Reducing Preoperative Waiting-time in a Pediatric Eye Operation Theater by Optimizing Process Flow: A Pilot Quality Improvement Project

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Received: December 17, 2017; Initial review: January 27, 2018; Accepted: June 12, 2018.

***Objective**:* To decrease the preoperative area waiting-time for children posted for eye surgery.

***Methods**:* A pilot quality improvement project was conducted in a single paediatric eye operation theatre in our tertiary-care hospital. Operation theatre process flow was analyzed, baseline data was collected, and two Plan-Do-Study-Act cycles were performed on consecutive days. Average and maximal waiting-time were recorded across six operation theatre days.

***Results**:* The average and maximal waiting time at baseline were 221 and 390 minutes, respectively. After two rapid Plan-Do-Study-Act cycles, these were reduced to 29 (87% reduction) and 52 minutes (87% reduction) from baseline, respectively, and could subsequently be sustained.

***Conclusion**:* Preoperative waiting time in ophthalmic operation theatre was significantly reduced by simple process flow optimization, thereby improving quality of care.

Keywords: *Healthcare delivery, Plan-do-study-act cycle, Start-time delay.*

Pediatric eye surgeries are performed under general anaesthesia (GA) at our tertiary-care eye hospital, but we noted many children kept waiting for long periods in the preoperative area leading to overcrowding, difficulty in patient coordination, increased risk of infection and prolonged fasting periods for small babies, leading to increased anxiety of the child and parents. Effective operation theatre (OT) planning is must for optimal utilization of treatment facilities [1]. Waiting-time is an important parameter to assess quality of healthcare and patients' satisfaction towards hospital services [2]. The aim of this pilot Quality improvement (QI) project was to reduce waiting time in the GA waiting-area for inpatients by 50% in a four-week period.

METHODS

This pilot project was done in a single eye OT of a single surgical unit (operating twice-a-week) at a tertiary-care eye hospital. A team was formed consisting of a faculty member (team leader), a senior resident (Post-MD), a junior resident (Postgraduate student) and a member of the nursing staff.

The baseline process was studied (***Fig. 1***). The junior resident (JR) called all patients from the ward, and then called the Neonatal Intensive Care Unit (NICU) for arrangement of backup postoperative bed. The patients left the ward and arrived at the OT reception area and were shifted inside to the GA waiting area. If found fit by the anaesthesia team, they were shifted for surgery, else awaited confirmation by the JR, and exited from the OT.

All eight patients posted for surgery were called much before the arrival time of the anaesthesia team *i.e.* 8.30 AM. Two of these patients were cancelled after five hours of waiting. An infected case posted for an intravitreal injection had to wait for over 6 ½ hours. two 'plan do study act (PDSA)' cycles were performed on two consecutive OT days.

1st PDSA cycle – The JR only called the first two patients from the inpatient ward. No calls were made before 8 AM, and only a single JR called so as to avoid confusion. The third patient would be called after the first case exited OT recovery area after surgery. The JR would physically escort cancelled patients out of the OT.

2nd PDSA cycle – The JR only called the first ward patient in the morning. The pre-anaesthetic examination and neonatology clearance was ensured the previous evening. Both these departments were supportive for this change and no resistance was encountered. The NICU team was informed by 8 PM by email. If no one replied, NICU bed was considered available and no calls were made to NICU in morning. The patient was kept ready in the ward in OT clothes, and parents were advised to take the stairs

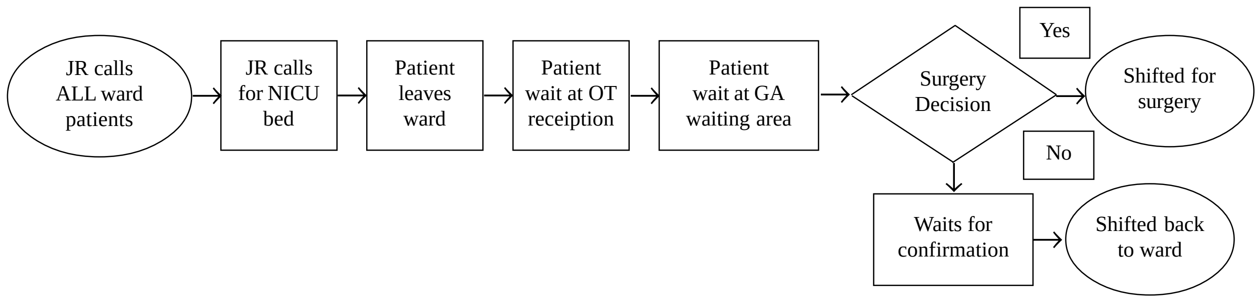

FIG. 1 *Baseline process flow chart depicting patient flow from ward to operation theatre till exit.*

instead of waiting for lift. The JR kept checking the OT reception area and shifted these babies into the GA waiting area quickly. The JR called the second case only after the first case started; in case of bilateral eye surgery, when the second eye surgery started; in case a multipart surgery by different surgeons to be performed, when the last surgeon started the surgery. Surgery was considered started when the surgical eye drape was cut.

