International Journal of Community Medicine and Public Health
Pavithran K et al. Int J Community Med Public Health. 2025 Apr;12(4):1700-1704
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20250914

Original Research Article

Reducing chemotherapy waiting times at a comprehensive cancer centre through telephonic triaging

Keechilat Pavithran*, Manakkolil Sreeraman Surya, Sahil Bambroo, Hridhya Jaymohanan, Sumi Soman

Department of Medical Oncology, Amrita Institute of Medical Sciences and research centre, Amrita Vishwa Vidhyapeetham, Kochi, Kerala, India

Received: 22 December 2024
Revised: 16 February 2025
Accepted: 18 February 2025

***Correspondence:**
Dr. Keechilat Pavithran,
E-mail: drkpavithran@hotmail.com

ABSTRACT

Background: In day-care chemotherapy facilities, long chemotherapy infusion wait times negatively impact patient experience. To resolve this problem, we implemented a quality improvement initiative using the - determining the problem, measuring the baseline, analysing the current situation, implementing the intervention, and controlling the improvement (DMAIC) methodology.
Methods: This study was conducted at the Department of Medical Oncology at the Amrita Institute of Medical Sciences, Kochi, from April to November 2019 in three phases. Phase 1 identified delay points from registration to the time of discharge using electronic records. Phase 2, after stakeholder input, implemented telephonic triaging (verification of laboratory results, health assessment and whether they recovered from the side effects) and pre-prepared chemotherapy orders. Phase 3 optimized scheduling - such as providing early slots for patients with chemotherapy infusion taking more than six hours, patients travelling long distances to the care centre, and vulnerable populations (older adults and children).
Results: We evaluated 1029 patients (409 males and 620 females) who underwent day-care chemotherapy. A pre- and post-comparative study across all phases revealed a significant reduction in mean waiting time. From a baseline of 3.5 hours, waiting time decreased to 2.4 hours in phase II and further to 1.6 hours in phase III, representing a 48.57% reduction.
Conclusions: Telephonic triaging and patient counselling prior to scheduled chemotherapy reduced wait times and unnecessary visits, streamlining workflow and improving patient care. This program, requiring only workflow restructuring with existing resources, offers a feasible model for other departments seeking to improve patient care and efficiency.

Keywords: Chemotherapy, Chemotherapy wait time, Phone call, Satisfaction, Healthcare organisation

INTRODUCTION

Cancer is a major health concern worldwide. The Global Cancer Observatory (GLOBOCAN) estimates that there were about 20 million new cancer diagnoses and 9.7 million cancer-related deaths globally in 2022.[1] The incidence of cancer in India is increasing steadily. There were an estimated 1,461,427 new cancer cases in India in 2022, and the number of cancer cases is projected to rise by 12.8% in 2025 compared to 2020.[2]

Challenges with day-care chemotherapy exist in every cancer centre. Chemotherapy is generally administered in ambulatory settings after multiple levels of checks in comprehensive cancer centres to ensure the quality and safety of chemotherapy prescription and administration.[3] Prolonged waiting times for chemotherapy infusion are a

common problem for all cancer types. Long waiting times lead to suboptimal care, increased costs, and dissatisfaction and frustration among patients, bystanders, and healthcare providers.[3] Long waiting times can also impose a financial burden on patients and hospitals since nurses need to work overtime, leading to extra payments. Patient dissatisfaction, in turn, leads to further delays. Long delays in a day-care chemotherapy unit may adversely affect adherence to scheduled appointments.[4-6] Therefore, reducing wait times is a high priority for day-care chemotherapy units.

Several studies have suggested that it is possible to reduce waiting times in day-care chemotherapy units by integrating collaborative efforts from multiple disciplines.[7-10] A comprehensive cancer centre at the Amrita Institute of Medical Sciences and Research Centre in Kochi, India, has a busy day-care chemotherapy unit. The chemotherapy administration unit has 26 chairs and 10 beds available to cater to 40–80 patients per day. We noticed significant delays in the initiation of chemotherapy infusion. To improve the quality of care, we developed a new workflow method to decrease how much time patients who were electively admitted to the day-care chemotherapy unit spent waiting for chemotherapy administration. By doing so, we intended to increase patient satisfaction, medication adherence, process efficiency, and better resource utilisation.

