

Original Article

Audit of efficacy of patient discharge process- Are we really up to the mark?

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ABSTRACT

Background: Procedural delays in discharge process are critical, yet remain a neglected area of patient care, resulting in frustration, financial losses and unnecessary bed-occupancy. Timely and effective communication of the discharge instructions are vital. Despite digitization, delays are common in routine practice. We audited the itemized timeframe of discharge process of a single department general ward. The patient attendant feedback of discharge instructions and overall satisfaction were collated and analyzed. This audit highlights the gaps which need to be addressed to improve the discharge experience.

Methods and Material: Prospective enrolment of 100 sequential discharges from Paediatric surgery general ward with itemized documentation of time taken for each event. The attendants filled out feedback form about their understanding of discharge instructions and self-reported their overall satisfaction with discharge process.

Statistical analysis: Descriptive statistics, one sample t test and Mann-Whitney U test using SPSS software.

Results: 70% were elective admissions. The average turn-around-time(TOT) for discharge till bed clearance in Hospital Management information system(HMIS) in Self-paying group was 332 min(NABH Standard-180 min) and in Credit billing group was 397 min(NABH Standard-240 min). 95% of attendants expressed satisfaction with effective communication of instructions at time of discharge.

Conclusions: Discharge process is significantly delayed in both groups compared to laid prescribed standards; more pronounced delays were noted in the credit billing patients. Single window operator billing process and lack of robust insurance processing systems were the main reasons for delay. Re-Audit after addressing these gaps would help attain the prescribed standards.

Keywords: Audit, credit billing , delay , discharge, turn-around-time.

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INTRODUCTION

The process of discharge from the hospital signifies an important transition of care from monitored in-patient care to a more physiological domiciliary care. This is a sequential, coordinated, seamless transition. Digitalization of healthcare has revolutionized the hospital records keeping, procedural billing, pharmacy indenting, and insurance systems across the world. Despite a large turnover of paediatric patients in hospitals worldwide every day, relatively scarce literature exists on formulation of framework of discharge care based on regulatory legal processes, clinical practice or research^[1] Data from a reputed medical Institute in India reported significant delay in discharging paediatric patients, especially in the Credit billing (Insurance) category, occupying the private wards.^[2] Delays often result from issues in processing billing requests, raising pharmacy indents, credit clearances from insurance third-party administrators, issuing discharge summary and deficient staffing. In India, the National Accreditation Board for Hospitals (NABH) has set forth a set of generalized guidelines streamlining this process of discharge from hospitals. ^[3] Newer Hospital Management Information systems(HMIS) have incorporated features to monitor identity based login with encryption security for accessing and performing day to day ward activities including bed status, pharmacy indents, procedural billing, discharge summaries, laboratory and imaging services and surgery scheduling.^[4] There is a growing need to focus on minimizing the timeframe of these events to reduce mental anguish caused by procedural delays, enhance patient-attendant satisfaction, and optimize resource utilization for faster turnover of inpatient services. This Quality-Improvement Audit (QIA) was conducted in the 24 bedded dedicated General ward of the Department of Paediatric Surgery manned by three nurses per 8-hour shift, after a recent change in the HMIS across the hospital, aimed to note the effectiveness of the discharge process and identify potential gaps which can be rectified.

MATERIALS AND METHODS

This is a prospective study conducted in the Department of Paediatric Surgery to evaluate and audit stepwise, the logistics, timeframe and patient satisfaction of discharge process after recent transition from CAREWORKSTM to KRANIUM HEALTHCARETM HMIS (on 31st March 2023). Institutional Ethical Clearance was obtained prior to the study from Institutional Ethics Committee.

Inclusion criteria:

100 serial patients discharged from the Paediatric Surgery General ward were enrolled to this study over 1 month period (April-May 2023).

Exclusion Criteria:

Patients admitted under the Paediatric surgery department but discharged from any other ward across the hospital (including Day-care ward).