Outcome Parameters - The waiting-time was defined as the time from the patient reporting to the OT reception area (outside the OT) to the time when the baby was shifted for surgery into the OT. The 'average waiting-time was defined as the mathematical mean of waiting-time of all babies posted for surgery in that OT. The maximum waiting-time was the maximum time any baby had to wait before being shifted for surgery or out of the OT and was calculated from the record sheet. The data was collected across a total of six OT days to test the sustenance of changes.

RESULTS

The study was performed over six consecutive OT days over three weeks with baseline data being collected on the first day. The number of patients operated on these days were 3, 3, 4, 3, 4, 4, respectively. The Average waiting-time and Maximal waiting-time at baseline were recorded as 221 minutes and 390 minutes, respectively.

The Average waiting-time reduced to 123 minutes (44% reduction) after the first PDSA cycle and further maximally to 29 minutes (87% from baseline) after the second PDSA cycle. Similarly, the Maximum waiting-time reduced to 195 minutes (50% reduction) and further maximally to 52 minutes (87% reduction) after the first and second PDSA cycles, respectively (***Fig. 2***). The changes were sustained over next 3 days. Statistical analysis could not be performed due to small number of data points.

DISCUSSION

The need of effective and organized OT planning for continuous quality improvement has been a concern for hospital management. The communication gap among anaesthesiologists, surgeons and nursing staff is known to be a factor for start time delays and high waiting time in OT [1], and QI methodologies can significantly improve surgical care, from reducing infection to increasing OT efficiency [3].

This pilot QI project highlights the importance of collection of baseline data to detect notable waiting time issues. PDSA is a widely accepted method of quality improvement in healthcare systems [4]. Repeated PDSA cycles lead to better understanding of the process flow issues, with identification of new factors providing better than expected outcome. Rapid PDSA changes across 2 OT days led to quick reduction in waiting times, JR and this led to a less crowded GA waiting area, and more efficient workflow, which can indirectly lead to more cases being operated in the same OT day.

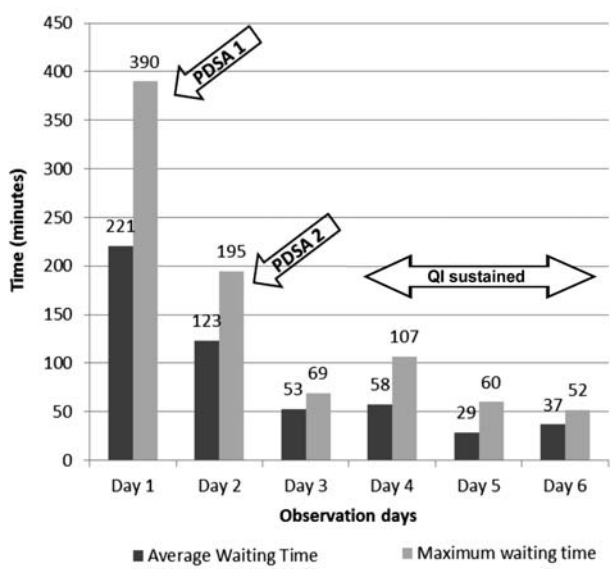

FIG. 2 *Bar chart depicting sustained reduction in average and maximum waiting time following two Plan-Do-Study-Act cycles.*

WHAT THIS STUDY ADDS?

- Small changes in the process flow may lead to significant reduction in waiting-time at no extra cost.

Since it was a pilot project, the waiting time was recorded only for six OT days. This is a limitation of the study and data collection over a longer period of time would have provided better insight into sustenance of quality improvement. These simple tweaks in process flow can be easily scaled and implemented across different operation theatres (not necessarily in eye OTs) to decrease waiting time. This project highlights how a common sense approach to tweak the system process flow can lead to improved patient quality of care at no extra cost.

Acknowledgements: This pilot project was conducted as part of QI training sessions at our center under the guidance of teams from IHI and USAID ASSIST.
Contributors: PC and RT: Conceptualization of research and interpretation of data; DD, YD and DK: Data collection; RT, DD and DK: Manuscript preparation; All authors were involved in critically revising the manuscript and approving the final manuscript. They agree to be accountable for all aspects of this research.
Funding: None; *Competing interests*: None stated.

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