METHODS

This prospective quality improvement project (lean 6-sigma project) was conducted in the Department of Medical Oncology at the Amrita Institute of Medical Sciences, Kochi. Since this is a quality improvement project, ethical committee approval was not required. The DMAIC method provides guidelines for handling complex tasks regarding quality service systems in healthcare organisations for patient satisfaction.[8] The study period was from April to November 2019, and time was considered the main variable.

Inclusion criteria

Patients (≥18 years) with a histopathologically confirmed diagnosis of cancer requiring systemic chemotherapy in the day care chemotherapy centre, and patients who have access to a telephone and are able to communicate effectively via telephone were included.

Exclusion criteria

Patients with cognitive impairment or communication barriers that preclude effective participation in telephonic triage (as determined by the treating physician), patients requiring immediate chemotherapy (e.g. patients with rapidly deteriorating clinical status), and patients participating in clinical trials were excluded.

We measured various time differences from the time of registration to the time when chemotherapy was completed. All data were documented and analysed using statistical package for the social sciences (SPSS) version 22. The findings were reported using the SQUIRE guidelines. This study was divided into three phases.

Defining the problem

We focused on patients scheduled for day-care chemotherapy. Our quality improvement team received many complaints regarding the delays these patients experienced in the day-care infusion unit, which prompted us to conduct the present study.

Measuring the baseline and analysing the situation

Details of each cancer patient's journey, starting with their registration in the outpatient clinic to the chemotherapy infusion and discharge, were charted, and the time taken at each station was extracted from the electronic medical records (Figure 1).

Pre-intervention phase (phase I) (April to May 2019)

We collected pre-intervention data from the hospital's electronic medical records (EMR) and noted the time taken at different stations from our regular workflow from registration to patient discharge from the chemotherapy room. We noted major delays in obtaining laboratory results, conducting pharmacy billing, and reporting to the chemotherapy infusion room. Phase II was initiated based on the results from Phase I.

Implementation of the action plan (phase II) (June to August 2019)

To solve the delay in pharmacy billing, a meeting was conducted with the pharmacy team to identify the difficulties in creating insurance codes for billing. This process usually takes a long time because several stakeholders need to be called. We solved this problem by arranging meetings with pharmacy, billing, and insurance personnel.

Getting laboratory results usually take 90-120 minutes. Improving laboratory delays was beyond the scope of this quality improvement process because it involves a separate workflow. To avoid delay, we asked scheduled patients to obtain relevant blood tests performed at approved laboratories near their residences. Three mobile phones were provided to our physician associates and clinical pharmacists so they could talk to the patients, verify laboratory results, checked the availability of medicines, whether they had insurance or not, assess the patient's health condition, and determine whether they had recovered from the side effects of the previous chemotherapy session on the day before the appointment for chemotherapy. If the patient was deemed fit for chemotherapy, chemotherapy orders were also prepared on

the previous day. This work flow helped us to start first chemotherapy infusion by 8:00 a.m.

During this intervention period, we found a measurable reduction in pharmacy billing time from 61.8 minutes to 40.8 minutes, followed by an additional decrease to 23.4 minutes in phase III. However, we could only check the availability of medicines; we could not initiate the billing and preparation process, as it can be initiated only after the patient has been registered on the day of administration.

Phase III (September to November 2019)

Based on the gap identified in phase I and phase II, we changed a few practices. The infusion time varied according to the chemotherapy regimen. Based on the duration of chemotherapy administration, we modified our appointment system and priority was given to patients having long infusion chemotherapy. We also prioritised vulnerable populations, such as older adults and children. We provided afternoon and evening time slots for short-duration chemotherapy and follow-up appointments with patients from nearby geographic locations. More than 50% of our patients needed to travel three to four hours to reach the hospital.