Annexure-1 form (ANN-1) was prepared to capture the real-time data of different events in discharge process which was recorded by the ward clerk or staff nurse in the ward from the time logs available on the newly installed HMIS system. Annexure-2 form (ANN-2) was prepared to capture the patient attendant feedback and was made available in 6 local vernacular languages (English, Kannada, Tamil, Hindi, Telugu and Bengali) given to attendants to self-report their satisfaction with various events pertaining to discharge process. All the ward staff were trained prior to the start of this study and a Pilot study of data entry simulation was done on 30 patients to ensure proper understanding and entry of timeline events. Similarly, 30 such feedback forms were given to patient attendants at discharge, to record responses and trouble shoot difficulties in understanding or choosing the right response for the questionnaire. The responses of pilot study from both arms were validated by an independent external observer. Data from ANN-1 was collected real-time from Electronic Medical Report (EMR) on the newly installed KRANIUM HMIS system while ANN-2 was a printed paper feedback form which was filled and returned by attendants. EPICOLLECT-5 software was used for recording ANN-1 and ANN-2 data. Descriptive statistics were reported as mean with standard deviation and median with 25th and 75th percentiles. One sample t test was used to compare the mean actual time recorded against NABH standard values. Mann-Whitney U test was used to compare the mean actual time recorded between paying and insurance group. Analysis was performed using SPSS (ver 26) software.

RESULTS

Of the 100 patients discharged, 70 were elective admissions and 30 were emergencies. 5 patients were registered as medico-legal cases and 3 patients were discharged against medical advice (DAMA). The median duration of admission was 4 days (range 0-21 days, mean 6 days). 85% were Self-paying patients while 15% were billed under credit schemes (Institutional credit- 7, Insurance- 4 and Government backed health schemes-4).

The discharge timelines were categorized into 9 events (T0 to T8) enumerated in (Table 1) for understanding the analysis of sequence of events, which provides the breakup of overall mean and standard deviation of each event in discharge process. The terminal event of Bed clearance was defined as exit of the patient from the ward, followed by housekeeping services and finally being cleared in the HMIS system for re-allotment to a new patient.

Table 1: Breakup of overall Mean and Standard deviation of each event in discharge process

		Mean (SD)	Median (25 th , 75 th percentiles)
T0	Announcement of discharge by doctor		
T1	T0 to completion of pharmacy billing	70.0 (55.2)	60 (36.2, 89.7)
T2	T0 to initiation of billing on EMR	103.1 (61.5)	105 (60, 120)
T3	T0 to completion of billing (receipt of final bill)	220.5 (119.7)	180 (145, 267.5)
T4	T0 to explanation of bill to attendants	254.1 (121.7)	240 (175, 298.7)
T5	T0 to settlement of bill	295.5 (115.3)	280 (225, 330)
T6	T0 to handover of discharge summary after explanation to attendants	321.1 (117.5)	300 (255, 376.5)
T7	T0 to time of patient exit from ward	335.3 (115.9)	315 (270, 390)
T8	T0 to bed clearance in HMIS System	342.4 (116.1)	330 (271.2, 393.7)

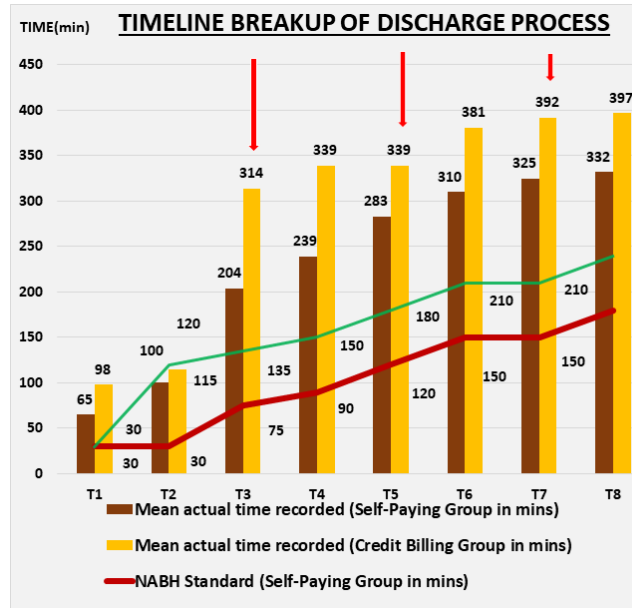
On comparison of timeline events enumerated in (Table 2), there was significant delay in each of these events from the first step and cascading into the final step of bed clearance in the HMIS system in both paying and credit billing groups.

