. Patients are the first-hand consumers of a discharge process and incorporating their viewpoints can significantly improve satisfaction and efficiency. Next, since discharge is an important process in a hospital, other studies should be conducted to elucidate the effectiveness of the LSS and DMAIC models in improving discharge procedure. Although LSS has been widely utilized in manufacturing, there are few studies that have incorporated its principles in the discharge process.

5.3 Study limitations

The principal researcher's managerial role in the organization may have caused ethical concerns, potentially leading participants to fear coercion or avoid honest responses. The distance between the three hospitals complicated study coordination and raised costs.

5.4 Acknowledgement

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5.5 Conflicts of interest. The authors declare no conflicts of interest.

5.6 Funding Statement. The author received no specific grant from any funding

5.7 Data Availability Statement. The data supporting this study is available from the corresponding author upon reasonable request. However, data sharing may be subject to restrictions due to confidentiality agreements.

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