RESULTS

We evaluated 1029 patients (409 males and 620 females) who underwent day-care chemotherapy. A pre- and post-comparative study was conducted in three phases. The mean age of the population was 57.5±12 years (Table 1).

Table 1: Distribution of population based on gender and age.

Variables	Phase I (no intervention)	Phase II (level 1 intervention)	Phase III (level 2 intervention)
Population (N)	298	385	346
Gender (%)			
Male	118 (39.6)	157 (40.8)	134 (38.7)
Female	180 (60.4)	228 (59.2)	212 (61.3)
Age (in years) (mean/STD)	55.3±12	59.8±12.1	57±17.6

Table 2: Comparison between 3 phases.

Stage	Phase I	Phase II	Phase III	Significance (p value)
Encounter – >consultation	58.2 minutes	51.6 minutes	22.2 minutes	<0.001
Consultation – >pharmacy billing	61.8 minutes	40.8 minutes	23.4 minutes	<0.001
Pharmacy billing – >chemo reporting	50.4 minutes	40.8 minutes	33.6 minutes	<0.001
Chemo reporting – >chemo starting	39.6 minutes	8.4 minutes	15 minutes	<0.001
Total time	210 minutes 3.5 hours	141.6 minutes 2.4 hours	94.2 minutes 1.6 hours	<0.001

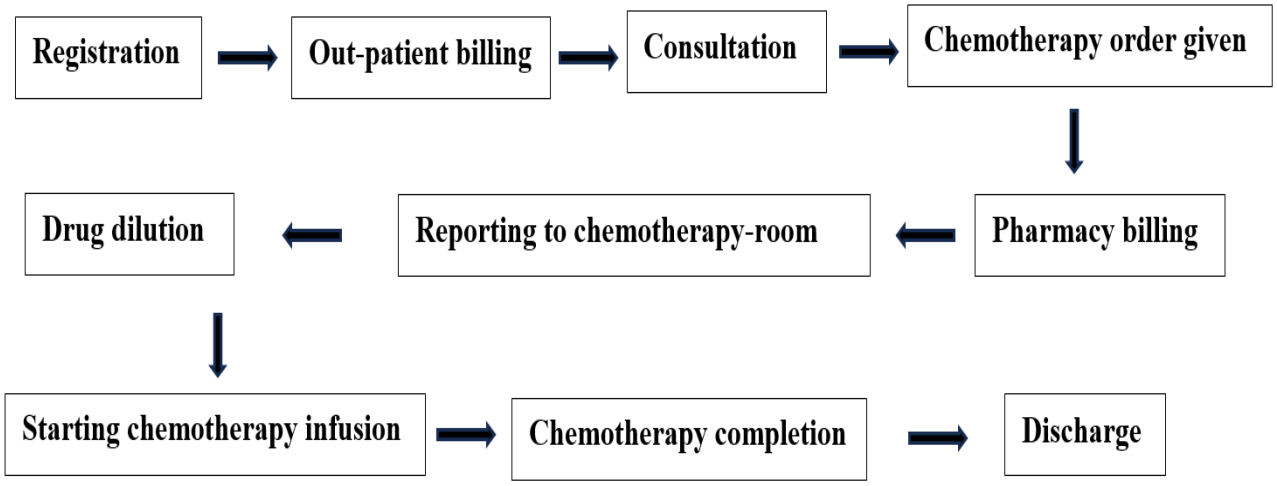

Figure 1: Workflow.

Table 3: Comparison with other studies.

Variables	Present study (2019)	Ahmed et al (2020)	Hashemi-Sadraei et al (2017)	Mahrous et al (2016)	Kallen et al (2010)
Population (N)	1029	200	1355	Not mentioned	1,224
Duration (months)	8	9	9	18	3
Mean reduction in waiting time from baseline (%)	48.57	59.25	43.5	51	29

The patients in phase I included 118 males and 180 females with an age range of 12-55 years. During this phase, the total waiting time from outpatient registration to the start of chemotherapy infusion was 3.5 hours. The longest delays occurred during pharmacy billing.