Table 2: Stepwise timeframe breakup for discharge process across 2 groups

EVENT DESCRIPTION	Self-Paying group (mins)		Insurance Group (mins)		
	NABH Standard	Mean actual time recorded	NABH Standard	Mean actual time recorded	
T0	Announcement of discharge by doctor	Reference standard Zero			
T1	T0 to completion of pharmacy billing	30	65*	30	98*
T2	T0 to initiation of billing on EMR	30	100*	120	115
T3	T0 to completion of billing (receipt of final bill)	75	204*	135	314*
T4	T0 to explanation of bill to attendants	90	239*	150	339*
T5	T0 to settlement of bill	120	283*	180	339*
T6	T0 to handover of discharge summary after explanation to attendants	150	310*	210	381*
T7	T0 to time of patient exit from ward	150	325*	210	392*
T8	T0 to bed clearance in HMIS System	180	332*	240	397*

*P value <0.05

The average turn-around-time (TOT) for discharge till bed clearance in HMIS in self-paying group was 332 min (NABH Standard-180 min) and in credit billing group was 397 min (NABH Standard-240 min). The average time frames to complete each step are depicted in both groups in (Graph 1) and enumerated as follows: completing pharmacy billing 70±55 min, completing EMR billing 220±119 min, completing bill settlement 295±115 min and patient exit from ward 335±116 min.



Graph 1: Graphical representation of Events in Discharge Process in minutes (Red arrows demonstrating events with significant higher negative Z scores).

On comparing the difference between timeframe of events across the two groups (Self-paying and Insurance groups) using non-parametric Mann Whitney U test, statistically significant difference was noted with significant delay ($p < 0.001$) in credit group in the following events T3 (Mean Z Score -1.91), T5 (Mean Z Score -1.715) and T7 (Mean Z Score -1.454). This indirectly reflects on the delays generated during processing of billing requests on the EMR which sequentially cascades to overall delays in TOT.

The time taken to issue printed authorized discharge summary was 392 min (120-810 min) in the credit group compared to 325 min (115-630 min) in self-paying group despite early intimation to the department secretary (Average time from announcement of discharge to intimation to secretary for preparation of discharge summary was 21 min (0-105 min) in paying group and 18 min (0-120 min) in credit group). 87% of patients received authorized printed discharge summary while 13% (n=13) were issued provisional hand-written discharge note. The primary reasons for non-issuance were discharge summary not being ready (n=7) [consultant not available/ summary not prepared by resident], software glitches (n=5) [Data wipe-off/ wrong authorization/ software unresponsiveness etc.] and delays in inter-departmental referrals (n=1).

Table 3: Patient Feedback report on process of discharge

Serial No.	Question	Yes, Satisfactory	Yes, But Unsatisfactory	No
1	Did the doctor/nurse inform clearly the discharge medicine to you?	96	1	3
2	Did the doctor/nurse instruct special instructions like wound dressing, suture removal care of tubes/catheters, care of stoma etc?	91	2	7
3	Did the doctor/nurse mention the diet requirements for the patient?	95	5	0
4	Did the doctor/nurse inform the date and time for follow-up visit?	97	2	1
5	Did the doctor/nurse explain what to do in case of an emergency?	93	2	5
6	Did the doctor/nurse give you chance to clarify all the doubts?	98	1	1
7	What is your overall opinion about the speed of discharge process at this hospital?	63 (Fast, efficient)	6 (Some Minor delay)	31 (Significant Delay)
8	Was the discharge from hospital discussed with your family?	Yes, By Consultant (85)	Yes, By Resident Doctor (12)	No (3)
9	Comments/ Suggestions for improvements	No (94)	Appreciative comments (3)	Needs Improvement (3)

The patient feedback (Table 3) showed very good patient satisfaction with most of the respondent's rating >95% satisfaction in understanding the discharge advice. 97% of respondents confirmed that the process of discharge was discussed with their family prior to initiating discharge process. However, 63% felt that the overall discharge process was fast and efficient while 31% felt significant delay in the discharge process. 94% did not opt to give suggestions on improvement. Three attendants approved with appreciative remarks & three commented on need for improvement ("Delay in billing very prolonged", "Insurance counter crowded and poorly manned" and "Billing department single window system-must make more counters to facilitate faster billing"). However, formal qualitative or thematic analysis were not done to the patient's feedback and their reviews were merely mentioned as "quotes" owing to the small number of comments received (n=3).

DISCUSSION

Digitalized HMIS systems have replaced most of the conventional manual systems across the world with enhanced security encryptions, data cloud storages and wide range of hospital applications including Patient registrations, medical record keeping, integration with hospital laboratory and imaging services, pharmacy indenting and financial accounting services. The process of Discharge marks the end of hospitalization following clinical improvement and certified by the treating doctor that the patient is deemed fit to go home. However, this process is rather complex, involving multiple steps before the patient leaves the hospital. Delay in discharge process causes mounting anxiety, frustration and unnecessary exposure of patient and his attendants to nosocomial infections.^[5] This delay causes revenue losses to hospital and unavailability of hospital beds resulting in postponement or cancellation of elective surgical procedures for patients waiting for elective admission. Although guidelines are formulated by the national regulatory body (NABH), pertaining to timeframe of each step of discharge process, effective discharge times are often delayed. In general, the credit billing is expected to take longer times for processing compared to paying patients due to delays in approval from the insurance authorities and resolution of queries pertaining to treatment.^[6] The introduction of newer KRANIUM HMIS enabled us to access the time-based logs of each such event, which motivated us to audit our efficacy and identify potential gaps to be addressed.

Literature from Centres located in Southern India have reported similar patterns in procedural delays of discharge process. A study by Vijaya Rudraraju^[7] reported that 44% of the procedural delays happened at billing level resulting in 50% of discharges taking more than 4 hours. 4% of the patients in this group had to wait more than 8 hours pending insurance clearance. Shobhita et al reported an average discharge time of 218 min (as against a NABH standard of 180 min) in a study conducted on 1872 discharged patients;

Preparation and finalization of discharge summaries, billing procedure and delays in patients to clear the pending bills were reported to be the main reasons for delay.^[8] Senu Thomas et al reported an average discharge time of 678 min the self-paying group and 793 min in the credit-billing group in their study on 60 patients.^[9] In addition to the billing delays, poor anticipation of discharge and unclear instructions communication between the doctors and nursing personnel contributed significantly to these significant delays. A study from Chelsea and Westminster, London by Hendy et al studied 83 patients admitted over 888 patient-days, in whom discharge delays were seen in 21% of patients incurring an average added expenditure of £565 per-patient.^[10]

Our study demonstrates a visible delay across both self-paying and credit billing groups at critical bottlenecks of discharge process. Finalization of itemized billing (T3) was the first critical event resulting in a chain-reaction flowing down the discharge process. In the credit billing group, only 3/15(20%) completed discharge process within the timeframe prescribed by NABH (240 min) with average time to discharge of 187 min compared to 450 min in the remaining 80%. In sharp contrast only 3/85(3.5%) of paying patients completed their discharge process within stipulated time (Avg 135min), compared to remaining 82/85(96.5%) who took an average of 339 min (NABH standard 180 min). The financial accounting akin to most corporate healthcare systems in India, follow a centralized single window system whereby there is physical transfer of billing sheets to and fro, to the single centralized accounts team which processes the billing formalities. This finding and explanation are consistent with a study by Shirish et al^[2] and reflects the need for decentralization of billing channels for faster dispensing. Most studies before 2019 from Indian subcontinent have highlighted delays in payment of bills by attendants in the self-paying groups.^[8, 9, 11] These have largely been improved by widespread popularization and use of cashless mobile linked online digital payment gateways like Unified payment Interface (UPI), Bharat Interface for Money (BHIM), Aadhar enabled payment system (AEPS), Bharat QR and Paytm.^[12]

The next step responsible for critical delay is processing insurance clearance from third party administrators. Ankit Singh et al reported an average time of 129.9±81 min for insurance clearance by external Third-party administrators (TPA). Requests for uploading Investigation reports (20%), previous treatment records (14%), in-patient records (14%) and exact aetiology of ailment (8%) were the most common queries by the Insurance TPAs.^[13] Although most healthcare systems in India house an Insurance Helpdesk, there is a definite absence of a Robust dedicated standalone Insurance TPA facilitation system to enhance faster processing of insurance clearances.