In phase II, data were collected from 385 patients (157 males and 228 females) aged 12–59 years. We found a significant reduction in pharmacy billing time from 61.8 minutes to 40.8 minutes. The total waiting time was reduced to 2.4 hours.

In phase III (after the implementation of further changes), data were collected from 346 patients (134 males and 212 females) aged between 17 and 57 years. There was no significant reduction in consultation time between Phases II and II, but the intervention reduced waiting times at other stations. Overall, during this period, the mean waiting time was reduced to 1.6 hours (Table 2).

A post hoc test was performed to compare the mean waiting times among the groups. The mean waiting time for the pre-intervention group was 3.5 hours, which was reduced to 2.4 hrs in phase II, which was followed by a significant reduction to 1.6 hours in phase III. The reduction from baseline to phase III was less than 50% but was statistically significant ($p<0.001$).

DISCUSSION

Our quality improvement initiative shows that a pre-planning process that includes effective telephonic triaging and preparation of chemotherapy orders before patient arrival significantly improves chemotherapy infusion waiting time. We reduced the chemotherapy waiting time from 3.5 hours at baseline to 1.6 hours in phase III. This was very similar to the previous studies (Table 3).[3,11-13]

By implementing telephonic triaging with the existing staff, we could reduce overtime utilisation, resulting in revenue savings for the hospital. Phone triaging methods similar to ours were used in two previous studies.[11,12] In a few studies, chemotherapy drugs were also prepared and kept ready before appointment dates (within 24 hours or on the day before the patient's arrival). However, we did not prepare medications on the day before the patient's arrival, as it could have resulted in wastage if the patient did not turn up on the infusion day. Further, our system doesn't allow to order the drugs before the patient's registration in the outpatient clinic.

Different methods have been applied to reduce waiting times in day-care chemotherapy units. Most of them have involved plan–do–study–act (PDSA) cycle or a lean 6-sigma DMAIC methodology.[3,7,8,12-15] In one study, an electronic chemotherapy dispensing system was introduced that prioritised dispensing based on anticipated patient arrival at the oncology outpatient unit.[16] In another study, Marino et al used the advance approval of outpatient chemotherapy via phone calls to shorten chemotherapy wait times.[17]

Similar to our project, previous studies have shown that strong communication helps reduce waiting times.[4,7,9,15] Communicating with patients the day before their appointments can solve many issues. For example, unnecessary visits can be avoided, workflow can be streamlined, and relationships with patients can be improved, making them more comfortable during their future visits. Quality improvement projects similar to ours are rare in developing countries, as care centres in these countries are concerned about providing treatment and managing high workloads.[18]

One notable limitation of this study must be acknowledged. Namely, we were unable to collect patient satisfaction data before and after the study. However, the general feedback from our quality team and nursing staff indicates that fewer complaints than usual was received during this period regarding long waiting times for chemotherapy and pharmacy billing delays.

The strength of our study lies in the accuracy of the time points collected from the hospital's electronic medical record-keeping system; from the point of registration to discharge, the system captures all data in real time. If such data were manually recorded, the notes could be delayed, which could increase the risk of recall bias.