The final step prior to discharge is the clear communication of the discharge instructions. A good discharge summary is a valuable medico-legal document which depicts the disease pathology, course in hospital,

results of investigations and important instructions pertaining to diet, medications and care of patient post-discharge from hospital. Effective communication of these instructions is equally important in ensuring effective after-care. These include instructions on medications (dose, frequency, duration and timing with meals), diet, care of surgical wounds, catheters or stomas (if any), follow up visits and contact information during emergency situations. These instructions are usually given by the members of treating team- resident doctors and/or nurses. It is essential to ensure that the attendants have understood these instructions properly and are permitted to clarify their queries earnestly. Apoorva Viswanath et al noted in their study that whilst most patient attendants showed excellent satisfaction with instructions given at time of discharge with regards to medications (100%), non-medication related instructions (80%) and follow-up (93%), a surprising 62% of attendants reported lame instructions on emergency contacts and visits and 32% expressed that they were not given an opportunity to clarify their queries.^[14] Timely preparation and issue of a finalized Discharge summary is yet another major issue. Tak S et al postulated that unplanned discharge, manpower shortages in transcription/typing pools, busy schedule of consultants/residents, pending clearances from the ancillary departments, nutrition and diet teams were key notable factors causing delay in issue of summaries.^[15] Pirani et al highlighted the importance of nursing personnel in effective communication with the doctors, transcriptionists and billing teams to bring down the overall time for discharge processing and timely issue of summary.^[16]

This study was effective in highlighting the gaps and deviations from prescribed standards by identifying clearly the steps of the discharge process associated with most delays. Single window operator system for processing billing along with need for a dedicated insurance facilitation team emerged as principal areas of focus to be addressed. Delivery of discharge instructions were quite satisfactory as per patient feedback responses. However, the drawback of this study is that we did not analyse some of the factors which could have contributed to the delays including temporal relation to time of day or night or over weekends or public holidays when the staffing would be suboptimal.

A policy decision by the hospital management to decentralize billing, along with provision of dedicated insurance facilitation team on a priority, shall help us address these issues and a subsequent re-audit to complete the cycle of Quality improvement initiative

CONCLUSION:

Discharge process is significantly delayed compared to the prescribed standards and this is more pronounced in the credit billing patients. Most patients were discharged with finalized discharge summaries and reported excellent communication of instructions at discharge. A comprehensive re-audit after addressing the gaps identified

(decentralized billing process, robust insurance facilitation and anticipated discharge summary preparation) would be helpful to attain the prescribed standards

DECLARATIONS

Ethics approval and Consent to Participate: Institutional Ethical Clearance obtained vide SJMCH/IEC-86/2023. Waiver of Consent was obtained as no patient related details were involved in this study and patient feedback forms were filled and returned by patient attendants with their implied consent to partake in the study. Manuscript does not contain any clinical data from individual person/patient.

CONSENT FOR PUBLICATION:

NOT APPLICABLE- No clinical data collected from individual patient

AVAILABILITY OF DATA AND MATERIAL

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

COMPETING INTERESTS:

"The authors declare that they have no competing financial or non-financial interests" in this section.

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AUTHORS' CONTRIBUTIONS:

This study was conceptualized, and study design planned by SRK and SAM, which was mentored and provisioned by JVT. Data collection and transcription was done by SRK, data analysis and statistical analysis done by SS. All the authors were involved in drafting, editing, refining, finalizing and approving the manuscript prior to final submission.

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CONFLICT OF INTERESTS

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