CONCLUSION

Through telephonic triaging and patient counselling, we could reduce waiting times for chemotherapy and avoid unnecessary hospital visits (for patients who are not well or who have low blood counts). This helped to streamline the workflow and improve patient care. This program can be implemented by restructuring the workflow with existing staff and facilities, indicating that, it can be applied in other departments also.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229-63.
2. Sathishkumar K, Chaturvedi M, Das P, Stephen S, Mathur P. Cancer incidence estimates for 2022 and projection for 2025: Result from National Cancer Registry Programme, India. Indian J Med Res. 2022:156(4&5);598-607.
3. Mahrous M, El Shaer E, Rezik L, Taha S, Yosef A. Decreasing prolonged waiting times for chemotherapy administration for patients with cancer. Glob J Quality Safety Healthc. 2018;1(2):44-8.
4. Kallen MA, Terrell JA, Lewis-Patterson P, Hwang JP. Improving wait time for chemotherapy in an outpatient clinic at a comprehensive cancer center. J Oncol Pract. 2012;8(1):e1-7.
5. Lacy NL, Paulman A, Reuter MD, Lovejoy B. Why we don't come: patient perceptions on no-shows. Ann Fam Med. 2004;2(6):541-5.
6. Paterson BL, Charlton P, Richard S. Non-attendance in chronic disease clinics: a matter of non-compliance? J Nurs Health care Chronic Illn. 2010;2(1):63-74.
7. Plourde CL, Varnado WT, Gleaton BJ, Lovejoy B. Reducing infusion clinic wait times using quality improvement. JCO Oncol Pract. 2020;16(8):e807-13.
8. Ahmed S. Integrating DMAIC approach of Lean Six Sigma and theory of constraints toward quality improvement in healthcare. Rev Environ Health. 2019;34(4):427-34.
9. Hendershot E, Murphy C, Doyle S, Van-Clieaf J, Lowry J, Honeyford L. Outpatient chemotherapy administration: decreasing wait times for patients and families. J Pediatr Oncol Nurs. 2005;22(1):31-7.
10. Ahmed Z, Elmekkawy T, Bates S. Developing an efficient scheduling template of a chemotherapy treatment unit: A case study. Australas Med J. 2011;4(10):575-88.
11. Soh TIP, Tan YS, Hairom Z, Ibrahim M, Yao Y, Wong YP, et al. Improving wait times for elective chemotherapy through pre-preparation: A quality-improvement project at the national university cancer institute of Singapore. J Oncol Pract. 2015;11(1):e89-94.
12. Ahmed HA. Improving Wait Time for Patients Receiving Chemotherapy at Johns Hopkins Aramco Healthcare Oncology Center: A Clinical Practice Quality Improvement Initiative. J Cancer Res Therap Oncol. 2020;8:1-8.
13. Hashemi-Sadraei N, Sasankan S, Crozier N, Tawfik B, Kittson R, Abernathy J, et al. Improving outpatient infusion clinic wait times at a Comprehensive Cancer Center. JCO Oncol Pract. 2021;17(12):e1935-42.
14. Macleod A, Campbell F, Macrae D, Gray E, Miller L, Beattie M. Reducing wait time for administration of systemic anticancer treatment (SACT) in a hospital outpatient facility. BMJ Open Qual. 2020;9(4):e000904.
15. Gupta A, Li J, Tawfik B, Pham T, Pham T, Pathak S, Singh P, et al. Reducing wait time between admission and chemotherapy initiation. J Oncol Pract. 2018;14(5):e316-23.
16. Aboumater HJ, Winner LE, Davis RO, Trovitch PB, Berg MM, Violette KM, et al. No time to waste: decreasing patient wait times for chemotherapy administration using automated prioritization in an oncology pharmacy system. Am J Manag Care. 2008;14(5):309-16.
17. Marino P, Touzani R, Seguin L, Moulin JF, Palomares M, Cappiello MA, et al. Advance Approval of Outpatient Chemotherapy via Phone Call Optimizes Healthcare Delivery without Compromising Patient Satisfaction with Care. Cancers (Basel). 2021;13(6):1337.
18. Aziz A, Samoon Z, Khurshid M, Feroz A, Ayoub N, Awan S, et al. Clinical audit to assess delays in chemotherapy administration at daycare oncology center at a tertiary care hospital in Karachi, Pakistan. Indian J Cancer. 2018;55(1):111-4.

Cite this article as: Pavithran K, Surya MS, Bambroo S, Jaymohanan H, Soman S. Reducing chemotherapy waiting times at a comprehensive cancer centre through telephonic triaging. Int J Community Med Public Health 2025;12:1700-4.